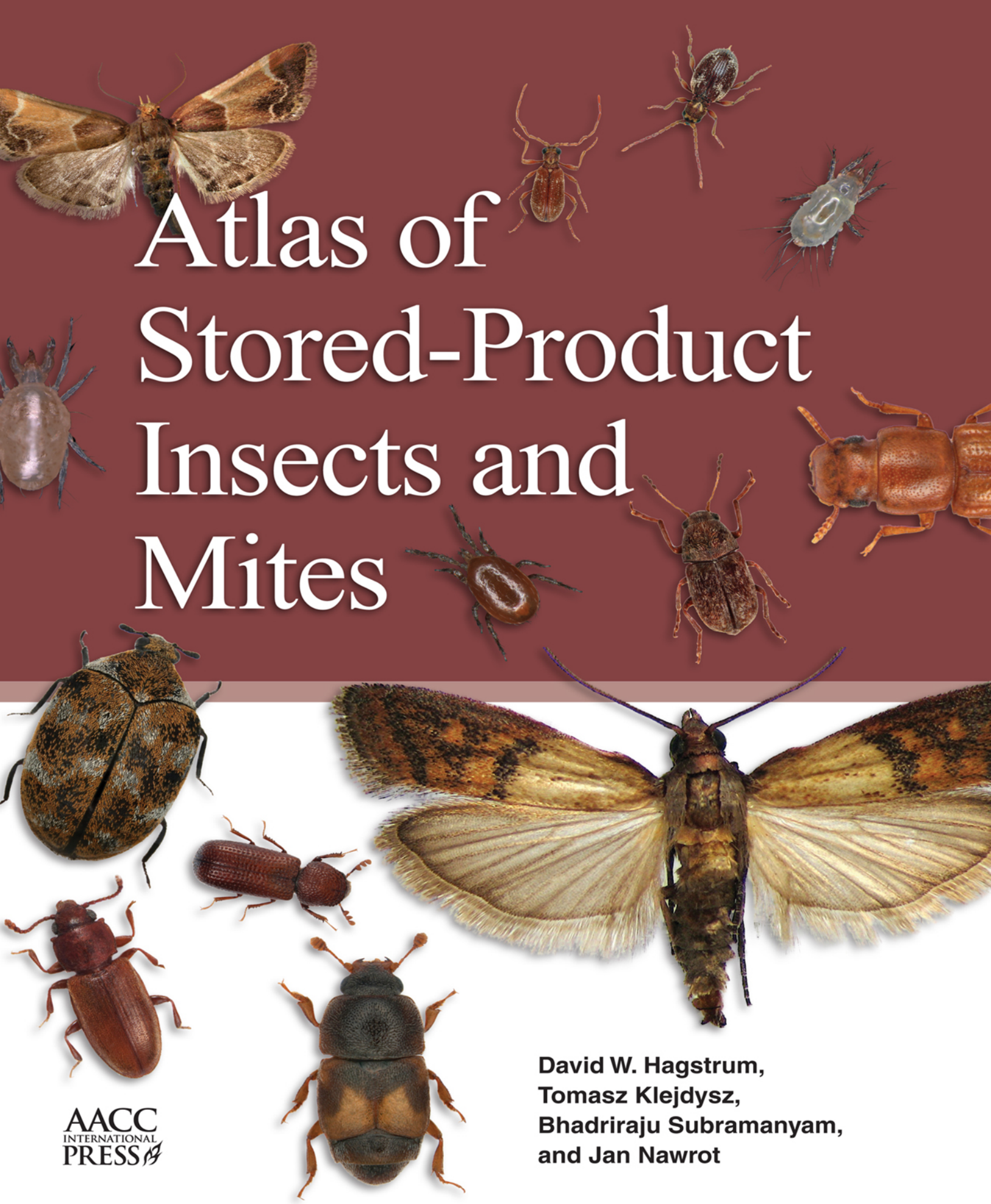
Atlas of Stored-Product Insects and Mites



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All of the photographs are original and were of insect specimens in the collection of the authors or insect specimens borrowed from other collections. The photographs were taken by the second author with the exception of images of the species *Aglossa pinguinalis*, *Cadra cautella*, *Ephestia elutella*, *E. kuehniella*, *Galleria mellonella*, *Hofmannophila pseudospretella*, *Etiella zinckenella,* which were taken by Jarosław Buszko and included with his permission.

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CHAPTER 1

INTRODUCTION

As well as a bound collection of maps, an atlas can be defined as a book of photographs or tables covering any subject. High quality insect photographs in Atlas of Stored-Product Insects and Mites will be useful in making an initial insect identification so that an appropriate taxonomic key can be selected to confirm the identification of an insect species. The book has 7 chapters. Chapter 2 has insect photographs and summary information for each of the 235 insect species that add to the photographs given in Nawrot and Klejdysz (2009) book and the information in Hagstrum and Subramanyam (2009a). The insect species photographed were 235 out of 1663 species that were ranked highest as stored-product insect pests. Chapters 3, 4 and 5 expand upon the summaries in Chapter 2. Chapter 6 provides summary information for 280 species of mites (Acari) reported to be associated with stored products similar to the summary information provided for insects. Chapter 7 discusses tools and information that need to be considered when developing a pest management program for stored-product insect pests and shows where additional information can be found. For a good example of a monitoring-based pest management program developed for stored wheat insect pests see Hagstrum et al. (2010). Popular literature which is infrequently cited in the scientific literature can be more user friendly and provide an industry perspective of pest problems and solutions. For an overview of useful popular literature on stored-product insect pests and their management see Hagstrum and Subramanyam (2009b).

The Atlas will be useful to students, extension personnel, consultants, food industry sanitarians and managers, legislators, regulators, plant quarantine inspectors, stored-product entomologists, urban entomologists, seed technologists and pest management professionals, and will be an essential desk reference for anyone working with stored-product insects or mites. Atlas of Stored-Product Insects and Mites includes more stored-product insect and mite common names, synonyms for stored-product insects and mites scientific names, geographic distribution records and literature citations for life histories studies than other books. The commodities infested by insect species are classified into 28 categories and research on the suitability of commodities as insect food is summarized. Literature references are provided for each record of a commodity infested by an insect species. These literature references may help the readers decide whether a commodity is likely to be a suitable host for a pest species. Atlas of Stored-Product Insects and Mites shows the diversity and geographic distribution of stored-product insect and mite species, and will make solving stored-product pest problems easier by making essential information more readily available.

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Nawrot, J. and T. Klejdysz. 2009. Atlas Owadów Szkodników Żywności. Polskie Stowarzyszenie Pracowników Dezynfekcji, Dezynsekcji i Deratyzacji, Warszawa, Poland. (Atlas of Insect Food Pests.)

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CHAPTER 2

STORED-PRODUCT INSECTS

A full listing of the abbreviations used in Table 2.2 is given in Table 2.1. Photographs of the adults of 235 species stored-product insects and information on these species are included in Table 2.2. For a few of these species, pictures of male and female are included to show the sexual dimorphism. Wingspan is given for most Lepidoptera and body length is given for the other species. Much of the text in Table 2.2 is from Hagstrum and Subramanyam (2009) with some summarization and updating. In addition to English common names, French (F), German (G), Russian (R) and Spanish (S) common names are provided for many species. Common names are reported for 26.8% of the the 235 species of insects.

Table 2.3 shows the countries or islands in each of seven geographical regions for which insect records are reported here (see Hagstrum and Subramanyam 2009 for a list of countries for each species). More countries or islands are included for some regions than for others, i.e., Africa (Af, 61), Asia and Middle East (As, 58), Central America and Caribbean (C, 34), Europe (E, 65), North America and Mexico (N, 3), Oceania (O, 24), South America (SA, 18). The extensive geographical distribution records provided in Löbl and Smetana (2003, 2004, 2007, 2008, 2010) for Coleoptera and Roesler (1973) for Lepidoptera have resulted in disproportionately more records for Europe, North Africa and Asia. Published records are likely to be incomplete and may underestimate a species' geographic distribution. Also, more studies have been done in some countries than in others. Some of the records may be in error, and in other cases, a species may be present only for a limited time and may not become permanently established. Many of the localities with low numbers of species reported are small, sparsely populated islands or small countries. This may be the result of less international trade.

Among geographical regions, the average number of species reported per country was highest for the North American region (132.0) and lowest for South American islands (1.4) (Table 2.3). Records from 158 mainland countries and 106 islands are included. The majority of these records (7710 out of 9262) were from mainland countries. The numbers of species reported for mainland countries were generally two or more times higher than those reported for islands. The number of species reported for Japan, New Zealand and United Kingdom (England, Ireland, Scotland and Wales) were more like those reported for mainland countries than those reported for islands, so these islands were included with the mainland countries. Some records reported species to be present in Indonesia or West Indies, while others reported their presence on individual islands of these island groups, so both kinds of records are included. Also, some records report species to be present in Yugoslavia, while others report their presence in countries into which this country has been divided, so both kinds of records are included.

The species list for nine countries that have reported large numbers of stored-product insect species are compared (Table 2.4). The countries with the largest number of species on each continent were selected because they are likely to be the countries in which stored-product insects have been most thoroughly studied. Egypt and Nigeria represent northern and southern Africa. England and Italy represent different parts of Europe. Twenty three species have been reported for all nine countries, 52 from eight, 82 from seven, 110 from six, 139 from five, 174 from four, 194 from three, 212 from two and 234 from one. *Pharaxonotha kirschii* was not reported in any of the nine countries. The largest number of species has been reported for the USA and these 177 species are 75.6% of the 234 species. Many of the species found in 7 or 8 countries may be present in the other 1or 2 countries, but have not been reported in the literature cited in this book.

In this chapter, only the percentages are given for the commodities in each of 28 categories found to be infested by a species. Commodity suitability information from Table 4.1 and Hagstrum and Subramanyam (2009) is included in Table 2.2. The letters s, m or u in parentheses after each commodity indicates whether a commodity is suitable, marginal or unsuitable for insect development, reproduction and/or population growth. In Table 5.1, the sources of the records for each species-commodity combinations are cited. In some cases, facilities that are commonly infested are reported instead of the commodities infested, so a list of facilities is also reported.

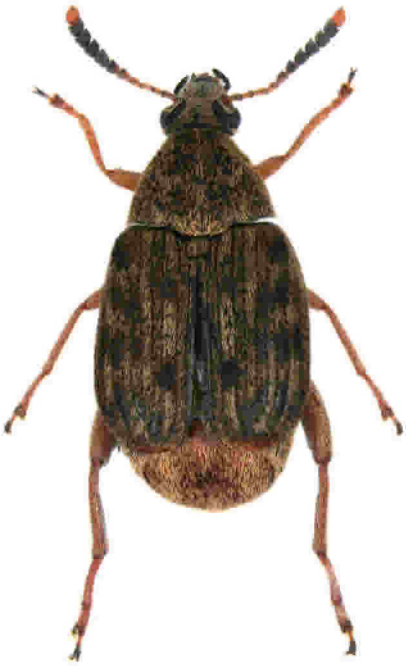
Under the life history heading, references to studies on insect developmental times over a range of temperatures have been included. The relation between life history and environment are important because these determine the rate of population growth. Some of the variation in developmental times is a result of some individuals going through additional instars (Esperk et al. 2007). Many of these studies include immature mortality. Some studies also consider the effects of commodity moisture content and equilibrium humidity. References to additional life history studies on the effect of diet can be found in Chapter 4. Most of the life history studies were done in the laboratory. However, some studies report data collected in the field (*Bruchus pisorum*, *Callosobruchus maculatus*, *Hypothenemus hampei*). Fewer studies are available on adult longevity and egg production. Diapause allows pests to evade pest management and survive during periods when commodity is not stored in a facility. Bell (1994) provides a list of stored-product insect species that diapause. For a few species, the literature on their life histories has been reviewed, i. e., *Corcyra cephalonica* (Hodges 1979), *Ephestia elutella* (Ashworth 1993a), *Hypothenemus hampei* (Damon 2000), *Lasioderma serricorne* (Ashwoth 1993b), *Nacerdes melanura* (Pitman et al. 2003), *Plodia interpunctella* (Mohandass et al. 2007), *Prostephanus truncatus* (Nansen and Meikle 2002), *Rhyzopertha dominica* (Edde 2012) and *Sitophilus* spp. (Longstaff 1981). Life history data are available for only 40% of the 235 stored product insect species considered in this book. The lists of recorded species of natural enemies are from Hagstrum and Subramanyam (2009) and additional information can be found there.

TABLE 2.1 Abbreviations used in the tables and text

Abbreviation	Term	Sub-headings
Af	Africa	Distribution
aninv	animal, invertebrate	Commodities
anv	animal, vertebrate	Commodities
As	Asia and Middle East	Distribution
bc	beverage crops	Commodities
bg	bake goods	Commodities
C	Central America and Caribbean	Distribution
Col.	Coleoptera	Taxonomy
df	dried fruit	Commodities
dfp	dried fruit product	Commodities
E	Europe	Distribution
F	French	Common names
ffv	fresh fruit or vegetable	Commodities
G	German	Common names
g	grain	Commodities
gp	grain product	Commodities
gs	grain spoiled	Commodities
Lep.	Lepidoptera	Taxonomy
m	marginally suitable	Commodities
me	medicine	Commodities
N	North America and Mexico	Distribution
n	nut	Commodities
np	nut product	Commodities
O	Oceania	Distribution
oc	other commodities	Commodities
os	oilseed	Commodities
osp	oilseed product	Commodities
p	pulse	Commodities
pp	pulse product	Commodities
Pso.	Pscoptera	Taxonomy
R	Russian	Common names
r	root	Commodities
res	residual commodities	Commodities
rp	root product	Commodities
SA	South America	Distribution
S	Spanish	Common names
s	suitable	Commodities
se	other seed	Commodities
sea	seasoning	Commodities
sp	spoiled other commodities	Commodities
syn.	synonym	Taxonomy
t	textile	Commodities
u	unsuitable	Commodities
v	vegetable material	Commodities
w	wood	Commodities
wp	wood product	Commodities

TABLE 2.2 Insect species associated with stored products[a]

***Acanthoscelides obtectus* (Say 1831)**



Dimension: 2.2-4.5 mm long

Common names: American seed beetle, bean bruchid (brucho de los porotos (S), bruco del frejol (S), bruquido del frijol (S)), bean weevil (bruche du haricot (F), Зерновка фасолевая (R), gorgojo de las judias (S), gorgojo de los frijoles (S), gorgojo del frijol (S)), common bean weevil, dried bean beetle, bruche coverte (covered weevil (F)), Speisenbohnenkäfer (edible bean weevil (G)), Stammbohnenkäfer (stem bean weevil (G)), gorgojo pintado (painted weevil (S))

Taxonomy: Col., Bruchidae, originally *Bruchus obtectus* and transferred to new genus by Razzauti 1917, also as *Laria obtecta*, *Mylabris obtectus*, syn. *Acanthoscelides obsoletus* (sensu auct.) (non Say 1931). For additional synonyms see Kingsolver 2004 and Löbl and Smetana 2010.

Distribution (7): Cosmopolitan. South American origin. Af 19, As 11, C 5, E 33, N 3, O 5, SA 4

Commodities (25): bc 3.7%, g 3.7%, gp 3.7%, p 81.5% broad bean (s, u), broad bean crushed (u), chickling vetch (s), chickpea (s), common vetch (u), field pea (m), garden pea (s), kidney bean (s), lentil (s), lupine (u), scarlet runner bean (s), soybean (u), tepary bean (s), se 7.4%

Facilities: grocery warehouses, retail groceries, seedmen (seed dealers)

Natural enemies (18): *Anisopteromalus calandrae*, *Bracon vestiticida*, *Chryseida bennetti*, *Dinarmus basalis*, *Eupelmus cushmani*, *Eupelmus cyaniceps*, *Eupelmus vesicularis*, *Eurytoma bruchophaga*, *Heterospilus prosopidis*, *Horismenus depressus*, *Pteromalus cerealellae*, *Stenocorse bruchivora*, *Theocolax elegans*, *Torymus atheatus*, *Triaspis thoracica*, *Trichogramma evanescens*, *Uscana semifumipennis*, *Uscana senex*

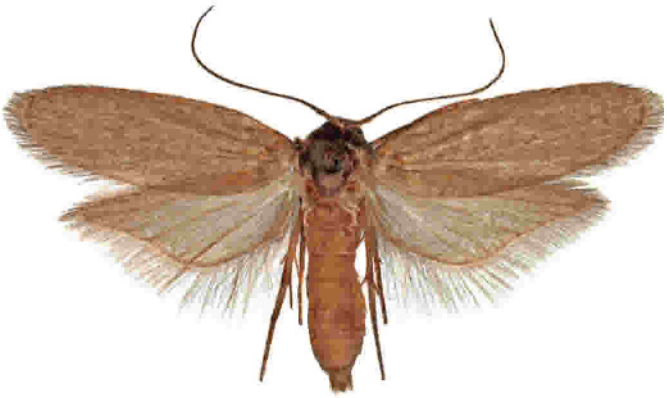
Life history: Howe and Currie 1964, Menusan 1934

(*continued on next page*)

[a] The order of insect and mite common names is English common names in alphabetical order followed by non-English common names in alphabetical order. The non-English equivalents of English common names used in the literature or English translations of non-English common names are given in parentheses. Common name language abbreviation from Table 2.1 is in parentheses after each insect common name that is not in English. Number of geographic regions out of the 7 in which an insect species has been reported is in parentheses after **Distribution**, number of commodities with which an insect species has been reported in Table 5.1 is in parentheses after **Commodities** and number of natural enemies reported for an insect species is in parentheses after **Natural Enemies.** Under **Distribution** in Table 2.2, the number of countries in which an insect species has been reported follows the geographic distribution abbreviation from Table 2.1. Under **Commodities** in Table 2.2, after each commodity category abbreviation from Table 2.1, the percentage of commodities with which an insect species has been reported in that category in Table 5.1 is given. Also, commodity suitability data from Table 4.1 and Hagstrum and Subramanyam (2009) are given under **Commodities**.

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Achroia grisella (Fabricius 1794)



Dimension: up to 21 mm wingspan

Common names: honey moth, lesser bee moth, lesser waxmoth, Fausse-teigne des ruches (beehive moth (F)), Petite teigne des ruches (small moth of hives (F)), Огнёвка пчелинная малая (small moth of hives (R)), Wachsmotte kleine (small wax moth (G))

Taxonomy: Lep., Pyralidae. For synonyms see Corbet and Tams 1943.

Distribution (5): Probably of European origin. Af 4, As 2, E 8, N 1, O 1

Commodities (8): aninv 37.5%, df 37.5%, g 12.5%, v 12.5%

Natural enemies (4): *Antrocephalus galleriae*, *Apanteles galleriae*, *Dibrachys boarmiae*, *Venturia canescens* (lab)

Life history: Uçkan et al. 2007

Aglossa dimidiata (Haworth 1809)

Dimension: 20-32 mm wingspan

Common names: black rice worm, tea tabby

Taxonomy: Lep., Pyralidae

Distribution (6): Cosmopolitan. Af 2, As 2, E 2, N 1, O 2, SA

Commodities (7): aninv 14.3%, bc 14.3%, g 28.6%, me 28.6%, v 14.3%

Facilities: feed mills, flour mills, tea warehouses

Natural enemies (1): *Peregrinator biannulipes*

Aglossa pinguinalis (Linnaeus 1758)

Dimension: 26-39 mm wingspan

Common names: grease moth (Pyrale de la graisse (F)), Italian moth of fat and lard, large tabby moth, Fettzünsler (grease pyralid moth (G)), Огнёвка домовая (house pyralid moth (R)), Schmalzzünsler (lard pyralid moth (G)), Teigne de la graisse (moth of the grease (F)), Огнёвка безхоботная домовая (snoutless pyralid moth (R))

Taxonomy: Lep., Pyralidae. For synonyms see Corbet and Tams 1943.

Distribution (4): Eurasian origin. Af 4, As 8, E 5, O 2

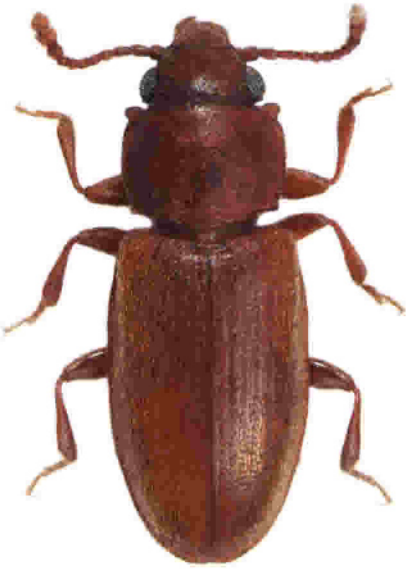
Commodities (10): anv 30.0%, g 30.0%, gp 10.0%, oc 10.0%, res 10.0%, se 10.0%

Natural enemies (1): *Stomatoceras pomonellae*

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Ahasverus advena (Waltl 1834)



Dimension: 2-2.3 mm long

Common names: foreign grain beetle (cucujide des grains (F), carcoma extranjera de los granos (S), gorgojo chico extranjero (S), gorgojo extranjero del grano (S)), tropischer Schimmel-Plattkäfer (tropical mold beetle (G))

Taxonomy: Col., Silvanidae, originally *Cryptophagus advena* 1832. For synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. American, Ethiopian or Oriental origin. Af 19, As 16, C 9, E 26, N 3, O 8, SA 7

Commodities (138): aniv 2.2% dried insect (u), anv 2.2%, bc 4.1% cocoa (u), bg 1.4%, df 4.3%, ffv 8.0%, g 6.5% wheat (u), gp 6.5% kibbled wheat (s), rolled oat (u), wheat flour (u), wheat germ (s), gs 0.7%, me 3.6%, n 3.6%, np 0.7%, oc 5.0%, os 6.0% copra (u), palm kernel (u), peanut (u), osp 5.1%, p 5.1%, pp 0.7% soybean meal (s), r 6.5%, rp 2.9%, se 3.6%, sea 7.2%, v 13.8%

Facilities: barley mills, cocoa storages, currant raisin storages, empty cargo containers, farm grain bins, farm storages of rice, feedmills, flat grain storages, flour mills, grain elevators, peanut shelling plants, peanut warehouses, pet stores, railroad cars, semolina mills, sultana raisin storages

Life history: David and Mills 1975, Jacob 1996

Alphitobius diaperinus (Panzer 1797)

Dimension: 5-5.6 mm long

Common names: lesser mealworm (petit ténébrion (F), petit tenebrion mat (F), gusano menor de las harinas (S)), litter beetle, grain mold beetle, glänzender Getreideschimmelkäfer (brilliant grain mold beetle (G), Хрущак смоляно-бурый (pitch-brown mealworm (R)), escarabajo negro chico de los granos (small black grain beetle (S)), petit ténébrion brillant (small shiny darkling beetle (F)), Хрущак вонючий (smelly mealworm (R))

Taxonomy: Col., Tenebrionidae, originally *Tenebrio diaperinus* Panzer and transferred to new genus by Wollaston 1854, syn. *Alphitobius ovatus* Herbst 1799, *Alphitobius piceus* sensu auct. partum not (Olivier). For additional synonyms see Löbl and Smetana 2008.

Distribution (7): Cosmopolitan. Af 17, As 30, C 5, E 26, N 3, O 9, SA 4

Commodities (89): aninv 1.1%, anv 6.7%, bc 4.5%, bg 2.2%, g 10.1% barley (m), barley flour (s), maize (u), maize flour (s), rice (m), rice flour (s), wheat (s), wheat broken (s), wheat flour (s), wheat ground (s), gp 12.4%, gs 3.4%, me 2.2%, n 2.2%, oc 3.4%, os 10.1% peanut (u), osp 12.4%, p 5.6% black gram (m), cowpea (s), pp 2.2%, r 4.5%, rp 1.1%, se 3.4% sea 3.4%, v 9.0%

Facilities: bakeries, barley mills, botanical warehouse, currant raisin storages, empty cargo containers, empty farm grain bins, farm storages of rice, feedmills, flour mills, grain bins, grain elevators, grocery warehouses, henhouses, peanut shelling plants, peanut warehouses, poultry houses, residences, stables, sultana raisin storages

Natural enemies (4): *Amphibolus venator*, *Peregrinator biannulipes*, *Somotrichus unifasciatus*, *Theocolax elegans*

Life history: Preiss and Davidson 1971, Rueda and Axtell 1996, Wilson and Miner 1969

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Alphitobius laevigatus (Fabricius 1781)

Dimension: 4.5-5 mm long

Common names: black fungus beetle (ténébrion des champignons (F)), schwarzer Getreideschimmelkäfer (black mold beetle (G)), strumpfschwarzer Getreideschimmelkäfer (black stockings grain mold beetle (G)), glänzendschwarzer Getreideschimmelkäfer (glossy black grain mold beetle (G), petit ténébrion mat (lesser mealworm (F)), Хрущак подстилочный смоляно-бурый (litter pitch-brown mealworm (R)), petit tenebrion brilliant (shiny lesser mealworm (F))

Taxonomy: Col., Tenebrionidae, originally *Opatrum laevigatum* and transferred to new genus by Blair 1914, syn. *Alphitobius piceus* (Olivier 1792), *Helops piceus* Olivier 1792. For additional synonyms see Löbl and Smetana 2008.

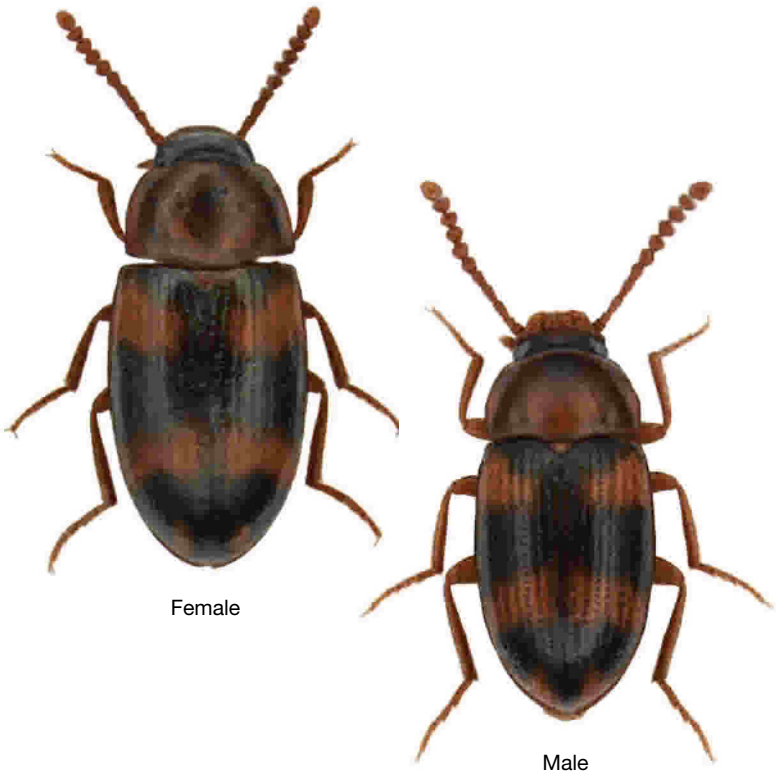
Distribution (7): Cosmopolitan. Tropical origin. Af 9, As 20, C 1, E 16, N 2, O 8, SA 4

Commodities (62): anv 8.1%, bc 8.1%, bg 1.6%, df 1.6%, ffv 1.6%, g 11.3%, gp 9.7%, gs 3.3%, me 1.6%, n 4.8%, oc 1.6%, os 11.3%, osp 12.9%, p 3.2%, r 6.5%, se 3.2%, sea 3.2%, v 6.4%

Facilities: currant raisin storages, empty cargo containers, grain storages, peanut shelling plants, peanut warehouses, sultana factories, sultana raisin storages

Natural enemies (2): *Peregrinator biannulipes*, *Somotrichus unifasciatus*

Alphitophagus bifasciatus (Say 1823)



Dimension: 2.5-3 mm long

Common names: two-banded fungus beetle (zweibindiger Pilzschwarzkäfer (G), Жук двухполосый грибной (R)), waste grain beetle (gebänderte Pilzschwarzkäfer (G))

Taxonomy: Col., Tenebrionidae, originally *Diaperis bifasciatua* and transferred to new genus by Horn 1870. For synonyms see Löbl and Smetana 2008.

Distribution (6): Cosmopolitan. Mediterranean origin. Af 4, As 7, E 4, N 3, O 1, SA 1

Commodities (26): anv 7.7%, g 26.9%, gp 11.5%, gs 11.5%, oc 3.9%, os 11.5%, osp 7.7%, p 7.7%, sp 7.7%, v 3.9%

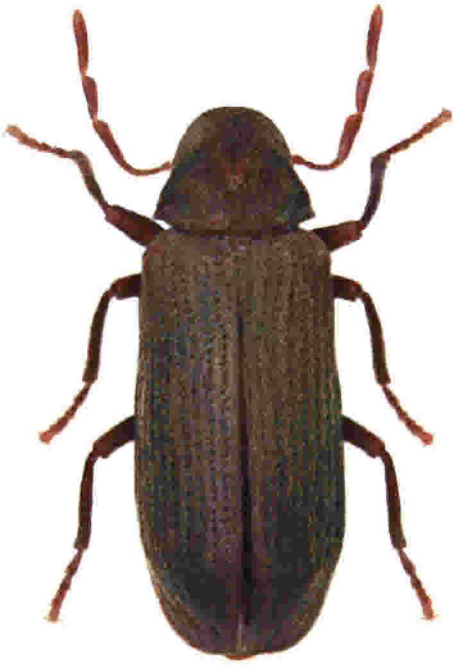
Facilities: cellars, empty grain bins, feedmills, feed stores, flour mills, grain bins, grain elevators, growing floor at maltings, peanut shelling plants, peanut warehouses, pet stores, rabbit cages, residences

Natural enemies (1): *Peregrinator biannulipes*

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Anobium punctatum (DeGeer 1774)



Dimension: 3-4 mm long

Common names: bookworm, common European house borer, common furniture beetle, European furniture beetle, furniture beetle (Trotzkäfer (G)), household borer, woodworm, Brettenbohrer (board drill (G)), Vrilette commune (common beetle (F)), gemeiner Totenuhr (common death's clock (G)), gemeiner Pochkäfer (common knock beetle (G)), Totenuhr (death clock (G)), Vrilette domestique (domestic beetle (F)), anobie ponctué (dotted anobie (F)), Точильщик мебельный (furniture grinder (R)), gestreifter Werkholkäfer (wood product hairy beetle (G))

Taxonomy: Col., Anobiidae, originally *Ptinus punctatum*, syn. *Anobium striatum* Olivier 1790. For additional synonyms see Löbel and Smetana 2007

Distribution (5): Af 7, As 4, E 32, N 2, O 1

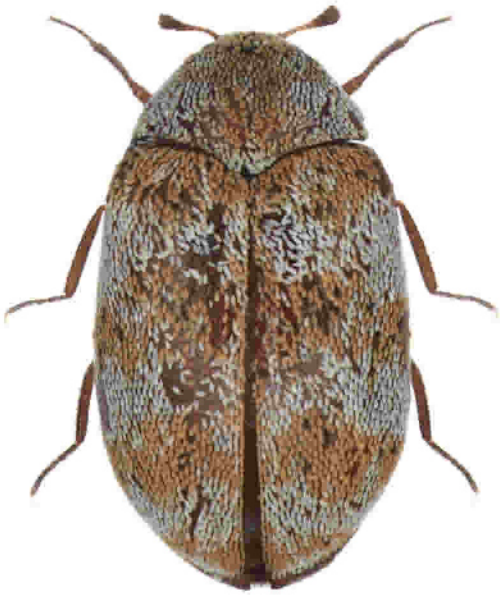
Commodities (5): oc 20%, r 20%, se 20%, w 40%

Facilities: barley storages, empty cargo containers, granaries, growing floors at maltings, malt storages, warehouses

Natural enemies (14): *Calosota vernalis*, *Cerocephala rufa*, *Demophorus robustus*, *Doryctes leucogaster*, *Entedon longiventris*, *Gelis cinctus*, *Habritys brevicornis*, *Hypsicera curvator*, *Pimpla flavicoxis*, *Plutothrix coelius*, *Sclerodermus domesticus*, *Spathius exarator*, *Spathius pedestris*, *Theocolax formiciformis*

Life history: French 1971

Anthrenus coloratus Reitter 1881



Dimension: 1.8-2 mm long

Taxonomy: Col., Dermestidae

Distribution (5): Af 10, As 16, E 10, N 1, SA 1

Commodities (7): aninv 14.3%, anv 57.1%, r 14.3%, se 14.3%

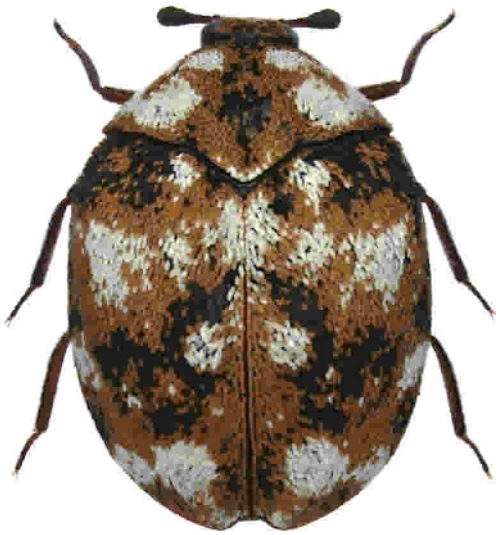
Facilities: residences, tobacco warehouses

Life history: Ali 1997

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Anthrenus flavipes LeConte 1854



Dimension: 2-3.5 mm long

Common name: furniture carpet beetle

Taxonomy: Col., Dermestidae, syn. *Anthrenus fasciatus* Reitter 1881, *Anthrenus immportatus* Pic 1952, *Anthrenus vorax* Waterhouse 1883. For additional synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Oriental Region origin.Af 3, As 15, C 1, E 10, N 2, O 1

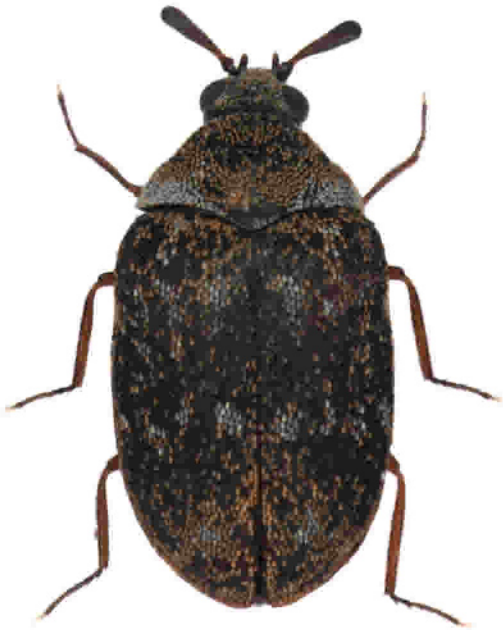
Commodities (39): aninv 10.3% silk cloth (u), anv 43.6% hog bristle (s), woolen (s), ffv 2.6%, g 7.7%, gp 2.6%, oc 10.3%, osp 2.6%, se 2.6%, t 12.8% cotton cloth (u), v 2.6%, w 2.6%

Facilities: residences

Natural enemies (3): *Laelius pedatus*, *Laelius utilis*, *Laelius voracis*

Life history: Griswold 1941

Anthrenus fuscus A. G. Olivier 1790



Dimension: 2-3.4 mm long

Taxonomy: Col., Dermestidae, syn. *Anthrenus claviger* Erichson 1846

Distribution (4): Af 2, As 3, E 28, N 2

Commodities (1): aninv 100%

Facilities: cocoa and spice warehouses, feedmills, flour mills, residences

Natural enemies (2): *Laelius pedatus*, *Laelius utilis*

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Anthrenus nipponensis Kalik and N. Ohbayashi 1985

Dimension: 2.3-4.1 mm long

Taxonomy: Col., Dermestidae

Distribution (1): As 4

Commodities (5): aninv 20%, anv 60%, g 20.0%

Anthrenus pimpinellae (Fabricius 1775)

Dimension: 2-4.5 mm long

Common names: Кожеед бедренцовый цветочный (anise flower carpet beetle (R)), Vogelnestkäfer (birdnest beetle (G)), Birbernelle-Blütenkäfer (burnet flower beetle (G)), Pimpinellenager (burnet rodent (G)), mittlerer Blüten-Speckkäfer (medium flour bacon beetle (G))

Taxonomy: Col., Dermestidae, originally *Byrrus pimpinellae*. For synonyms see Löbl and Smetana 2007.

Distribution (5): Cosmopolitan. Af 2, As 12, E 35, N 2, O 1

Commodities (8): aninv 25%, anv 37.5%, oc 37.5%

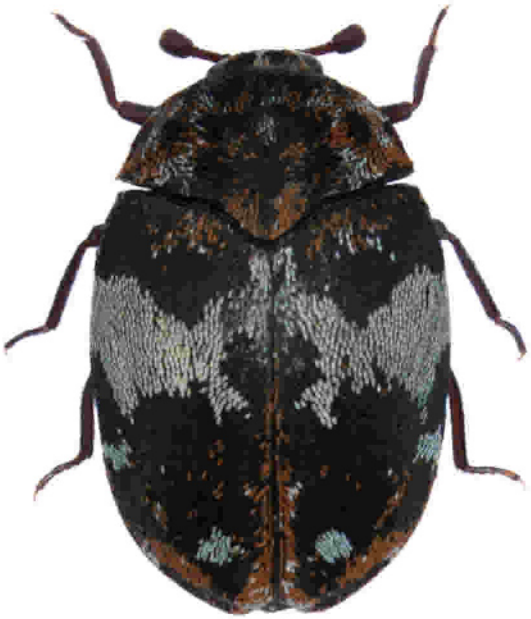


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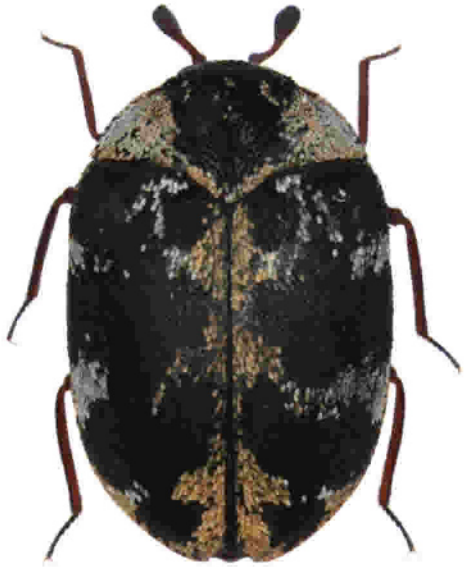
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Anthrenus scrophulariae (Linnaeus 1758)



Dimension: 2-3.8 mm long

Common names: buffalo carpet beetle (anthrène de la crophulaire (F)), buffalo moth, carpet beetle (anthrène des tapis (F)), common carpet beetle (gemeiner Teppichkäfer (G), Кожеед обыкновенный ковровый (R)), old-fashioned carpet beetle, Rongeur des tapis (carpet rodent (F)), Кожеед норичниковый (figwort carpet beetle (R)), großer Blüten-Speckkäfer (larger flour bacon beetle (G))

Taxonomy: Col., Dermestidae. For synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Eurasian origin. Af 2, As 8, E 35, N 2, O 2, SA 1

Commodities (25): aninv 8.0%, anv 32.0%, g 12.0%, gp 12.0%, oc 16.0%, se 4.0%, t 8.0%, v 8.0%

Facilities: feedmills, pet stores

Anthrenus verbasci (Linnaeus 1767)

Dimension: 1.7-3.5 mm long

Common names: small cabinet beetle, varied carpet beetle (veränderlicher Teppichkäfer (G)), variegated carpet beetle (anthrène bigarré des tapis (F), Anthrène à bandes (banded beetle (F)), Anthrène du bouillon (broth beetle (F)), Wollkrautblütenkäfer (mullein flower beetle (G)), Кожеед коровяковый (mullein flower beetle (R)), Кожеед коллекционный (museum beetle (R)), gorgojo pintado de las alfombras (painted carpet beetle (S)), gefleckter Teppichkäfer (spotted carpet beetle (G))

Taxonomy: Col., Dermestidae, originally *Byrrhus verbasci* and transferred to new genus by Olivier 1790. For synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Af 7, As 8, E 15, N 2, 3, SA 2

Commodities (79): aninv 6.3%, anv 22.8%, bc 1.3%, bg 2.5%, df 2.5%,g 11.4 %, gp 10.1 %, gs 1.3%, me 3.8%, n 2.5%, np 1.3%, oc 6.3%, os 2.5%, osp 2.5%, p 2.5%, pp 1.3%, r 1.3%, se 5.1%, sea 5.1%, t 5.1%, v 1.3%, wp 1.3%

Facilities: barley mills, cocoa and spice warehouses, currant storages, feedmills, flour mills, grain elevators, peanut shelling plants, peanut warehouses, pet stores, residences, seedmen (seed dealers), silk industry, sultana storages

Natural enemies (5): *Allepyris microneurus*, *Laelius anthrenivorus*, *Laelius pedatus*, *Laelius utilis*, *Laelius yamatonis*

Life history: Blake 1958, 1961; Griswold 1941

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Araecerus fasciculatus (DeGeer 1775)

Dimension: 2-5 mm long

Common names: areca nut weevil, cocao weevil (Долгоносик какаовый (R)), coffee bean weevil (Kaffeebohnenkäfer (G)), coffee berry borer, nutmeg weevil, tephrosia beetle, Bruche des grains de café (coffee seed bruchid (F)), gorgojo del café (coffee weevil (S)), fausse bruche du café (false coffee weevil (F))

Taxonomy: Col., Anthribidae, restored name to *Araecerus coffeae* (Fabricius 1801) (Zimmerman 1994), but restoration judged to be unacceptable (Valentine 2005), syn. *Araeocerus seminaries* Chevrolat 1871

Distribution (7): Af 9, As 14, C 2, E 1, N 3, O 7, SA 4

Commodities (73): bc 6.9% coffee bean (s), bg 1.4%, df 6.8%, ffv 4.1%, g 5.5% maize (s), gp 1.4%, me 5.5%, n 8.2%, oc 1.4%, os 9.6%, osp 4.1%, p 9.6%, r 11.0% ginseng (s), yam (s), rp 2.7%, se 4.1%, sea 8.2%, t 1.4%, v 8.2%

Facilities: chocolate plants, farm grain bins, local yam markets, peanut shelling plants, peanut warehouses

Natural enemies (12): *Anisopteromalus calandrae*, *Apanteles araeceri*, *Cephalonomia gallicola*, *Cleonymus texanus*, *Epitranus inops*, *Eupelmus cushmani*, *Eupelmus javae*, *Eurytoma tylodermatis*, *Goniozus emigratus*, *Philolema javensis*, *Philolema tephrosiae*, *Plastanoxus westwoodi*

Life history: Ali et al 2011, Patel and Chari 1977

Atomaria lewisi Reitter 1877

Dimension: 1.4-2 mm long

Taxonomy: Col., Cryptophagidae, syn. *Atomaria herbigrada* Reitter 1896, *Atomaria psallioticola* Hinton 1941

Distribution (6): Cosmopolitan. Af 1, As 15, E 26, N 1, O 1, SA 1

Commodities (2): g 50%, me 50%

Facilities: rabbit farms

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Attagenus bifasciatus (A. G. Olivier 1790)

Dimension: 3.3-4.5 mm long

Taxonomy: Col., Dermestidae, originally *Dermestes bifasciatus*. For synonyms see Löbl and Smetana 2007.

Commodities:

Distribution (3): Af 5, As 9, E 13

Facilities: shops, residences

Female

Male

Attagenus fasciatus (Thunberg 1795)

Dimension: 4.3-5.9 mm long

Common names: tobacco seed beetle, wardrobe beetle

Taxonomy: Col., Dermestidae, originally *Anthrenus fasciatus* and transferred to new genus by Dejean 1837, syn. *Attagenus annulifer* Laporte 1840, *Attagenus gloriosae* (-*us*) (Fabricius 1798), *Attagenus gossypianus* Fauvel 1903. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 10, As 23, C 2, E 9, N 1, O 1, SA 2

Commodities (45): aninv 8.9%, anv 22.1% dried milk (s), bc 13.3%, g 13.3%, gp 8.9%, gs 2.2%, me 4.4%, oc 4.4%, os 6.7%, osp 2.2%, p 6.7%, pp 2.2%, se 0% tobacco seed (s), sea 2.2%, t 2.2%

Facilities: feedmills, feed stores, food stores, residences, tobacco warehouses

Natural enemies (1): *Creophilus maxillosus*

Life history: Ali et al. 2011, Patel and Chari 1977

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Attagenus lobatus Rosenhauer 1856

Dimension: 2.8-4.5 mm long

Taxonomy: Col., Dermestidae, syn. *Attagenus byturoides* Solsky 1876

Distribution (4): Af 4, As 12, E 7, N 1

Commodities (2): anv 50%, g 50%

Facilities: granaries

Attagenus pantherinus (Ahrens 1814)

Dimension: 4.5-5.5 mm long

Taxonomy: Col., Dermestidae), originally *Dermestes pantherinus* Ahrens.

Distribution (2): As 1, E 12

Commodities (3): anv 100%

Facilities: nests of hymenopterous species from genus *Bombus, Osmia, Anthophora,* sometimes in flats and offices

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Attagenus pellio (Linnaeus 1758)

Dimension: 3.5-6 mm long

Common names: dotted carpet beetle, felt beetle, fur beetle, two-spotted carpet beetle, gemeiner Pelzkäfer (common fur beetle (G)), Кожеед меховой (fur carpet beetle (R)), Кожеед шубный (skin coat carpet beetle (R)), gefleckter Pelzkäfer (spotted fur beetle (G)), Attagène Pelletier (tanner beetle (F))

Taxonomy: Col., Dermestidae, originally *Dermestes pellio*. For synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Af 8, As 25, E 44, N 1, O 1, SA 1

Commodities (31): aninv 9.7%, anv 25.8%, g 12.9%, gp 19.3% soybean meal (u), oc 9.7%, os 3.2%, osp 6.5%, res 3.2%, t 3.2%, v 6.5%

Facilities: barley storages, clothing stores, feedmills, granaries, malt storages at maltings, mills, residences, seed storages, stables, warehouses

Attagenus smirnovi Zhantiev 1973

Dimension: 2.3-4.0 mm long

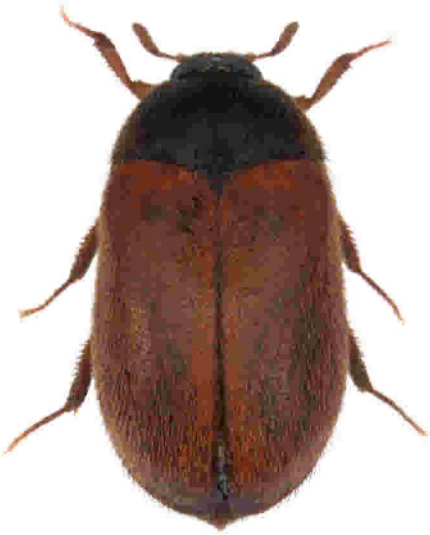
Common name: Smirnoff vodka beetle

Taxonomy: Col., Dermestidae

Distribution (4): Kenyan origin. Af 5, As 2, E 17, O 1

Commodities (8): aninv 12.5%, anv 50%, bc 12.5%, gp 12.5%, oc 12.5%

Facilities: farm grain stores, museums, nursing homes, residences, warehouses



Female

Male

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Attagenus unicolor (Brahm 1791)

Dimension: 2.5-5.5 mm long

Common names: black carpet beetle (attagène des tapis (F), gorgojo negro de las alfombras (S)), pitchy carpet beetle, brauner Pelzkäfer (brown fur beetle (G)), clavicorne (F), dunkel Pelzkäfer (dark fur beetle (G))

Taxonomy: Col., Dermestidae, originally *Dermestes unicolor* and moved to a new genus by Mroczkowski 1968, syn. *Dermestes piceus* A. G. Olivier 1790, *Dermestes megatoma* Fabricius 1798, *Megatoma brevicornis* Herbst 1792. For additional synonyms see Löbl and Smetana 2007.

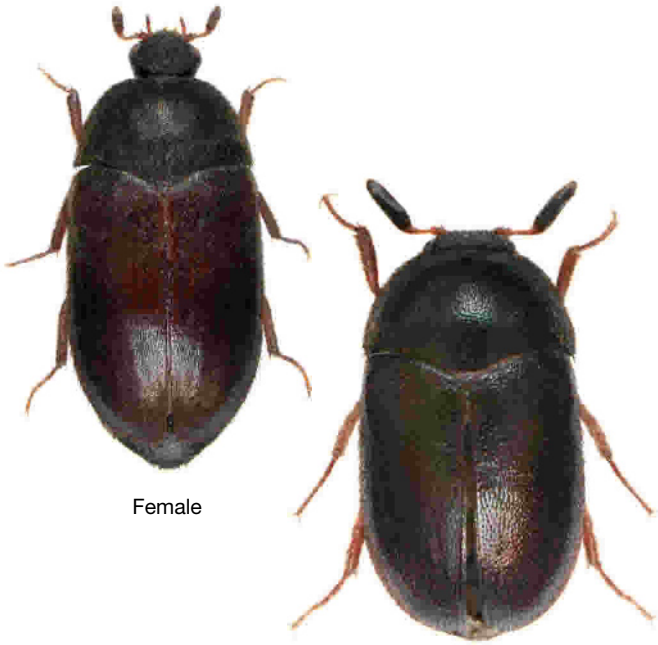
Distribution (6): Cosmopolitan. Oriental region origin. Af 4, As 12, E 44, N 2, O 2, SA 1

Commodities (97): aninv 5.1%, anv 21.7%, bc 1.0%, bg 2.1%, df 1.0%, g 7.2%, gp 10.3%, me 2.1%, n 1.0%, np 2.1%, oc 6.2%, os 4.1%, osp 7.2%, p 6.2%, pp 1.0%, res 1.0%, se 9.3%, sea 4.1%, t 5.1%, v 2.1%

Facilities: bakeries, barley mills, dried milk factories, feedmills, flat storages of grain, flour mills, grain elevators, granaries, knitting factories, peanut shelling plants, peanut warehouses, railroad cars, residences, shops, warehouses

Natural enemies (2): *Peregrinator biannulipes*, *Xylocoris flavipes*

Life history: Baker 1977, 1983; Griswold 1941, Howe 1952, Kiritani and Kawahara 1963



Blaps japonensis Marseul 1879

Dimension: 20-27 mm long

Taxonomy: Col., Tenebrionidae

Distribution (1): As 4

Commodities (2): g 50%, gs 50%

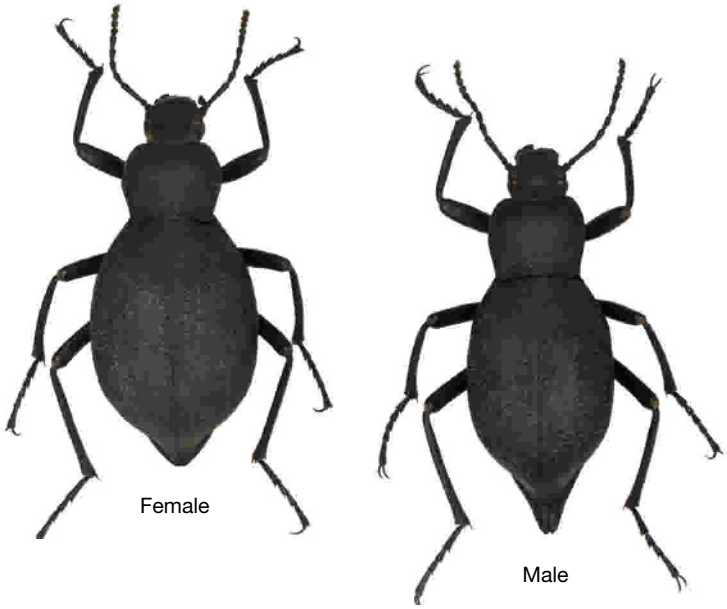


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Blaps lethifera Marsham 1802

Dimension: 16-28 mm long

Common names: Медляк широкогрудый (broad breast beetle (R)), breiter Totenkäfer (broad death beetle (G))

Taxonomy: Col., Tenebrionidae. For synonyms see Löbl and Smetana 2008.

Distribution (3): Af 3, As 7, E 34

Commodities (1): sp 100%

Facilities: barns, cellars, cowsheds, granaries, stables

Female

Male

Blaps mortisaga Linnaeus 1758

Dimension: 20-28 mm long

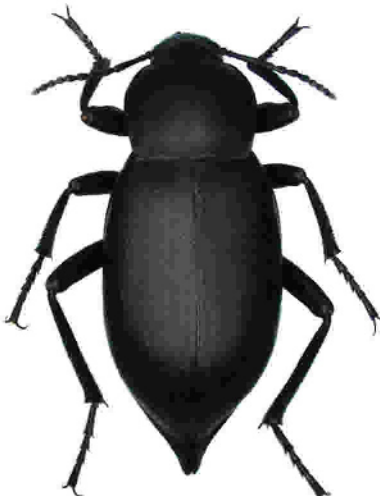
Common names: cellar beetle, churchyard beetle, gemeiner Totenkäfer (common death beetle (G)), Медляк смертоносный (common death beetle (R)), gemeiner Trauerkäfer (common grief beetle (G)), Schattenkäfer (Egyptian beetle (G)), Totentrauerkäfer (funeral death beetle (G)), Медляк вещатель (leisurely prophet (R)), Présage-mort (omen death (F)) Scarabée puant (stink beetle (F)), Вонючка (stinker (R))

Taxonomy: Col., Tenebrionidae), originally *Tenebrio mortisaga*. For synonyms see Löbl and Smetana 2008.

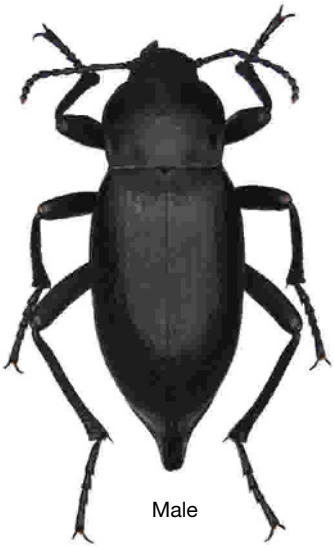
Distribution (2): As 4, E 31

Facilities: bakeries, cellars, granaries, kitchens, malt storages, stables

Commodities (1): g 100%



Female



Male

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Bostrychoplites cornutus (A. G. Olivier 1790)

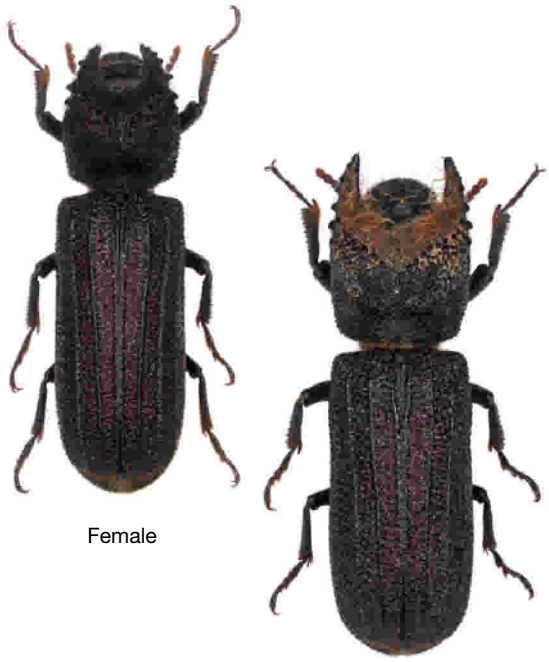
Dimension: 7-18 mm long

Common names: African horned wood borer, false powder post beetle

Taxonomy: Col., Bostrichidae, originally *Bostrichus cornutus*, syn. *Bostrichus abyssinicus* Murray 1867, *Bostrichus destructor* Burchell 1822

Distribution (4): Af 7, As 3, E 8, N

Commodities (8): r 25%, rp 12.5%, v 12.5%, w 50.0%



Bruchidius atrolineatus (Pic 1921)

Dimension: 2.3-3 mm long

Common name: bruche africaine du niébé (African cowpea weevil (F))

Taxonomy: Col., Bruchidae, originally *Bruchus* (*Callosobruchus*) *atrolineatus* and transferred to new genus by Decelle 1977, syn. *Bruchus semiflabellatus* Pic 1931

Distribution (4): Af 20, As 4, E 7, SA 1

Commodities (6): g 16.7%, p 83.3% adzuki bean (s), bambara groundnut (u), chickpea (s), cowpea (s), kidney bean (u), lentil (u), mung bean (s), soybean (u)

Natural enemies (3): *Eupelmus orientalis*, *Eupelmus vuilleti*, *Uscana lariophaga*

Life history: Ofuya and Credland 1996

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Bruchidius lividimanus (Gyllenhal 1833)

Dimension: 2-3 mm long

Taxonomy: Col., Bruchidae, originally *Bruchus lividimanus*. For synonyms see Udayagiri and Wadhi 1989 and Löbl and Smetana 2010.

Distribution (3): Af 7, As 6, E 21

Natural enemies (8): *Bracon pectoralis*, *Bracon piger*, *Bracon praecox*, *Bracon variator*, *Dinarmus acutus*, *Eupelmus urozonus*, *Triaspis luteipes*, *Triaspis thoracica*

Bruchidius sahlbergi Schilsky 1905

Dimension: 2.1-3.1 mm long

Taxonomy: Col., Bruchidae

Distribution (2): Af 2, As 3

Commodities (2): p 50%, se 50%

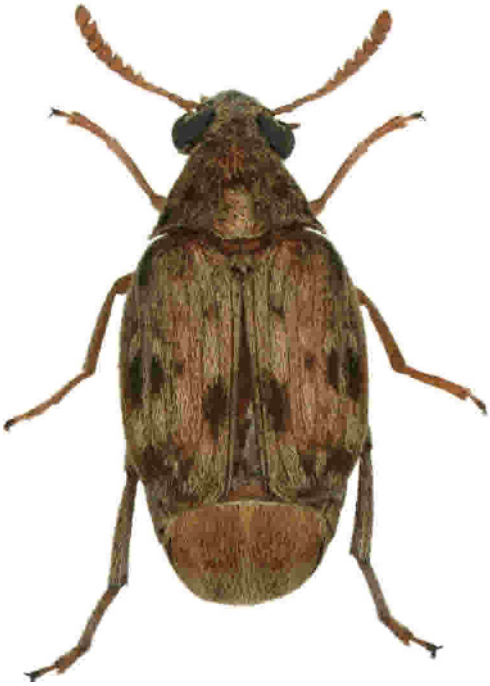


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Bruchus atomarius (Linnaeus 1760)

Dimension: 2-3.5 mm long

Taxonomy: Col., Bruchidae, originally *Curculio atomarius.* For synonyms see Udayagiri and Wadhi 1989.

Distribution (3): Af 1, As 10, E 31

Commodities (1): p 100%

Natural enemies (6): *Bracon praecox*, *Cerceris julii*, *Chremylus elaphus*, *Triaspis bruchivorus*, *Triaspis pallipes*, *Triaspis thomsoni*

Bruchus brachialis Fåhraeus 1839

Dimension: 2.3-3.5 mm long

Common names: vetch bruchid (Bruche des vesces (F)), Zottelwickenkäfer (hairy vetch beetle (G)) Зерновка виковая (hairy vetch bruchid (R))

Taxonomy: Col., Bruchidae, also as *Laria brachialis*, *Mylabris brachialis*, syn. *Bruchus pallidicornis.* Mulsant and Rey 1858, *Bruchus rugicollis* Motschulsky 1874

Distribution (4): Af 1, As 3, E 25, N 2

Commodities (1): p 100%

Natural enemies (16): *Anisopteromalus calandrae*, *Baryscapus bruchophagi*, *Dibrachys cavus*, *Dinarmus acutus*, *Eupelmus amicus*, *Eupelmus cyaniceps*, *Eupelmus vesicularis*, *Eurytoma obtusa*, *Eurytoma tylodermatis*, *Habrolepoidea tarsalis*, *Laelius utilis*, *Lariophagus distinguendus*, *Microdontomerus anthonomi*, *Triaspis thomsoni*, *Triaspis thoracica*, *Zatropis incertus*

Life history: Dickason 1960, Pinckney 1937, Steinhauer 1959

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Bruchus ervi Froelich 1799

Dimension: 2.8-3.5 mm long

Common names: Mediterranean pulse beetle, grauer südlicher Linsenkäfer (gray southern lentil beetle (G)), Зерновка чечевичная (lentil weevil (R))

Taxonomy: Col., Bruchidae, syn. *Bruchus bipunctatus* Sulzman 1776, *Bruchus sertatus* Illiger 1805

Distribution (5): Cosmopolitan. Af 7, As 10, C 1, E 16, SA 1

Commodities (4): p 100%

Bruchus lentis Froelich 1799

Dimension: 3-3.7 mm long

Common names: lentil beetle (Linsenkäfer (G)), lentil seed beetle, Bruche des lentils (lentil bruchid (F)), Зерновка чечевичная (lentil weevil (R))

Taxonomy: Col., Bruchidae

Distribution (4): Cosmopolitan. Af 9, As 14, E 23, N 1

Commodities (5): p 100%

Natural enemies (10): *Bracon praecox*, *Chremylus elaphus*, *Dinarmus acutus*, *Dinarmus basalis*, *Eupelmus urozonus*, *Triaspis facialis*, *Triaspis luteipes*, *Triaspis similis*, *Triaspis thoracica*, *Uscana senex*

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Bruchus pisorum (Linnaeus 1758)

Dimension: 3.5-5.2 mm long

Common names: pea seed weevil, pea weevil, pea bruchid (bruche du pois (F), bruco de la arveja (S)), gemeiner Erbsenkäfer (common pea weevil (G)), großer Erbsenkäfer (large pea weevil (G))

Taxonomy: Col., Bruchidae, originally *Dermestes pisorum*, also as *Mylabris pisorum*, syn. *Bruchus obscurus* Philippi and Philippi 1864, *Bruchus pisi* Linnaeus 1767. For additional synonyms see Kingsolver 2004.

Distribution (7): Cosmopolitan. West Asian origin. Af 8, As 16, C 2, E 21, N 3, O 1, SA 4

Commodities (8): g 12.5%, p 75%, v 12.5%

Facilities: retail groceries, seedmen (seed dealers), warehouses

Natural enemies (19): *Anisopteromalus calandrae*, *Aprostocetus aethiops*, *Aprostocetus claviger*, *Dinarmus basalis*, *Dinarmus magnus*, *Eupelmus amicus*, *Eupelmus orientalis*, *Gastrancistrus undulatus*, *Microdontomerus anthonomi*, *Pteromalus sequester*, *Staphylinus nigrellus*, *Stenomalina micans*, *Systasis encyrtoides*, *Tetrastichus nerio*, *Triaspis gibberosus*, *Triaspis thoracica*, *Trichomalopsis leguminis*, *Uscana semifumipennis*, *Uscana senex*

Life history: Smith and Ward 1995

Bruchus rufimanus Boheman 1833

Dimension: 3.1-5.2 mm long

Common names: broad bean weevil (bruche de la gourgane (F), Saubohnenkäfer (G)), European bean weevil (Зерновка бобовая (R)), large bean seed beetle, bruco del haba (bean bruchid (S)), Ackerbohnenkäfer (field bean beetle (G)), Pferdebohnenkäfer (horse bean beetle (G)), Зерновка красноногая (red-legged bean weevil (R))

Taxonomy: Col., Bruchidae, originally *Bruchus rufimanus*, also as *Laria rufimana*, *Mylabris rufimana*, syn. *Bruchus fabae* Motschulsky 1854.

Distribution (7): Cosomopolitan. West Asian origin. Af 8, As 12, C 2, E 37, N 3, O 2, SA 3

Commodities (12): g 8.3%, me 8.3%, p 58.3%, se 16.7%, sea 8.3%

Natural enemies (22): *Anisopteromalus calandrae*, *Chremylus elaphus*, *Dinarmus acutus*, *Dinarmus basalis*, *Dinarmus magnus*, *Eupelmus microzonus*, *Eupelmus orientalis*, *Eupelmus swezeyi*, *Eupelmus terryi*, *Eurytoma watchii*, *Lariophagus distinguendus*, *Stenomalina micans*, *Theocolax elegans*, *Triaspis forbesii*, *Triaspis gibberosus*, *Triaspis luteipes*, *Triaspis pallipes*, *Triaspis similis*, *Triaspis stictostiba*, *Triaspis thoracica*, *Uscana semifumipennis*, *Zelus renardii*

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Bruchus rufipes Herbst 1783

Dimension: 3-4 mm long

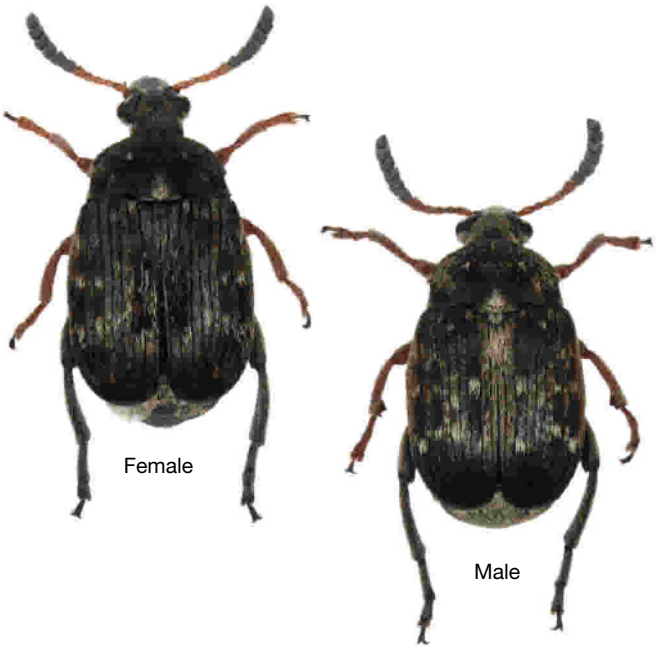
Common names: vetch weevil (Bruche de la vesce (F)), Семеед красноногий резедовый (mignonette red-legged seed eater (R)), rotbeiniger Resedasamenkäfer (red-legged mignonette seed beetle (G))

Taxonomy: Col., Bruchidae, also as *Mylabris rufipes*, syn. *Bruchus nubilus* Boheman. For additional synonyms see Udayagiri and Wadhi 1989.

Distribution (4): Af 5, As 3, E 24, N 1

Commodities (3): p 100%

Natural enemies (10): *Baryscapus bruchophagi*, *Cerceris julii*, *Cerceris labiata*, *Chrysocharis pentheus*, *Dinarmus acutus*, *Eulophus coecilius*, *Eupelmus vesicularis*, *Semiotus varians*, *Triaspis thomsoni*, *Triaspis thoracica*



Cadra calidella (Guenée 1845)

Dimension: 11-24 mm wingspan

Common names: carob moth, dried fruit moth, oases dates moth, Rosinenmotte (raisin moth (G))

Taxonomy: Lep., Pyralidae, also as *Ephestia calidella* Guenée 1845.

Distribution (3): Af 9, As 8, E 19

Commodities (21): aninv 9.5%, anv 4.8%, df 28.6% date (s), raisin (m), dfp 0% ground carob (s), carob pieces (s), ffv 4.8%, g 4.8%, gp 4.8%, n 14.3%, almond (m), os 4.8%, osp 4.8%, p 9.5%, v 4.8%, wp 4.8%

Facilities: warehouses

Natural enemies (1): *Dibrachys cavus*

Life history: Alrubeai 1987, Cox 1974, Prevett 1968, Subramanyam and Hagstrum 1993

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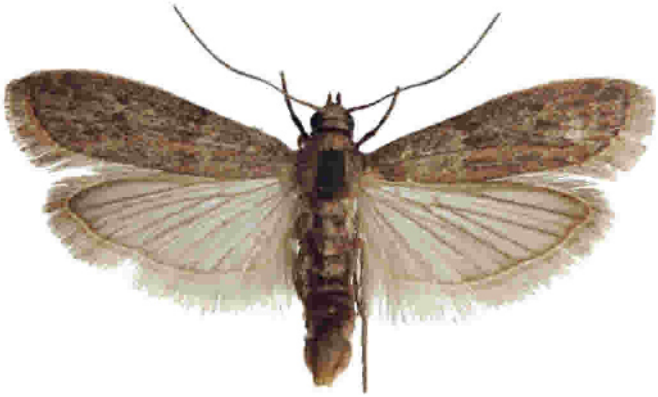
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cadra cautella (Walker 1863)



Dimension: 13-21 mm wingspan

Common names: almond moth (Dattelmotte (G), palomilla de la almendra (S), Pyrale des amandes (F), Teigne de l'amandier (F), tiña del almendro (S)), cocoa bean moth (teigne des grains de cacao (F)), cocoa moth (polilla del cacao (S), dried currant moth (Огнёвка сухофруктовая (R)), dried fruit moth, fig moth, tropical warehouse moth (tropische Speichermotte (G)), Моль финиковая (date moth (R)), polilla del higo seco (dried fig moth (S)), Rosinenmotte (raisin moth (G)), teigne des entrepots (warehouse moth (F)), polilla del almacen (warehouse moth (S))

Taxonomy: Lep., Pyralidae, originally *Pempelia cautella* Walker, also as *Ephestia cautella* (Walker 1863). For synonyms see Corbet and Tams 1943, Heinrich 1956, and Neunzig 1990.

Distribution (7): Cosmopolitan. Af 25, As 33, C 11, E 34, N 3, O 5, SA 8

Commodities (119): aninv 1.7%, anv 2.5% dried milk (u), bc 5.0% cocoa bean (s), bg 0.8% biscuit (s), df 8.4% date (s), raisin (m), dfp 1.7% ground carob (s), carob pieces (m), ffv 5.0%, g 7.6% barley (s), ground buckwheat (s), hungary rice (s), maize (s, m), millet (s), paddy (u), rice (s), sorghum (s), soybean (s), teff (m), wheat (s, u), gp 9.2%, maize flour or meal (s), millet flour (s, u), millet semolina (s), oat flake (s), polished rice (m), rice meal (s), rolled oat (s), wheat bran, flour, germ or meal (s), me 1.7%, n 6.7% almond (s), hazelnut (s), np 0.8%, oc 4.2%, os 6.7% broken safflower seed (s), linseed (s), peanut (s), safflower (u), sesame seed (s), osp 8.4% peanut meal (s), safflower meal (u), p 5.9% black gram (u), chickpea (m), cowpea (s), kidney bean (m), lentil (u), mung bean (m), pigeonpea (m), soybean (s, m), pp 1.7% black gram flour (s), cowpea flour (s), dried soy milk (s), kidney bean flour (s), lentil flour (s), mung bean flour (s), pigeonpea flour (s), soybean flour or meal (s), rp 1.7%, se 5.0%, sea 5.9%, sp 0.8%, v 8.4%

Facilities: barley mills, central stores, cereal factories, chocolate factories, cull fig warehouses, date packing houses, empty cargo containers, feedmills, flat storages of grain, flour mills, grocery Distribution warehouses, peanut shelling plant, peanut warehouses, port warehouses, railroad cars, tobacco fields

Natural enemies (18): *Anisopteromalus calandrae*, *Amphibolus venator*, *Dibrachys cavus*, *Habrobracon brevicornis*, *Habrobracon hebetor*, *Holepyris glabratus*, *Peregrinator biannulipes*, *Plastanoxus monroi*, *Psilochalcis brevialata*, *Syzeuctus zairensis*, *Trichogramma brassicae*, *Trichogramma carverae*, *Trichogramma evanescens*, *Trichogramma minutum*, *Trichogramma parkeri*, *Trichogramma pretiosum*, *Venturia canescens*, *Xylocoris flavipes*

Life history: Barrer 1976, Bell 1975, Imura 1981, Nawrot 1986a, b, Sinha et al. 1986, Steele 1970, Subramanyam and Hagstrum 1993

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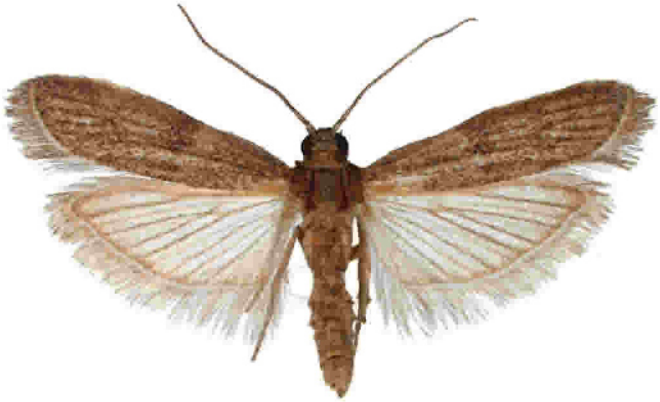
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cadra figulilella (Gregson 1871)



Dimension: 15-20 mm wingspan

Common names: fig moth (Feigenmotte (G)), raisin moth

Taxonomy: Lep., Pyralidae, originally *Ephestia figulilella.* For synonyms see Corbet and Tams 1943, Heinrich 1956, and Neunzig 1990.

Distribution (7): Af 8, As 15, C 1, E 28, N 2, O 1, SA 1

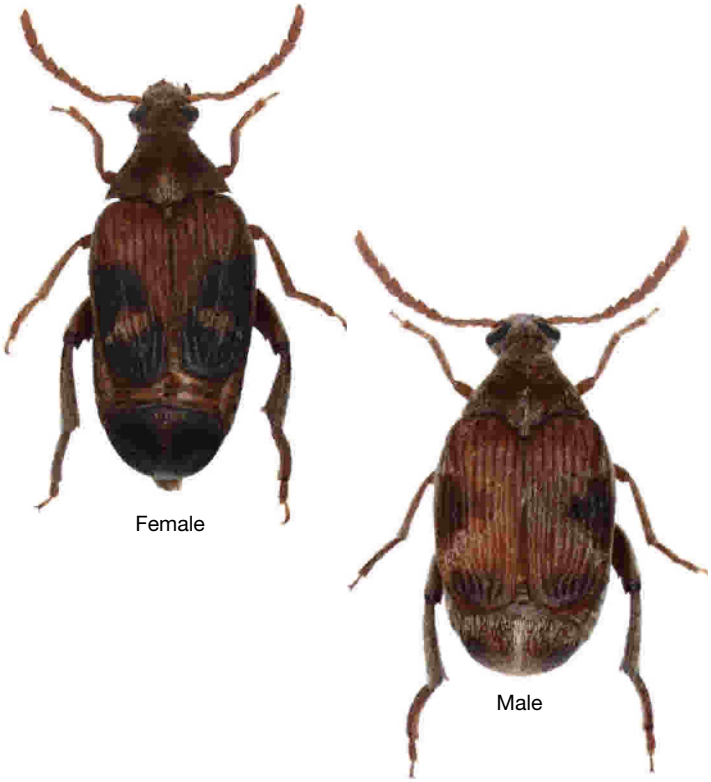
Commodities (40): bc 5.0%, bg 2.5%, df 15.0% date (s), raisin (s), dfp 2.5% ground carob (s), carob pieces (m), ffv 2.5%, g 10.0%, gp 10.0%, me 2.5%, n 12.5% almond (s), oc 5.0%, os 5.0%, osp 5.0%, p 2.5%, r 2.5%, se 5.0%, sea 5.0%, v 7.5%

Facilities: cocoa storages, date packing houses, dried fruit warehouses, drug stores, feedmills, orchards, raisin-processing plants, tobacco fields, vineyards, warehouses

Natural enemies (3): *Habrobracon hebetor*, *Mesostenus gracilis*, *Venturia canescens*

Life history: Cox 1974, Subramanyam and Hagstrum 1993

Callosobruchus analis (Fabricius 1781)



Dimension: 2.7-3.1 mm long

Common name: Gramerbsenkäfer (gram pea weevil (G))

Taxonomy: Col., Bruchidae, originally *Bruchus analis* and transferred to new genus by Bridwell 1938, For synonyms see Löbl and Smetana 2010 and Udayagiri and Wadhi 1989.

Distribution (6): Cosmopolitan. Af 12, As 15, C 1, E 7, O 1, SA 1

Commodities (18): p 94.4% black gram (s), chickpea (s), cowpea (s), garden pea (s), moth bean (s), mung bean (s), pea (s), pigeonpea (s), sea 5.6%

Natural enemies (7): *Anisopteromalus calandrae*, *Dinarmus basalis*, *Dinarmus vagabundus*, *Pteromalus cerealellae*, *Pteromalus schwenkei*, *Theocolax elegans*, *Uscana mukerji*

Life history: Giga and Smith1983, Utida 1971

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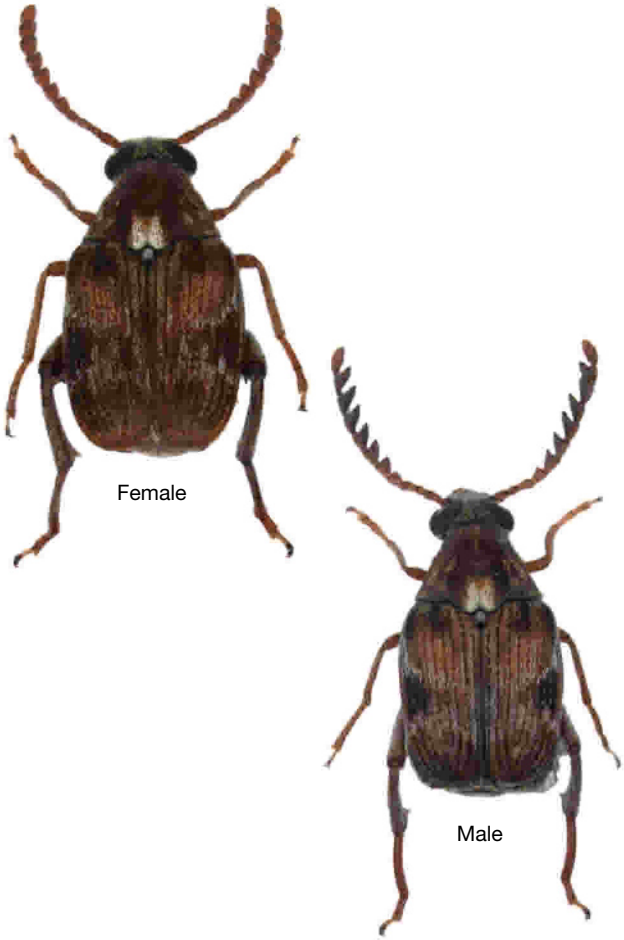
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Callosobruchus chinensis (Linnaeus 1758)



Dimension: 2-4 mm long

Common names: adzuki bean weevil, Chinese pea weevil, mung bean weevil, oriental cowpea bruchid, southern cowpea weevil, gorgojo de los frijoles (bean weevil (S)), Зерновка китайская (China weevil), chinesischer Bohnenkäfer (Chinese bean weevil (G)), chinesischer Kundekäfer (Chinese customer beetle (G)), Bruche chinoise (Chinese weevil (F)), gorgojo del caupi (cowpea weevil (S)), kammfühleriger Samenkäfer (pectinate antenna cowpea beetle (G))

Taxonomy: Col., Bruchidae, originally *Curculio chinensis* and transferred to new genus by Bridwell 1929, also as *Bruchus chinensis*, *Mylabris chinensis*, *Pachymerus chinensis*. For synonyms see Kingsolver 2004, Löbl and Smetana 2010 and Udayagiri and Wadhi 1989.

Distribution (7): Cosmopolitan. African origin. Af 19, As 20, C 3, E 22, N 3, O 3, SA 3

Commodities (35): g 2.9% wheat (u), n 2.9%, p 80.0% black gram (s, u), broadbean (s), catjang (u), chickling vetch (s), chickpea (s), cluster bean (s, u), cowpea (s), garden pea (s), gram (s), grass pea (s), hyacinth bean (s, u), kidney bean (s, u), lentil (s, m), moth bean (s), mung bean (s), pea (s, u), pigeonpea (s), rice bean (s), soybean (m, s), sword bean (s), pp 2.9%, se 5.7% gourd (u), okra (s), sea 5.7%

Natural enemies (14): *Anisopteromalus calandrae*, *Dinarmus basalis*, *Dinarmus colemani*, *Dinarmus vagabundus*, *Eupelmus orientalis*, *Heterospilus prosopidis*, *Lariophagus distinguendus*, *Pteromalus cerealellae*, *Pteromalus schwenkei*, *Stenocorse bruchivora*, *Theocolax elegans*, *Urosigalphus bruchi*, *Uscana mukerjii*, *Uscana semifumipennis*

Life history: Giga and Smith1983, Utida 1971

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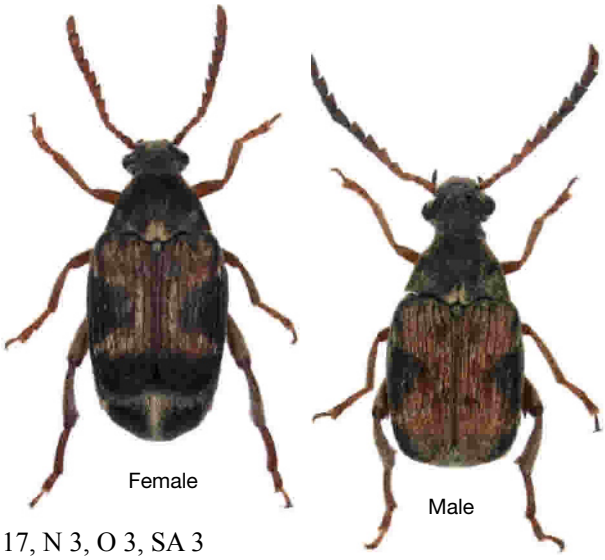
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Callosobruchus maculatus (Fabricius 1775)

Dimension: 2-5 mm long

Common names: cowpea weevil (bruche du niébé (F), gorgojo del caupí (S), picudo del caupi (S)), four-spotted cowpea weevil (Bruche à quatre taches (F)), southern cowpea beetle, bruquido del chícharo de vaca (cowpea bruchid (S)), gorgojo de cuatro manchas (four spots weevil (S)), vierfleckige Bohnenkäfer (four spotted bean weevil (G)), Зерновка четырёхпятнистая (four spotted bean weevil (R)), vierfleckiger Kunde-kaefer (four spotted client beetle (G))

Taxonomy: Col., Bruchidae, originally *Bruchus maculatus* and transferred to new genus by Bridwell 1929, also as *Mylabris quadrimaculatus*, *Pachymerus quadrimaculatus*, syn. *Bruchus quadrimaculatus* Fabricius 1792. For additional synonyms see Kingsolver 2004, Löbl and Smetana 2010 and Udayagiri and Wadhi 1989.



Distribution (7): Cosmopolitan. African origin. Af 18, As 20, C 3, E 17, N 3, O 3, SA 3

Commodities (42): aninv 2.4%, df 2.4%, g 9.5%, n 4.8%, os 4.8% safflower (u), p 57.1% bambara groundnut (s), black gram (s), broad bean (s), chickpea (s), cowpea (s), grass pea (u), hyaciath bean (s), kidney bean (u), lentil (m, u), mung bean (s), pea (s), pigeonpea (s, m), soybean (s), pp 4.8%, res 2.4%, se 2.4%, sea 7.1%, v 2.4%

Natural enemies (19): *Anisopteromalus calandrae*, *Antistrophoplex acythopoeusi*, *Cephalonomia gallicola*, *Dinarmus basalis*, *Dinarmus magnus*, *Dinarmus vagabundus*, *Eupelmus orientalis*, *Eupelmus vuilleti*, *Heterospilus prosopidis*, *Lariophagus distinguendus*, *Lariophagus texanus*, *Liposcelis bostrychophilus*, *Pteromalus cerealellae*, *Theocolax elegans*, *Uscana lariophaga*, *Uscana marilandica*, *Uscana mukerji*, *Uscana semifumipennis*, *Uscana senex*

Life history: El Sawaf 1956, Giga and Smith 1983, Hagstrum 1985, Mookherjee and Chawala 1964, Osuji 1982, Sagnia 1994, Utida 1971

Callosobruchus phaseoli (Gyllenhal 1833)

Dimension: 3-3.5 mm long

Common names: gorgojo del frijol (bean weevil (S)), Fisolen-Kaefer (green bean beetle (G))

Taxonomy: Col., Bruchidae, originally *Bruchus phaseoli* and transferred to new genus by Bridwell 1938, also as *Mylabris phaseoli*, *Pachymerus phaseoli*, syn. *Bruchus conicicollis*, Fairmaire 1889, *Bruchus figuratus* Gyllenhal 1839.

Distribution (5): Cosmopolitan. Af 5, As 8, E 7, N 1, SA 1

Commodities (14): bc 7.1%, p 92.9%

Natural enemies (5): *Anisopteromalus calandrae*, *Dinarmus basalis*, *Heterospilus prosopidis*, *Lariophagus distinguendus*, *Uscana semifumipennis*

Life history: Giga and Smith 1983, Utida 1971

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Carcinops pumilio (Erichson 1834)

Dimension: 1.6-2.7 mm long

Taxonomy: Col., Histeridae, originally *Paromalus pumilio*, syn. *Dendrophilus quattuordecimstriatus* Stephens 1835, *Epierus krujanensis* Mader 1921, *Hister nanus* J. E. LeConte 1845

Distribution (6): Cosmopolitan. African origin. Af 8, As 5, E 32, N 2, O 1, SA 1

Commodities (18): anv 5.6%, bg 5.6%, g 16.7%, gp 22.2%, n 5.6%, os 11.1%, p 5.6%, r 5.6%, res 16.7%, v 5.6%

Facilities: barley storages, bone works, empty granaries, feedmills, flat storages of grain, flour mills, granaries, growing floors at maltings, henhouses, peanut shelling plants, peanut warehouses, poultry houses, stables

Carpophilus dimidiatus (Fabricius 1792)

Dimension: 2-3 mm long

Common names: corn sap beetle (Getreidesaftkäfer (G)), gemeiner Saftkäfer (common sap beetle (G)), nitidulide du mais (corn nitidulid (F)), carpophile des grains (grain carpophile (F)), carpophile des magasins (shop carpophile (F))

Taxonomy: Col., Nitidulidae, originally *Nitidula dimidiata* and transferred to new genus by Wollaston 1871. For synonyms see Gillogly 1962.

Distribution (7): Cosmopolitan. Af 21, As 24, C 13, E 10, N 3, O 12, SA 7

Commodities (128): anv 0.8%, bc 3.1%, df 5.5%, dfp 0.8%, ffv 8.6%, g 7.8%, gp 7.8% cracked rough rice (s), wheat bran (s), me 2.3%, n 10.2%, np 0.8%, oc 2.3%, os 6.3%,osp 6.3%, p 7.8%, pp 0.8%, r 3.9%, res 1.6%, rp 1.6%, se 3.9%, sea 5.5%, sp 3.9%, v 8.6%

Facilities: farm storages of rice, flat storages of grain, feedmills, feed stores, flour mills, grain bins, grain elevators, peanut shelling plants, peanut warehouses, rice mills

Life history: Balzer 1942, Lefkovitch 1966, Lindgren and Vincent 1953, Porter 1986

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Carpophilus hemipterus (Linnaeus 1758)

Dimension: 1.9-4.1 mm long

Common names: driedfruit beetle (Backöbstkafer (G), escarabajo de la fruta seca (S)), nitidulide des fruits (fruit nitidulid (F))

Taxonomy: Col., Nitidulidae, originally *Dermestes hemipterus* and transferred to new genus by Wollaston 1871, syn. *Carpophilus aterrimus* W. J. Macleay 1871. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 13, As 21, C 2, E 30, N 2, O 7, SA 3

Commodities (122): aninv 1.6%, anv 1.6%, bc 1.6%, bg 1.6%, df 11.5%, dfp 0.8%, ffv 14.7%, g 6.6%, gp 5.7%, gs 0.8%, me 1.6%, n 3.3%, np 1.6%, oc 4.1%, os 5.7%, osp 4.1%, p 1.6%, pp 2.5%, r 4.9%, res 1.6%, rp 0.8%, se 2.5%, sea 5.7%, sp 1.6%, v 11.5%

Facilities: canneries, cull fig warehouses, currant raisin storages, empty cargo containers, feedmills, fig market, flour mills, grain bins, local yam markets, packing houses, peanut shelling plants, peanut warehouses, railroad cars, sultana raisin storages, wine press

Natural enemies: *Cerchysiella utilis*, *Microctonus nitidulidis*

Life history: Cangardel 1981, El-Kadi et al. 1962, James and Vogele 2000, Lindgren and Vincent 1953

Carpophilus humeralis (Fabricius 1798)

Dimension: 3-4.2 mm long

Common names: pineapple sap beetle, pineapple souring beetle, yellow shouldered souring beetle, escarabajo de fruta seca (dried fruit beetle (S))

Taxonomy: Col., Nitidulidae, originally *Nitidula humeralis*, also as *Urophorus humeralis* (Fabricius 1798), syn. *Brachypterus picinus* Boheman 1851, *Carpophilus foveicollis* Murray 1864, *Carpophilus punctatus* Fleutiaux 1887, *Carpophilus ricksecker*i Fall 1910.

Distribution (7): Cosmopolitan. Af 14, As 10, C 2, E 3, N 1, O 7, SA 1

Commodities (55): bc 3.6%, df 7.3%, ffv 25.5%, g 9.1%, n 7.3%, os 5.5%, osp 5.5%, p 3.6%, r 12.7%, se 1.8%, sp 7.3%, t 1.8%, v 9.1%

Facilities: peanut shelling plants, peanut warehouses

Natural enemies: *Microctonus nitidulidis*

Life history: James and Vogele 2000, Lindgren and Vincent 1953, Schmidt 1935, Tan et al. 1969

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Carpophilus marginellus Motschulsky 1858

Dimension: 2.2-3.8 mm long

Common name: shiny sap beetle

Taxonomy: Col., Nitidulidae, syn. *Carpophilus nitens* Fall 1910

Distribution (6): Cosmopolitan. Af 4, As 13, E 18, N 2, O 3, SA 3

Commodities (30): bc 3.3%, df 10.0%, ffv 33.3%, g 13.3%, gp 3.3%, gs 3.3%, np 3.3%, os 3.3%, osp 3.3%, p 3.3%, r 3.3%, sp 10.0%, t 3.3%, v 3.3%

Facilities: feedmills, flour mills, grain elevators, peanut shelling plants, peanut warehouses

Carpophilus mutilatus Erichson 1843

Dimension: 2.8-3.5 mm long

Common name: confused sap beetle

Taxonomy: Col., Nitidulidae, syn. *Carpophilus floridanus* Fall 1910, *Carpophilus halli* Dobson 1954, *Carpophilus luridus* Murray 1864, *Carpophilus mutabilis* Erichson, *Carpophilus pilosellus* Motschulsky 1858

Distribution (7): Cosmopolitan. Af 13, As 21, C 7, E 12, N 3, O 5, SA 5

Commodities (45): aninv 2.2%, bc 4.5%, df 6.7%, ffv 15.6%, g 8.9%, gp 11.1%, gs 2.2%, n 6.7%, np 2.2%, os 11.1%, osp 6.7%, p 6.7%, r 2.2%, res 2.2%, rp 2.2%, sea 6.7%, v 2.2%

Facilities: currant raisin storages, flour mills, peanut shelling plants, peanut warehouses, port warehouses, railroad cars, sultana raisin storages

Natural enemies (1): *Cerchysiella utilis*

Life history: Hall et al. 1978, James and Vogele 2000

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Carpophilus obsoletus Erichson 1843

Dimension: 2.5-4 mm long

Taxonomy: Col., Nitidulidae, syn. *Carpophilus immaculatus* Lucas 1849. For additional synonyms see Gillogly 1962 and Löbl and Smetana 2007.

Distribution (7): Af 13, As 23, C 2, E 8, N 2, O 2, SA 2

Commodities (54): bc 1.9%, df 11.1%, ffv 3.7%, g 9.3%, gp 9.3%, me 1.9%, n 11.1%, os 11.1%, osp 14.8%, p 1.9%, r 9.3%, res 1.9%, rp 1.9%, sea 3.7%, v 7.4%

Facilities: date warehouses, empty cargo containers, granaries

Natural enemies (1): *Anisopteromalus calandrae*

Carpophilus pallipennis (Say 1823)

Dimension: 2.5-4 mm long

Taxonomy: Col., Nitidulidae, originally *Cercus pallipennis*

Distribution (2): Af 1, N 3

Commodities (3): g 66.7%, r 33.3%

Facilities: peanut shelling plants, peanut warehouses

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cartodere constricta (*-us*) (Gyllenhal 1827)

Dimension: 1.2-1.7 mm long

Common name: plaster beetle

Taxonomy: Col., Lathridiidae, originally *Lathridius constrictus* and transferred to new genus by Thomson 1859, also as *Coninomus constrictus* (*-a*) (Gyllenhal 1827) (sensu auct.), syn. *Cartodere apicalis* (Blackburn 1888). For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 5, As 10, C 2, E 28, N 2, O 1, SA 1

Commodities (12): anv 8.3%, bc 8.3%, df 8.3%, ffv 8.3%, g 33.3%, me 8.3%, r 8.3%, res 8.3%, v 8.3%

Facilities: beer canning plants, empty grain bins, farm grain bins, farm storages of rice, feedmills, pet stores

Life history: Kerr and McLean 1956

Cartodere nodifer (Westwood 1839)

Dimension: 1.5-2.1 mm long

Taxonomy: Col., Lathridiidae, originally *Lathridius nodifer* Westwood 1839, also as *Aridius nodifer*, *Coninomus nodifer*. For synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Af 1, As 3, E 28, N 2, O 1, SA 2

Commodities (15): anv 6.7%, df 6.7%, g 26.7%, gp 6.7%, gs 6.7%, n 20.0%, res 6.7%, rp 6.7%, se 6.7%, v 6.7%

Facilities: barley storage, empty cargo containers, farm storages of rice, growing floors at maltings, rice mills

Female

Male

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Caryedon pallidus (Olivier 1790)

Dimension: 3-5 mm long

Taxonomy: Col., Bruchidae, originally *Bruchus pallidus*, also as *Caryopemon pallidus*, *Pachymerus pallidus*, syn. *Caryoborus germari* Kuster 1845, *Caryoborus pallidulus* Schilsky 1905.

Distribution (3): Af 8, As 5, E 5

Commodities (3): me 33.3%, os 33.3%, p 33.3%

Natural enemies (1): *Euchalcidia caryebori*

Caryedon serratus (Olivier 1790)

Dimension: 6-7.3 mm long

Common names: groundnut borer, groundnut bruchid (Bruche de l'arachides (F)), groundnut seed beetle (Erdnuß-Samenkäfer (G)), tamarind beetle (gorgojo del tamarindo (S)), Westafrikanische Erdnuß-Samenkäfer (West African groundnut seed beetle (G))

Taxonomy: Col., Bruchidae, originally *Bruchus serratus* and transferred to new genus by Schönherr 1823, also as *Bruchus gonargra, Caryoborus gonagra*, *Pachymerus gonagra*, was a syn of *Bruchus fuscus* (Goeze), syn. *Caryedon gonagra* (Fabricius 1798), *Pachymerus sibutensis* Pic 1924

Distribution (7): Asian or Indian origin. Af 12, As 10, C 5, E 5, N 2, O 4, SA 4

Commodities (13): g 7.7%, os 23.1%, osp 7.7%, p 30.8%, se 15.4%, v 15.4%

Natural enemies (19): *Anisopteromalus calandrae*, *Anisopteromalus caryedophagus*, *Antrocephalus aethiopicus*, *Antrocephalus mitys*, *Aximopsis caryedocida*, *Bracon kirkpatricki*, *Dibrachys boarmiae*, *Dinarmus altifrons*, *Dinarmus basalis*, *Euchalcidia caryobori*, *Eupelmus swezeyi*, *Goniozus emigratus*, *Heterospilus prosopidis*, *Proconura serratociba*, *Sclerodermus immigrans*, *Stenocorse bruchivora*, *Urosigalphus bruchi*, *Uscana caryedoni*, *Uscana semifumipennis*

Life history: Davey 1958

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cathartus quadricollis (Guérin-Méneville 1844)

Dimension: 2.5-3.5 mm long

Common names: squarenecked grain beetle (gorgojo cuello-cuadrado de los granos (S))

Taxonomy: Col., Silvanidae, originally *Silvanus quadricollis* Guérin-Méneville, syn. *Cathartus annectens* Sharp 1899, *Cathartus cassiae* Reiche 1854, *Cathartus gemellatus* Jaquelin du Val 1857

Distribution: (6): Cosmopolitan. Southern USA origin. Af 6, As 5, C 9, E 5, N 2, SA 3

Commodities (37): bc 5.4%, df 2.7%, ffv 2.7% peeled melon (s), g 16.2% maize (s), sorghum (s), wheat (s), gp 10.8% broken maize (s), broken rice (m), broken sorghum (s), broken wheat (s), maize flour (s), wheat bran (m), os 8.1%, osp 5.4%, p 10.8% cut cowpea (s), r 10.8%, res 2.7%, rp 5.4%, se 2.7%, sea 5.4%, v 10.8%

Facilities: cocoa and sugar warehouses, farm grain bins, flour mills, peanut shelling plants, peanut warehouses, railroad cars, seedmen (seed dealers)

Natural enemies (1): *Xylocoris flavipes*

Life history: Allotey and Morris 1993, Sousa et al. 2009

Cephimallota colonella (Erschoff 1874)

Dimension: 17-25 mm wingspan

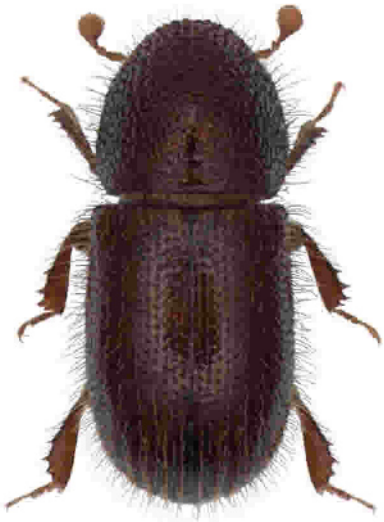
Taxonomy: Lep., Tineidae, also as *Cephitinea colonella*, syn. *Homalopsycha agglutinata* Meyrick 1931.

Distribution (1): As 4

Commodities (1): sp 100%

Facilities: barley mills, feed factories, flour mills

Coccotrypes dactyliperda (Fabricius 1801))



Dimension: 1.8-2.3 mm long

Common names: button beetle, date stone beetle, date stone borer beetle, palm seed borer, Dattelkern-Borkenkäfer (date stone bark beetle (G)), Короед пальмовый (palm bark beetle (R)), Steinnuß-Borkenkäfer (stone nut bark beetle (G))

Taxonomy: Col., Scolytidae, originally *Bostrichus dactyliperda.* For synonyms see Wood 1982.

Distribution (7): Af 17, As 13, C 5, E 7, N 1, O 4, SA 9

Commodities (3): df 33.3%, os 33.3%, se 33.3%

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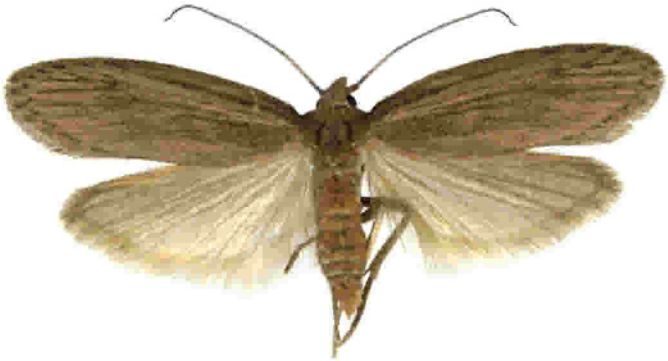
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Corcyra cephalonica (Stainton 1866)



Dimension: 14-24 mm wingspan

Common names: rice moth (Pyrale du riz (F), Teigne du riz (F), Reismotte (G), Огнёвка рисовая (R))

Taxonomy: Lep., Pyralidae, originally *Melissoblaptes cephalonica*, syn. *Anerastia lineata* Legrand 1965, *Corcyra translineella* Hampson 1901, *Melissoblaptes oeconomellus* Mann 1872, *Tineopsis theobromae* Dyar 1913.

Distribution (7): Af 14, As 15, C 5, E 4, N 2, O 6, SA 5

Commodities (85): aninv 1.2%, anv 2.3% dried milk (m, s), bc 4.7% cocoa (s, u), coffee powder (u), tea dust (u), bg 1.2% biscuit powder (s), bread crumb (s), df 3.5% broken date (s), broken fig (s), raisin (s), g 9.4% barley (s), buckwheat (s), hungary rice (s), maize (s), millet (s), paddy (m), rice (s), sorghum (s), wheat (m, s), gp 12.9% barley flour (s), broken maize (s), broken or ground sorghum (s), buckwheat flour (s), ground maize (s), ground millet (s), ground paddy (s), maize flour (s), millet flour or semolina (s), rice bran or flour (s), sorghum flour (s), wheat bran (m, s), wheat flour (s), wheat meal (s), n 3.5% almond (s), pistachio (s), np 1.2% broken cashew (s), soap nut powder (u), oc 1.2%, os 9.4% castor bean (u), cottonseed (m, s), peanut (m, s), sesame (s), osp 9.4% broken peanut (s), castor bean cake (s, m), crushed castor bean (u), crushed coconut (u), copra bit (u), crushed cottonseed (s, u), crushed peanut (u), peanut cake (m, s), sesame oilcake (m, s), p 9.4% black gram (s, u), chickpea (m, s), cowpea (m, s), kidney bean (m), lentil (m), mung bean (m, s), pp 1.2% black gram flour (m, s), broken chickpea (s), broken lentil (u), broken mung bean (s), broken pigeonpea (u), chickpea flour (m, s), cowpea flour (s), dried soy milk (s), kidney bean flour (m), lentil flour (u), mung bean flour (s), pigeonpea flour (u), r 1.2% ginger (u), tumeric powder (u), rp 1.2%, se 11.8% apricot seed bit (u), broken fenugreek (s), castor bean (u), coriander (m), coriander powder (u), fenugreek (s, u), ginger (s), mustard (s), pomegranate (m), poppy (s), sea 7.1% black pepper powder (u), caraway (u), chili powder (s), clove powder (u), coriander powder (u), cumin seed (m), curry powder (m), fennel seed powder (u), mustard crushed (s) or powder (u), nutmeg bark powder (u), pepper powder (u), t 1.2%, v 7.1% cholam forage (s), potato chip powder (u), snuff (u), sugar (u), tamarind pulp (u)

Facilities: chocolate factories, flour mills, grain elevators, peanut shelling plants, peanut warehouses

Natural enemies (15): *Amphibolus venator*, *Antrocephalus aethiopicus*, *Antrocephalus mitys*, *Bracon gelechiae*, *Dibrachys boarmiae*, *Dufouriellus ater*, *Habrobracon brevicornis*, *Habrobracon hebetor*, *Holepyris glabratus*, *Peregrinator biannulipes*, *Trichogramma achaeae*, *Trichogramma evanescens*, *Trichogramma minutum*, *Venturia canescens* (lab), *Xylocoris sordidus*

Life history: Cox et al. 1981, Hodges 1979, Kamel and Hassanein 1967, Subramanyam and Hagstrum 1993

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Corticaria elongata (Gyllenhal 1827)

Dimension: 1.5-1.8 mm long

Taxonomy: Col., Lathridiidae, originally *Lathridius elongatus* and transferred to new genus by Reitter 1887. For synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Af 3, As 9, E 34, N 2, O 1, SA 1

Commodities (11): bc 9.1%, g 36.4%, gs 18.2%, os 9.1%, res 9.1%, sp 9.1%, wp 9.1%

Corticaria pubescens (Gyllenhal 1827)

Dimension: 2.3-3 mm long

Common names: weichhaariger Mulmkäfer (smooth duff-haired beetle (G)), Скрытик опушенный (smooth duff-haired beetle (R)), Zahnhalsmoderkäfer (tooth neck plaster beetle (G))

Taxonomy: Col., Lathridiidae, originally *Lathridius pubescens* Gyllenhal. For synonyms see Löbl and Smetana 2007.

Distribution (6): Af 4, As 4, C 1, E 26, N 2, O 1

Commodities (8): g 37.5%, gp 12.5%, me 12.5%, n 12.5%, os 12.5%, v 12.5%

Facilities: beer canning plants, grain bins

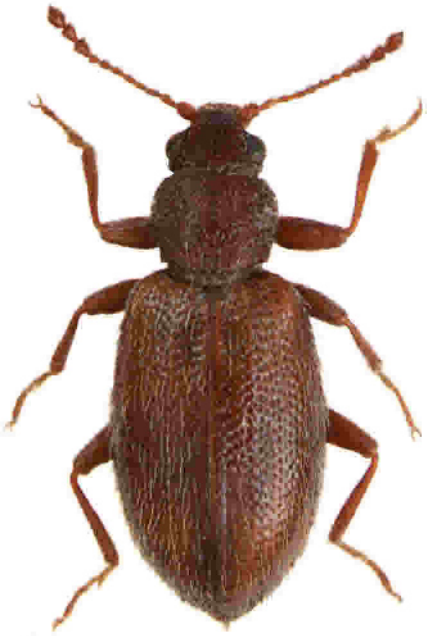

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Corticaria serrata (Paykull 1798)

Dimension: 1.8-2.2 mm long

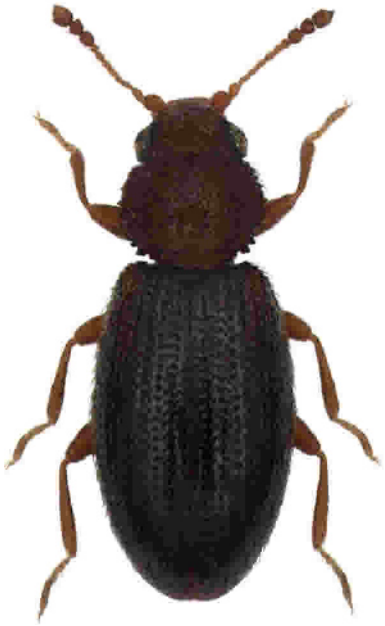
Taxonomy: Col., Lathridiidae, originally *Dermestes serrata*. For synonyms see Löbl and Smetana 2007.

Distribution (5): Cosmopolitan. Af 6, As 7, A 33, N 2, O 1

Commodities (12): bc 8.3%, df 16.7%, dfp 8.3%, g 16.7%, gp 8.3%, n 16.7%, osp 8.3%, p 8.3%, wp 8.3%

Facilities: barley storages at maltings, empty grain bins, flour mills

Life history: Kerr and McLean 1956



Cortinicara gibbosa (Herbst 1793)

Dimension: 1.2-1.4 mm long

Taxonomy: Col., Lathridiidae, originally *Lathridius gibbosa*, also as *Corticaria gibbosa* (Herbst). For synonyms see Löbl and Smetana 2007.

Distribution (4): Af 2, As 13, E 31, N 2

Commodities (2): g 50.0%, osp 50.0%

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Creophilus maxillosus (Linnaeus 1758)

Dimension: 15-23 mm long

Common name: Staphylin à grandes mâchoires (large jaw rove beetle (F))

Taxonomy: Col., Staphylinidae, originally *Staphilinus maxillosus*, syn. *Creophilus villosus* Gravenhorst. For additional synonyms see Löbl and Smetana 2004.

Distribution (7): Cosmopolitan. Af 7, As 20, C 4, E 45, N 3, O 1, SA 5

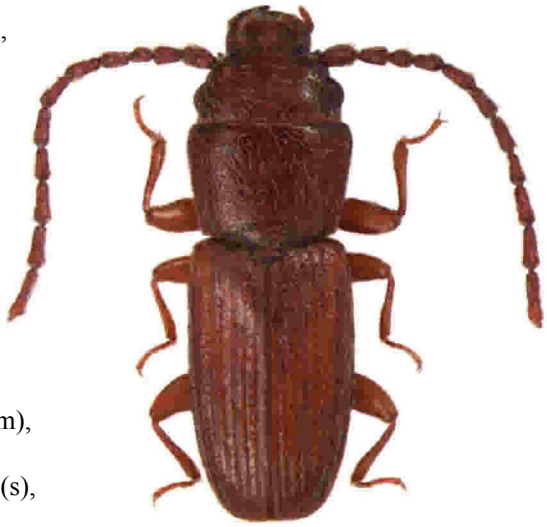
Commodities (2): anv 100%

Facilities: granary

Hosts/Prey (5): *Attagenus fasciatus*, *Dermestes ater*, *Dermestes frischii*, *Dermestes maculatus*, *Necrobia rufipes*

Natural enemies (1): *Codrus ater*

Cryptolestes ferrugineus (Stephens 1831)



Dimension: 1.5-2.5 mm long

Common names: rust-red grain beetle, rusty grain beetle (Cucujide roux (F), Мукоед рыжий (R)), carcoma achatada (flattened beetle (S)), carcoma de los granos (grain beetle (S)), rotbrauner Leistenplattkäfer (red brown strips beetle (G)), Мукоед короткоусый рыжий (short antenna rusty flour eater (R))

Taxonomy: Col., Laemophloeidae, originally *Cucujus ferrugineus* and transferred to new genus by Steel and Howe 1955, has been in the family Cucujidae, also as *Laemophloeus ferrugineus* Stephens, syn. *Cucujus testaceus* Paykull 1799, *Laemophloeus emgei* Reitter 1887. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 22, As 20, C 2, E 21, N 3, O 2, SA 7

Commodities (84): anv 1.1%, bc 3.1%, df 4.2%, ffv 1.1%, g 20.0% barley (m), maize (m), millet (s), oat (m), rice (s), rye (s), wheat (s),gp 11.6% cracked barley (s), ground barley (s), ground maize (s), ground millet (s), ground oat (s), ground rice (s), ground rye (s), ground wheat (s) me 2.1%, n 3.2%, oc 1.1%, os 6.3% canola (s), flax (m, u), rape (s, m, u), sunflower (s, u), osp 6.3% ground flax (m, u), ground rape (u), ground sunflower (s, m, u), p 4.2% broad bean (u), soybean (u), pp 5.9%, crushed broad bean (s), soybean meal (m), r 3.2%, res 1.1%, rp 3.2%, se 2.1% clover (s), ground clover (m,u), mustard (u), sea 6.3%, v 13.7% alfalfa pellet (u), rye grass pellet (u)

Facilities: bakeries, barley mills, barley storages, currant raisin storages, farm grain bins, feedmills, flat storages of grain, flour mills, grain elevators, granaries, growing floors at maltings, malt storages, oilseed refineries, peanut shelling plants, peanut warehouses, rice mills, semolina mills, sultana raisin storages

Natural enemies (5): *Anisopteromalus mollis*, *Cephalonomia waterstoni*, *Holepyris sylvanidis*, *Theocolax elegans*, *Xylocoris galactinus*

Life history: Hagstrum and Milliken 1988, Kawamoto et al. 1989, Rilett 1949, Smith 1965

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cryptolestes pusilloides (Steel and Howe 1952)

Dimension: 1.5-2.2 mm long

Taxonomy: Col., Laemophloeidae, originally *Laemophloeus pusilloides* and transferred to new genus by Steel and Howe 1955, also as *Cryptolestes* (*Tripsolestes*) *pusilloides* (Steele and Howe) by Iablokoff-Khnzorian 1978.

Distribution (7): Cosmopolitan. Af 10, As 8, C 1, E 8, N 3, O 5, SA 4

Commodities (32): aninv 3.1%, bc 3.1%, df 6.3%, dfp 3.1%, ffv 3.1%, g 18.7%, gp 21.9% wheatfeed (s), n 9.4%, os 6.3%, osp 3.1%, p 3.1%, sea 9.4%, v 9.4%

Facilities: farms, flour mills, pet stores, warehouses

Life history: Lefkovitch 1964

Cryptolestes pusillus (Schönherr 1817)

Dimension: 1-1.8 mm long

Common names: flat grain beetle (Cucujide plat (F)), caroma achatada (flat zeetle (S)), gorgojo plano (flat beetle (S)), rotbrauner Leistenplattkäfer (red brown strips beetle (G)), Мукоед рыжий (rusty flour eater (R)), Мукоед короткоусый рыжий (short antenna rusty flour eater (R)), kleine Leistenkopfplattkäfer (small head strips beetle (G))

Taxonomy: Col., Laemophloeidae, originally *Cucujus pusillus* and transferred to new genus by Lefkovitch 1959, has been in the family Cucujidae, also as *Laemophloeus pusillus*, *Cryptolestes* (*Tripsolestes*) *pusillus* (Schönherr) by Iablokoff-Khnzorian 1978, syn. *Cucujus minutus* A. G. Olivier 1791, *Cryptolestes minutus* (A. G. Olivier 1791), *Laemophloeus minutus* (A. G. Olivier 1791). For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 21, As 23, C 9, E 16, N 3, O 7, SA 7

Commodities (86): bc 3.5%, bg 2.3%, df 3.5%, dfp 1.2%, ffv 2.3%, g 10.5% maize (m, u), rice (u), teff (u), wheat (s, m), gp 9.3% maize meal (s), rice meal (u), wheatfeed (s), wheat flour (s), wheat meal (m), me 1.2%, n 3.5%, oc 4.7%, os 8.1% peanut (u), safflower (u), osp 7.0% peanut meal (u), safflower meal (u), p 4.8% cowpea (u), pp 3.5% cowpea meal (u), lentil flour (u), soybean meal (u), r 4.7%, rp 4.7%, se 4.7%, sea 8.1%, v 11.6%

Facilities: barley mills, currant raisin storages, empty farm grain bins, farms, feedmills, flat storages of grain, flour mills, grain elevators, granaries, maltings, pet stores, retail stores, peanut shelling plants, peanut warehouses, sultana raisin storages

Natural enemies (6): *Cephalonomia waterstoni*, *Palorus shikhae*, *Peregrinator biannulipes*, *Plastonoxus chittendenii*, *Plastonoxus westwoodi*, *Xylocoris flavipes*

Life history: Currie 1967, Hagstrum and Milliken 1988

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cryptolestes spartii (Curtis 1834)

Dimension: 1.5-2 mm long

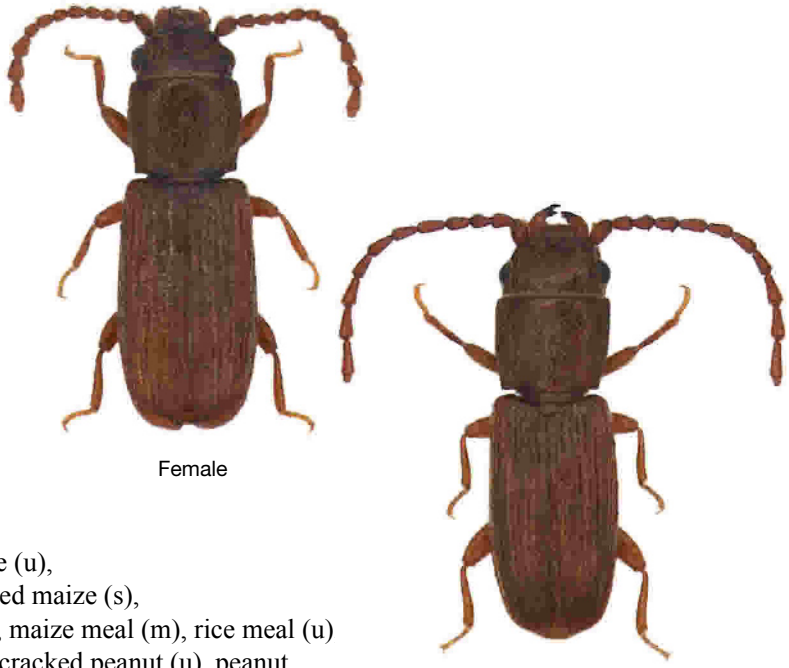
Taxonomy: Col., Laemophloeidae, originally *Cucujus spartii* Curtis. For additional synonyms see Löbl and Smetana 2007.

Distribution (3): Af 6, As 1, E 15

Commodities (1): gp 100%

Facilities: flour mills, grain bins at elevators, mill machinery

Cryptolestes turcicus (Grouvelle 1876)



Dimension: 1.5-2.1 mm long

Common names: flour mill beetle, Turkish grain beetle, cucujide longicorne (longhorn beetle (F)), Мукоед турецкий (Turkish flat grain beetle (R)), türkische Leistenkopfplattkäfer (Turkish head strips flat beetle (G)), türkischer Leistenplattkäfer (Turkish strips flat beetle (G))

Taxonomy: Col., Laemophloeidae, has been in the family Cucujidae, originally *Laemophloeus turcicus*, transferred to new genus by Steel and Howe 1955 and *Cryptolestes* (*Tripsolestes*) *turcicus* (Grouvelle) by Iablokoff-Khnzorian 1978, syn. *Laemophloeus immundus* Reitter 1874. *Laemophloeus truncatus* Casey 1884.

Distribution (5): Cosmopolitan. Af 8, As 11, E 17, N 2, SA 4

Commodities (27): bc 3.7%, df 11.1%, g 25.9% maize (u), rice (u), wheat (u), gp 22.2% cracked barley (u), cracked maize (s), cracked oat (u), cracked rice (u), cracked wheat (s, m), maize meal (m), rice meal (u) wheat meal (s), me 3.7%, os 0% peanut (u), osp 3.7% cracked peanut (u), peanut meal (u), p 3.7% broad bean (u), cowpea (u), pp 0% cowpea meal (u), cracked cowpea (u), crushed broad bean (u), soybean meal (u), res 7.4%, rp 3.7%, sea 11.1%, v 3.7%

Facilities: bakeries, currant storages, farm storages of rice, feedmills, flour mills, grain elevators, maltings, peanut shelling plants, peanut warehouses

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cryptophagus acutangulus Gyllenhal 1827

Dimension: 1.5-3.5 mm long

Common name: acute-angled fungus beetle

Taxonomy: Col., Cryptophagidae, syn. *Cryptophagus prominens* Casey 1924, *Cryptophagus restrictus* Casey 1924. For additional synonyms see Löbl and Smetana 2007.

Distribution (5): Af 3, As 8, E 32, N 3, O 1

Commodities (16): anv 6.3%, df 18.8%, g 12.5%, gp 12.5%, n 12.5%, oc 6.3%, pp 6.3%, sp 6.3%, v 18.8%

Facilities: bakeries, barley storages at maltings, cellars, empty farm grain bins, flour mills, granaries, herbariums, warehouses

Life history: Hinton and Stephens 1941

Cryptophagus cellaris (Scopoli 1763)

Dimension: 1.9-2.8 mm long

Common name: cellar beetle

Taxonomy: Col., Cryptophagidae, originally *Dermestes cellaris* and transferred to new genus by Westwood 1840, syn. *Cryptophagus angustatus* Casey 1924, *Cryptophagus rupimontis* Casey 1924. For additional synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Af 7, As 17, E 33, N 2, O 1, SA 1

Commodities (39): aninv 2.6%, anv 2.6%, bg 2.6%, df 12.8%, ffv 2.6%, g 20.5%, gp 15.4%, n 5.1%, oc 2.6%, os 5.1%, osp 5.1%, p 2.6%, pp 5.1%, res 2.6%, sp 5.1%, v 5.1%, wp 2.6%

Facilities: barley storages, breweries, cellars, farm storages of rice, feedmills, grain elevators, granaries, growing floors at maltings, leather factories, malt storages at maltings, warehouses

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cryptophagus dentatus (Herbst 1793)

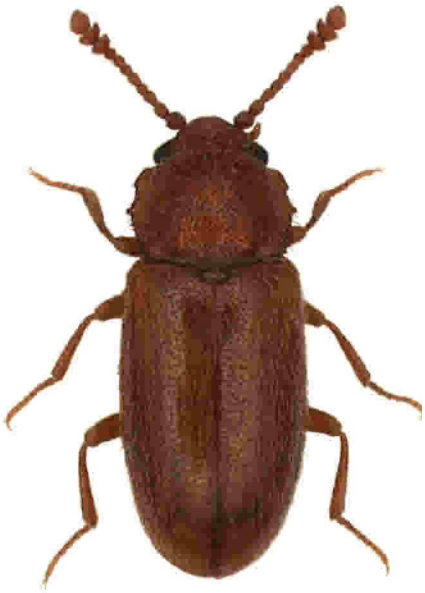
Dimension: 1.9-2.9 mm long

Taxonomy: Col., Cryptophagidae, originally *Kateretes dentatus* Herbst 1793, syn. *Corticaria fumata* Marsham 1802, *Cryptophagus fortidens* Rey 1889, *Cryptophagus fumatus* (Marsham 1802), *Cryptophagus quadridentatus* Mannerheim 1843

Distribution (4): Af 7, As 5, E 38, N 2

Commodities (11): df 27.3%, g 27.3%, gp 9.1%, me 9.1%, os 9.1%, rp 9.1%, v 9.1%

Facilities: granaries, warehouses, wine cellars, wine factories



Cryptophagus pilosus Gyllenhal 1827

Dimension: 2-3.2 mm long

Taxonomy: Col., Cryptophagidae, syn. *Cryptophagus punctipennis* C. Brisout de Barneville 1863. For additional synonyms see Löbl and Smetana 2007.

Distribution (4): Af 1, As 7, E 32, N 2

Commodities (8): df 12.5%, g 12.5%, gp 25.0%, gs 12.5%, n 12.5%, pp 12.5%, v 12.5%

Facilities: bakeries, barley storages, empty farm grain bins, feedmills, grain elevators, granaries, growing floors atmaltings, malt storages, warehouses

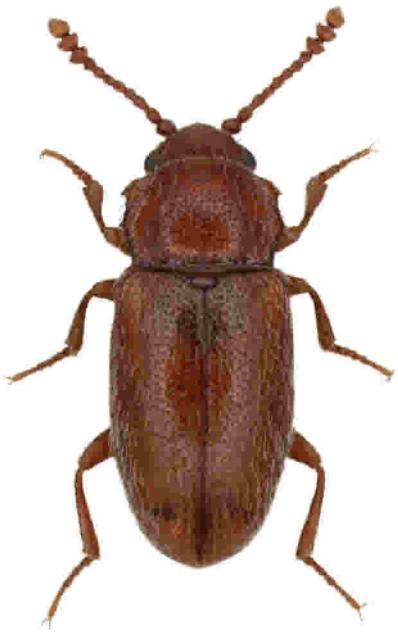


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cryptophagus saginatus Sturm 1845

Dimension: 1.7-2.7 mm long

Taxonomy: Col., Cryptophagidae. For synonyms see Löbl and Smetana 2007.

Distribution (4): Af 4, As 2, E 37, N 2

Commodities (12): df 8.3%, g 41.7%, gp 8.3%, gs 8.3%, n 8.3%, v 25.0%

Facilities: barley storages, breweries, currant storages, farm storages of rice, flour mills, grain elevators, granaries, growing floors at maltings, malt storages, warehouses

Cryptophagus scanicus (Linnaeus 1758)

Dimension: 1.8-2.8 mm long

Taxonomy: Col., Cryptophagidae, originally *Dermestes scanicus.* For synonyms see Löbl and Smetana 2007.

Distribution (4): Af 2, As 3, E 35, N 1

Commodities (9): df 33.3%, ffv 11.1%, g 11.1%, gp 11.1%, n 22.2%, v 11.1%

Facilities: currant raisin storages, flour mills, granaries, sultana raisin storages

Natural enemies: *Zeteticontus laeviscutum*

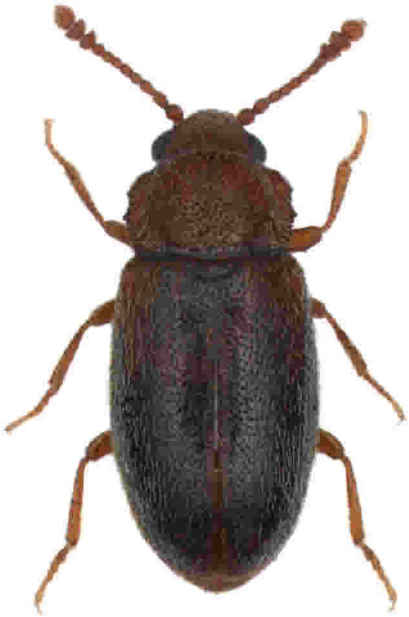

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cryptophagus scutellatus Newman 1834

Dimension: 1.2-1.9 mm long

Taxonomy: Col., Cryptophagidae, syn. *Cryptophagus bicolor* Sturm 1945. For additional synonyms see Löbl and Smetana 2007.

Distribution (4): Af 1, As 3, E 33, N 2

Commodities (1): g 100%

Facilities: grain elevators, granaries, warehouses

Cryptophagus setulosus Sturm 1845

Dimension: 2-3.2 mm long

Taxonomy: Col., Cryptophagidae, syn. *Cryptophagus antennatus* Casey 1900, *Cryptophagus grossulus* Casey 1924. For additional synonyms see Löbl and Smetana 2007.

Distribution (4): Af 2, As 5, E 28, N 2

Facilities: granaries

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cryptophagus subfumatus Kraatz 1856

Dimension: 2-3.2 mm long

Common name: silky grain beetle

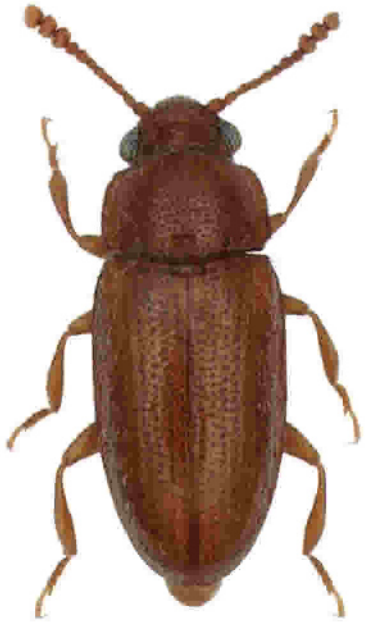
Taxonomy: Col., Cryptophagidae, syn. *Cryptophagus kraatzi* Reitter 1875.

Distribution (3): As 6, E 29, N 3

Commodities (8): aninv 12.5%, df 37.5%, g 12.5%, n 25%, sea 12.5%

Facilities: grain elevators

Cryptophilus integer (Heer 1841)



Dimension: 2.4 mm long

Taxonomy: Col., Languriidae, originally *Cryptophagus integer*, syn. *Cryptophilus propinquus* Reitter 1874, also in family Biphyllidae and family Erotylidae subfamily Cryptophilinae. For additional synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Af 8, As 16, E 19, N 2, O 1, SA

Commodities (13): df 15.4%, g 23.1%, gp 7.7%, me 7.7%, pp 7.7%, res 15.4%, sp 7.7%, v 15.4%

Facilities: currant raisin storages, feedmills, paddy storages, sultana raisin storages

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cydia pomonella (Linnaeus 1758)

Dimension: 14-22 mm wingspan

Common name: codling moth

Taxonomy: Lep., Tortricidae, originally *Phalaena pomonella*, also as *Carpocapsa pomonella*, *Enarmonia pomonella*, *Laspeyresia pomonella*.

Distribution (3): As 2, E 3, N 2

Commodities (5): ffv 60%, n 40%

Natural enemies (6): *Dibrachys cavus*, *Eupelmus cyaniceps*, *Hymenochaonia delicata*, *Macrocentrus ancylivorus*, *Macrocentrus instabilis*, *Pristomerus vulnerator*

Life history: Aghdam et al. 2009a, b; Howell 1981, Howell and Neven 2000

Cylas formicarius (Fabricius 1798)

Dimension: 6-8.5 mm long

Common name: sweet potato weevil

Taxonomy: Col., Brentidae, includes subspecies *Cylas formicarius elegantulus* (Summers 1875), also in families Apionidae, Curculionidae, and Cyladidae

Distribution (6): African origin. Af 22, As 17, C 16, N 2, O 15, SA 3

Commodities (1): r 100% sweet potato (s)

Natural enemies: *Bassus cylasovorus*, *Bracon cylasovorus*, *Bracon punctanus*, *Bracon yasudai*, *Euderus purpureas*, *Metapelma spectabilis*, *Microbracon mellitor*

Life history: Mullen 1981

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Cynaeus angustus (LeConte 1851)

Dimension: 4.5-6.1 mm long

Common name: larger black flour beetle

Taxonomy: Col., Tenebrionidae

Distribution (5): North American origin. As 1, C, E, N3, SA

Commodities (16): df 12.5%, g 37.5% barley (s), maize (s), oat (s), wheat (s), gp 25.0%, gs 6.3%, oc 6.3%, pp 6.3%, v 6.3%

Facilities: bakeries, empty farm grain bins, farm grain bins, feedmills, flat storages of grain, flour mills, grain elevators, mausoleums, peanut shelling plants, peanut warehouses, poultry houses, railroad cars, residences, retail stores, tobacco storage at factories, worm beds

Life history: Krall and Decker 1945, White and Sinha 1987

Dermestes ater DeGeer 1774

Dimension: 7-9 mm long

Common names: black larder beetle, incinerator beetle, Dermeste noir (black beetle (F)), Кожеед чёрный (black carpet beetle (R)), Aasspeckkäfer (carrion bacon beetle (G))

Taxonomy: Col., Dermestidae, syn. *Dermestes cadaverinus* Fabricius 1775. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. American origin. Af 14, As 30, C 2, E 41, N 2, O 9, SA 4

Commodities (77): aninv 7.8%, anv 20.8%, bc 5.2%, bg 1.3%, df 5.2%, ffv 2.6%, g 3.9%, gp 5.2% wheat flour (u), wheat germ (s), me 2.6%, n 3.9%, oc 5.2%, os 6.5% peanut (u), osp 9.1%, p 2.6%, pp 1.3% soybean meal (u), r 2.6%, se 2.6%, sea 2.6%, sp 1.3%, v 7.8%

Facilities: empty cargo containers, peanut shelling plants, peanut warehouses, restaurants, spice warehouses

Natural enemies: *Creophilus maxillosus*

Life history: Coombs 1981, Roth and Willis 1950

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dermestes caninus Germar 1824

Dimension: 7.5-8.5 mm long

Taxonomy: Col., Dermestidae. For synonyms see Mroczkowski 1968.

Distribution (2): C 3, N 3

Commodities (1): os 100%

Dermestes carnivorus Fabricius 1775

Dimension: 6.5-7.5 mm long

Taxonomy: Col., Dermestidae. For synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. American origin. Af 5, As 8, C 1, E 13, N 2, O 3, SA 1

Commodities (22): aninv 4.5%, anv 31.8%, bc 4.5%, g 4.5%, me 4.5%, n 4.5%, oc 9.1%, os 9.1%, osp 9.1%, res 4.5%, se 4.5%, v 9.1%

Facilities: meat stores

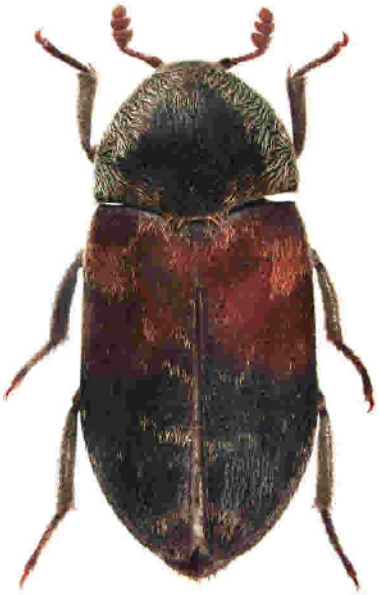


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dermestes frischii Kugelann 1792

Dimension: 6-10 mm long

Common names: leather beetle, Frisch's speckkäfer (Frisch's bacon beetle (G)), Кожеед Фриша (Frisch carpet beetle (R)), dornloser Speckkäfer (thornless bacon beetle (G))

Taxonomy: Col., Dermestidae. For synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Af 10, As 27, E 42, N 2, O 1, SA 1

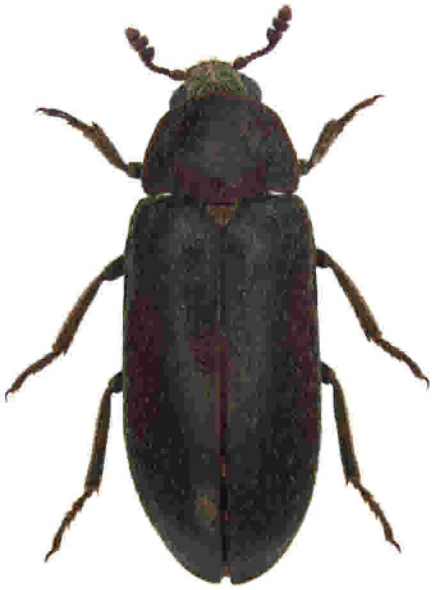
Commodities (37): aninv 16.2%, anv 35.1% fishmeal (s), bc 2.7%, bg 2.7%, df 5.4%, g 5.4%, gp 5.4% wheat flour (u), wheat germ (u), me 2.7%, n 2.7%, oc 5.4%, os 5.4% peanut (u), osp 2.7%, p 2.7%, pp 0% soybean meal (u), sea 2.7%, wp 2.7%

Facilities: cocoa and spice warehouses, fishmeal plant, granaries, mills

Natural enemies: *Creophilus maxillosus*, *Korynetes coeruleus*, *Necrobia violacea*, *Saprinus semipunctatus*, *Saprinus semistriatus*

Life history: Amos 1968, Howe 1953

Dermestes haemorrhoidalis Küster 1852



Dimension: 6.5-9 mm long

Common names: black larder beetle, sheepskin dermestid, dermeste africain du lard (African bacon dermestid (F))

Taxonomy: Col., Dermestidae, syn. *Dermestes gulo* Mulsant and Godart 1855

Distribution (4): Cosmopolitan. Af 10, As 3, E 18, SA 4

Commodities (4): anv 100%, gp 0% wheat flour (u), wheat germ (u), os 0% peanut (u)

Facilities: dairies, factories, food-processing facilities, hospitals, hotels, offices, meat packing plants, milk powder plants, residences, shops, slaughterhouses, tanneries

Life history: Coombs 1979, Jacob and Fleming 1984

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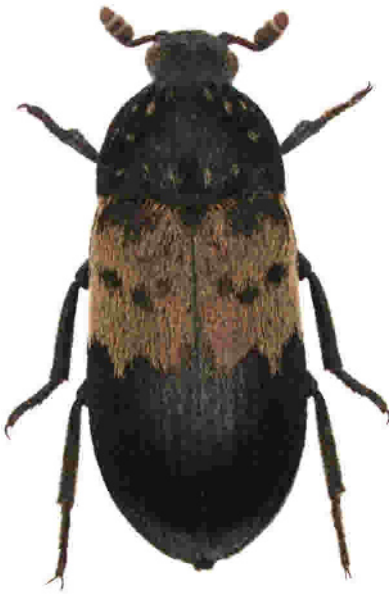
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dermestes lardarius Linnaeus 1758



Dimension: 7-9.5 mm long

Common names: bacon beetle, larder beetle (dermeste du lard (F)), dermeste del tocino (bacon dermestid (S)), gemeiner Speckkäfer (common bacon beetle (G)), Кожеед ветчинный (ham carpet beetle (R)), escarabajo de las despensas (pantry beetle (S))

Taxonomy: Col., Dermestidae, syn. *Dermestes luganensis* Stierlin 1902. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Eurasian origin. Af 10, As 25, C 3, E 42, N 2, O2, SA 2

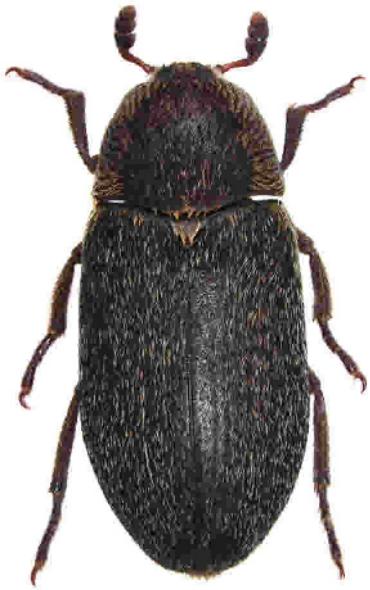
Commodities (50): aninv 10.0%, anv 36.0% fishmeal (s), bc 4.0% cocoa (u), bg 6.0%, df 6.0%, g 4.0%, gp 4.0% wheat flour (u), wheat germ (s), n 4.0% almond (u), oc 2.0%, os 0% peanut (s), osp 8.0% copra (u), p 2.0%, pp 2.0% soybean meal (u), se 2.0%, sea 2.0%, sp 4.0%, v 4.0%

Facilities: bakeries, butcher shops, chocolate factories, empty grain bins, farm grain bins, feedmills, flat storages of grain, flour mills, food-processing facilities, hospitals, hotels, meat packing plants, offices, pet stores, poultry houses, residences, restaurants, shops, slaughterhouses, warehouses

Natural enemies (1): *Saprinus semistriatus*

Life history: Coombs 1978, Jacob and Fleming 1980a,b, 1981, 1984

Dermestes maculatus DeGeer 1774



Dimension: 5.5-10 mm long

Common names: hide beetle, leather beetle (dermeste des peaux (F), gorgojo del cuero (S)), skin beetle, tallow dermestid, Fuchsspeckkäfer (fox bacon beetle (G)), Dermeste renard (fox beetle (F)), dermeste zorruno (foxy dermestid (S)), Кожеед шиповатый (prickly carpet beetle (R)), Кожеед пятнистый (spotted carpet beetle (R)), Dornspeckkäfer (thorny bacon beetle (G))

Taxonomy: Col., Dermestidae, syn. *Dermestes truncatus* Casey 1916, *Dermestes vulpinus* Fabricius 1781. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Eurasian origin. Af 15, As 28, C 2, E 42, N 3, O 3, SA 6

Commodities (83): aninv 10.8%, anv 30.1% blood meal (s), bone meal (s), fishmeal (s), fish (dried) (s), sardine meal (m), hide (s), bc 4.8% cocoa (u), bg 1.2%, ffv 1.2%, g 3.6%, gp 3.6% wheat flour (u), wheat germ (u), me 1.2%, n 3.6% almond (u), oc 8.4% dog chow (s), os 6.0% peanut (u), osp 3.6% copra (u), palm kernel meal (u), p 3.6%, pp 0.0% soybean meal (s), r 1.2%, se 4.8%, sea 1.2%, t 3.6%, v 6.0%, wp 1.2%, v 0% alfalfa pellet (u), ryegrass pellet (u)

Facilities: bone-crushing works, dry milk factories, empty cargo containers, food-processing facilities, local fish markets, meat packing plants, peanut shelling plants, peanut warehouses, poultry houses, skin yards, slaughterhouses, soap factories, tanneries

Life history: Bellemare and Brunelle 1950, Kiritani 1959, Paul et al. 1963, Richardson and Goff 2001, Scoggin and Tauber 1949

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dermestes marmoratus Say 1823

Dimension: 10-13 mm long

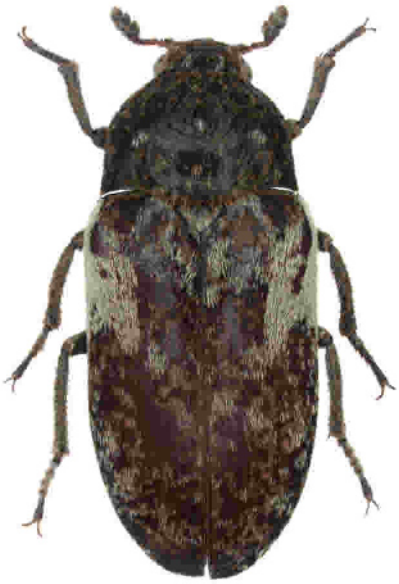
Common names: common carrion dermestid, hide beetle

Taxonomy: Col., Dermestidae

Distribution (3): Af 2, C 1, N 3

Commodities (1): oc 100%

Facilities: cereal warehouses, powder milk plants



Dermestes murinus Linnaeus 1758

Dimension: 7-9 mm long

Common names: mausgrauer Speckkäfer (mousy bacon beetle (G)), Кожеед рябой (pockmarked carpet beetle (R))

Taxonomy: Col., Dermestidae. For synonyms see Löbl and Smetana 2007.

Distribution (3): Af 3, As 9, E 31

Commodities (4): aninv 50.0%, anv 50.0%

Facilities: bone-crushing works, museums, residences, warehouses

Natural enemies (1): *Hemiteles dermestinus*

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dermestes peruvianus La Porte de Castelnau 1840

Dimension: 7-10 mm long

Common names: Peruvian larder beetle, gusano peludo del charqui (furry dried meat worm (S)), dermeste péruvien (Peruvian bacon beetle (F)), peruvianischer Speckkäfer (Peruvian bacon beetle (G)), Кожеед перуанский (Peruvian carpet beetle (R))

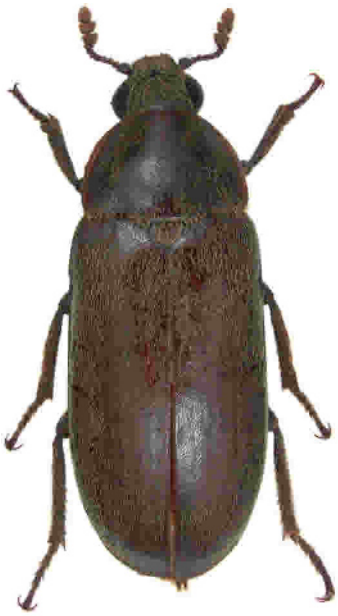
Taxonomy: Col., Dermestidae, syn. *Dermestes angustatus* C. F. A. Schaeffer 1931, *Dermestes angustus* Casey 1900, *Dermestes oblongus* Solier 1849, *Dermestes peruanus* Erichson 1847, *Dermestes rufofuscus* Solier 1849.

Distribution (5): Cosmopolitan. Probably South American origin. Af 4, As 4, E 10, N 2, SA 4

Commodities (11): aninv 9.1%, anv 54.5%, g 9.1%, gp 0% wheat flour (u), wheat germ (u), os 0% peanut (u), osp 18.2%, v 9.1%

Facilities: factories, food-handling facilities, hide warehouses, hospitals, hotels, offices, residences, shops

Life history: Coombs 1979



Dermestes tessellatocollis Motschulsky 1860

Dimension: 7-8 mm long

Taxonomy: Col., Dermestidae, syn. *Dermestes kaliki* Havelka 1957.

Distribution (1): As 8

Commodities (7): aninv 16.7%, anv 33.3%, me 16.7%, os 16.7%, osp 16.7%

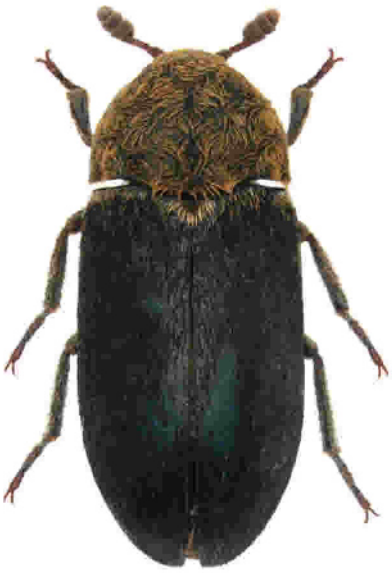


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dermestes undulatus Brahm 1790

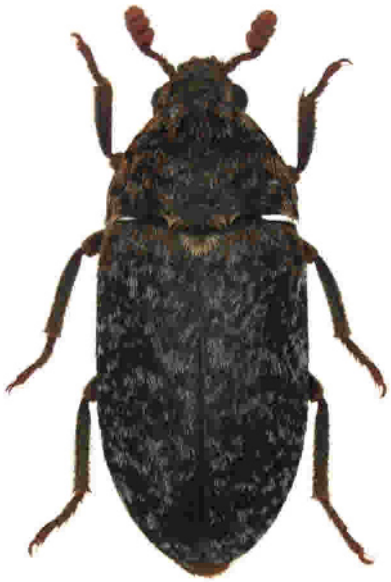
Dimension: 5-7 mm long

Taxonomy: Col., Dermestidae. For synonyms see Löbl and Smetana 2007.

Distribution (3): As 4, E 4, N 2

Commodities (6): aninv 33.3%, anv 33.3%, g 16.7%, me 16.7%

Facilities: warehouses



Dermestes vorax Motschulsky 1860

Dimension: 7-8 mm long

Taxonomy: Col., Dermestidae, syn. *Dermestes albofasciatus* Matsumura and Yokoyama 1928

Distribution (2): As 7, E 2

Commodities (4): aninv 50.0%, anv 25.0%, me 25.0%

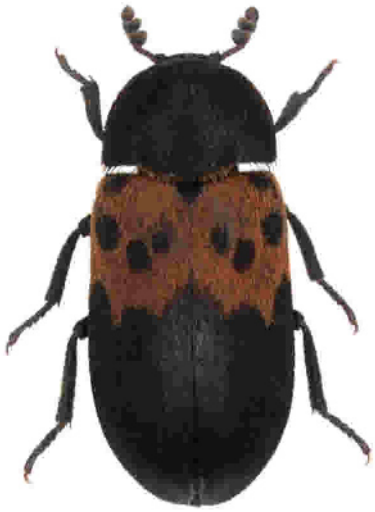


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dienerella arga (*-us*) (Reitter 1884)

Dimension: 1.3-1.4 mm long

Taxonomy: Col., Lathridiidae, originally *Cartodere argus* Reitter 1884, also as *Microgramme arga* (Reitter 1884).

Distribution (4): Af 6, As 6, E 20, N 2

Commodities (5): g 20.0%, gp 20.0%, osp 20.0%, res 20.0%, v 20.0%

Life history: Kerr and McLean 1956

Dienerella filiformis (Gyllenhal 1827)

Dimension: 1.2-1.4 mm long

Taxonomy: Col., Lathridiidae, originally *Lathridius filiformis* Gyllenhal 1827, also as *Cartodere filiformis* (Gyllenhal 1827), *Microgramme filiformis* (Gyllenhal 1827). For synonyms see Löbl and Smetana 2007.

Distribution (3): As 5, E 28, N2

Commodities (10): anv 20.0%, g 20.0%, me 10.0%, n 10.0%, sp 10.0%, v 30.0%

Facilities: empty feedmills, grain bins, grain elevators

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dienerella filum (Aubé 1850)

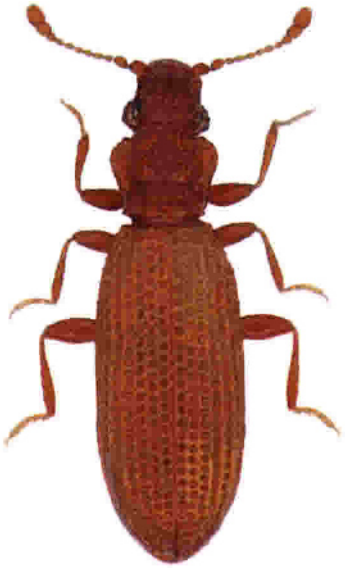
Dimension: 1.2-1.6 mm long

Common names: herbarium beetle, Жучок дрожжевой (minute mold beetle (R)), Hefekafer (yeast beetle (G))

Taxonomy: Col., Lathridiidae, originally *Lathridius filum*, also as *Cartodere filum* (Aubé 1850), *Microgramme filum* (Aubé 1850).

Distribution (5): Cosmopolitan. Af 1, As 2, E 23, N 3, SA

Commodities (9): df 11.1%, g 44.4%, gp 11.1%, me 11.1%, sp 11.1%, v 11.1%



Dinoderus bifoveolatus (Wollaston 1858)

Dimension: 2.5-3.7 mm long

Common name: West African ghoon beetle

Taxonomy: Col., Bostrichidae, syn. *Dinoderus perpunctatus* Lesne 1895.

Distribution (5): Cosmopolitan. Af 8, As 13, E 15, N 1, SA 1

Commodities (28): bc 3.6%, df 3.6%, g 7.1%, gp 7.1%, osp 3.6%, r 21.4%, rp 17.9%, sea 3.6%, v 32.1%

Natural enemies (1): *Denops albofasciatus*

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dinoderus brevis Horn 1878

Dimension: 2.5-4 mm long

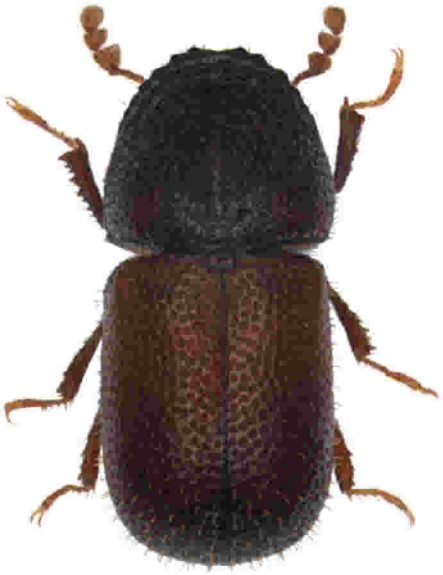
Common name: Indian ghoon beetle

Taxonomy: Col., Bostrichidae

Distribution (4): Af 3, As 10, C 1, E 7

Commodities (7): g 28.6%, r 14.3%, v 57.1%

Natural enemies (1): *Spathius bisignatus*



Dinoderus japonicus Lesne 1895

Dimension: 3.5-5 mm long

Common name: Japanese ghoon beetle

Taxonomy: Col., Bostrichidae, syn. *Dinoderus pubicollis* Van Dyke 1923, *Dinoderus tsugae* Matsumura 1915.

Distribution (4): As 2, E 4, N 1, O 1

Commodities (2): g 50.0%, v 50.0%

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Dinoderus minutus (Fabricius 1775)

Dimension: 2.6-3.5 mm long

Common names: bamboo borer, bamboo powderpost beetle (escarabajo del bamboo seco (S)), smaller bamboo shot-hole borer, bostryche des bambous (bamboo bark beetle (F)), Капюшонник бамбуковый (bamboo bark beetle (R)), Bambusbohrer (bamboo drill (G))

Taxonomy: Col., Bostrichidae, originally *Apate minutus* and transferred to new genus by Lesne 1897, syn. *Dinoderus japonicus* Matsumura 1915, *Dinoderus substriatus* Stephens 1830. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Chinese, Japanese or Indian origin. Af 14, As 14, C 5, E 16, N 2, O 2, SA 2

Commodities (48): bc 4.2%, df 4.2%, ffv 6.3%, g 10.4%, gp 2.1%, me 2.1%, n 4.2%, oc 2.1%, os 2.1%, osp 2.1%, p 4.2%, r 14.6%, rp 6.3%, se 2.1%, sea 6.3%, sp 2.1%, t 2.1%, v 16.6% bamboo (s), w 2.1%, wp 4.2%

Facilities: cocoa and spice warehouses, empty cargo containers

Natural enemies (11): *Cerocephala aquila*, *Cerocephala dinoderi*, *Denops albofasciatus*, *Doryctes jarvus*, *Peregrinator biannulipes*, *Platyspathius dinoderi*, *Sclerodermus domesticus*, *Sclerodermus harmandi*, *Spathius bisignatus*, *Teretrius nigrescens*, *Tilloedea notatus*

Life history: Garcia and Morrell 2009, Plank 1948

Dinoderus ocellaris Stephens 1830

Dimension: 3-4 mm long

Taxonomy: Col., Bostrichidae, syn. *Dinoderus pilifrons* Lesne 1895

Distribution (5): Af 1, As 9, E 8, N 1, O 2

Commodities (4): r 25.0%, rp 25.0%, v 50.0%

Natural enemies (2): *Platyspathius dinoderi*, *Spathius bisignatus*

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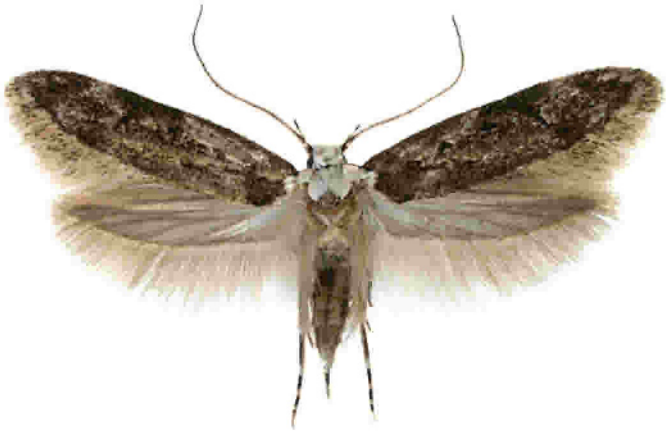
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Endrosis sarcitrella (Linnaeus 1758)



Dimension: 15-21 mm wingspan

Common names: white-shouldered house moth, whiteshouldered tubic, Моль мусорная домашняя (garbage house moth (R)), Моль мусорная (garbage moth (R)), Teigne de l'agaric du bouleau (horse mushroom birch moth (F)), polilla de la despensa (pantry moth (S)), Teigne fripière (shouldered house moth (F)), Kleistermotte (shouldered house moth (G))

Taxonomy: Lep., Oecophoridae, syn. *Endrosis lactella* (Denis and Schiffermüller 1775)

Distribution (4): Cosmopolitan. E 4, N 2, O 2, SA 1

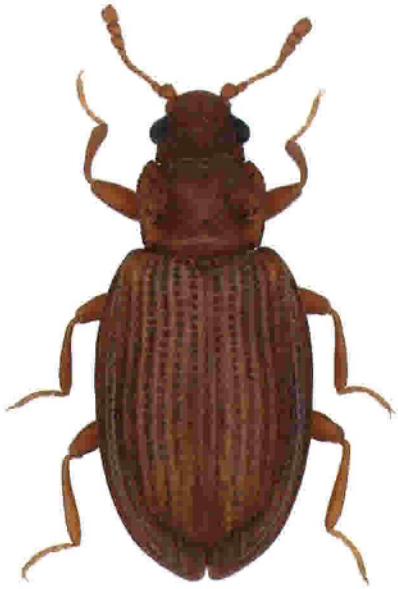
Commodities (42): aninv 2.4% dried insect (s), anv 11.9%, bc 2.4%, df 2.4%, ffv 2.4%, g 11.9% wheat (s), gp 28.6% macaroni (m), wheat flour or middling (s), n 2.4%, oc 2.4%, os 2.4% peanut (m), osp 7.1%, p 9.5% bean (s), pp 4.8%, r 2.4%, se 2.4%, sp 2.4%, v 2.4% dried grass (s)

Facilities: barley storages, breweries, flat storages of grain, feedmills, flour mills, growing floors at maltings, malt storages, pourltry houses, residences

Natural enemies: *Diadegma chrysostictos*, *Microbracon variegator*, *Xenolytus bitinctus*

Life history: Woodroffe 1951b

Enicmus histrio Joy and Tomlin 1910



Dimension: 1.5-2.1 mm long

Common name: Furchenhals-Moderkäfer (groove neck plaster beetle (G))

Taxonomy: Col., Lathridiidae, syn. *Cartodere histrio* Joy and Tomlin 1910

Distribution (3): Cosmopolitan. Af 4, As 12, E 28

Commodities (1): g 100%

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Epauloecus unicolor (Piller and Mitterpacher 1783)

Dimension: 1.8-3 mm long

Common name: brauner Spinnenkäfer (brown spider beetle (G))

Taxonomy: Col., Ptinidae, originally *Ptinus unicolor*, also as *Tipnus unicolor* (Piller and Mitterpacher 1783). For synonyms see Löbl and Smetana 2007.

Distribution (4): Af 1, As 1, E 5, N 1

Commodities (3): anv 33.3%, g 33.3%, me 33.3%

Facilities: bakeries, barley storages, bread stores, breweries, flour mills, growing floors at maltings, maize shops, malt storages, residences, stables, warehouses

Life history: Howe 1955

Ephestia elutella (Hübner 1796)

Dimension: 14-22 mm wingspan

Common names: chocolate moth (Огнёвка шоколадная (R)), cocoa bean moth, cocoa moth (pyrale du cacao (F), teigne du cacao (F), Kakaomotte (G), Огнёвка какаовая (R), tina del cacao (S)), currant moth, red streaked knothorn, stored tobacco moth, tobacco moth (pyrale du tabac (F), Heumotte (G), Tabakmotte (G), Огнёвка табачная (R), polilla del tabaco (S)), walnut moth, warehouse moth (Speichermotte (G)), polilla de color chocolate (chocolate colored moth (S)), Dörrobstzüensler (dried fruit borer (G)), graue Dörrobstmotte (gray dried fruit moth (G)), Grautteumotte (groat moth (G)), Teigne friande du cacao (moth fond of cocoa (F)), Graupenmotte (pearl barley moth (G)), Kiefernsamenzünsler (pine seed borer (G)), Огнёвка семенная (seed moth (R))

Taxonomy: Lep., Pyralidae, originally *Tinea elutella*. For synonyms see Corbet and Tams 1942, Heinrich 1956, and Neunzig 1990

Distribution (7): Af 10, As 26, C 2, E 39, N 3, O 3, SA 4

Commodities (77): aninv 2.6%, bc 2.6% cocoa bean (m) ground cocoa bean (s), bg 2.6%, df 14.3% fig (m) sultana (s), dfp 1.3%, ffv 2.6%, g 10.4% oat (s), rice (s), wheat (s), gp 9.1% ground maize (s), wheat flour (m), wheat germ or middlings (s), wheat ground (s), me 3.9%, n 3.9%, np 1.3%, oc 2.6%, os 5.2%, osp 3.9% ground peanut (s), p 3.9% bean (m), pea (s), pp 0% soybean flour, grit or meal (s), r 2.6%, rp 1.3%, se 2.6%, sea 7.8%, v 13.0% alfalfa pellet (u), rye grass pellet (u), tobacco (m)

Facilities: bakeries, barley storages at maltings, chocolate factories, cull fig warehouses, feedmills, flat storages of grain, flour mills, haystacks, oilseed refineries, orchards, soup flavoring factories, storehouses, tobacco curing barns, tobacco drying plants, tobacco fields, tobacco warehouses

Natural enemies (14): *Anisopteromalus calandrae*, *Diadegma chrysostictos*, *Goniozus emigratus*, *Goniozus gallicola*, *Habrobracon hebetor*, *Holepyris glabratus*, *Mesostenus gracillis*, *Orius insidiosus*, *Psilochalcis brevialata*, *Trichogramma evanescens*, *Trichogramma turkestanica*, *Venturia canescens*, *Xylocoris cursitans*, *Xylocoris flavipes*

Life history: Ashworth 1993a, Bell 1975, Imura 1981, Subramanyam and Hagstrum 1993, Waloff et al. 1948

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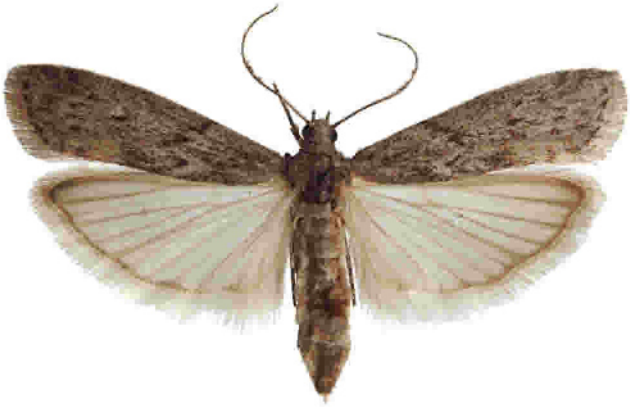
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Ephestia kuehniella Zeller 1879



Dimension: 20-22 mm wingspan

Common names: flour moth (pyrale de la farine (F), teigne de la farine (F), mehlmotte (G), palomilla de la harina (S)), gray flour moth (papillon gris de la farine (F), polilla gris de la harina (S)), Mediterranean flour moth (pyrale mediterranéenne de la farine (F)), mill moth (Огнёвка мельничная (R), palomilla de los molinos (S)), storage pyralid moth (speicherzünsler (G)), wood moth (polilla de la Madera (S)), Огнёвка амбарная (storage moth (R))

Taxonomy: Lep., Pyralidae, also as *Anagasta kuehniella* (Zeller 1879), syn. *Ephestia fuscofasciella* Ragonot 1887, *Ephestia sericarium* (Scott 1859). For additional synonyms see Corbet and Tams 1942, Heinrich 1956 and Neunzig 1990.

Distribution (7): Af 11, As 12, C 1, E 29, N 3, O 3, SA 3

Commodities (84): aninv 1.2% dried insects (u), anv 0% dried milk (u), bc 2.4% tea leaf (s), bg 2.4% cracker (m), df 3.6%, dfp 1.2%, g 10.7% barley (s), buckwheat (s), rice (s), rye (s), wheat (s), gp 22.6% buckwheat flour (s), ground barley (s), ground buckwheat (s), ground millet (s), maize flour (s), noodle (m), oat flake (s), oat flour (s), rye flour (s), wheat bran, flour or semolina (s), n 5.9%, np 4.8%, oc 4.8%, os 7.1% broken sunflower (s), safflower (u), osp 3.6%, p 8.3%, soybean (u), pp 2.4% dried soya milk (s), soybean flour (s), soybean meal (u), safflower meal (u), r 2.4%, rp 1.2%, se 4.8%, sea 2.4%, v 8.3% dried vegetable (s), sugar (s), tobacco leaf (s)

Facilities: bakeries, barley mills, breweries, chocolate factories, cocoa warehouses, cull fig warehouses, farm storages of rice, feedmills, flat storages of grain, flour mills, grain bins, grain elevators, maltings, orchards, residences, tobacco curing barns, tobacco fields

Natural enemies (26): *Angitia incipiens*, *Anisopteromalus calandrae*, *Apanteles nephoptericis*, *Bracon mellitor*, *Cardiasthetus nazarenus*, *Chelonus blackburni*, *Chremylus elaphus*, *Diadegma chrysostictos*, *Habrobracon brevicornis*, *Habrobracon hebetor*, *Holepyris glabratus*, *Liotryphon punctulatus, Mesostenus gracilis*, *Mesostenus longicaudis*, *Nidicola marginata*, *Peregrinator biannulipes*, *Phanerotoma flavitestacea*, *Phanerotoma hapaliae*, *Phanerotoma ocularis*, *Trichogramma brassicae*, *Trichogramma carverae*, *Trichogramma evanescens*, *Trichogramma minutum*, *Trichogramma turkestanica*, *Venturia canescens*, *Xylocoris flavipes*, *Xylocoris sordidus*

Life history: Bell 1975, Imura 1981, Jacob and Cox 1977, Subramanyam and Hagstrum 1993

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Epuraea luteolus (*-a*) Erichson 1843

Dimension: 1.7-2.8 mm long

Common name: yellowbrown sap beetle

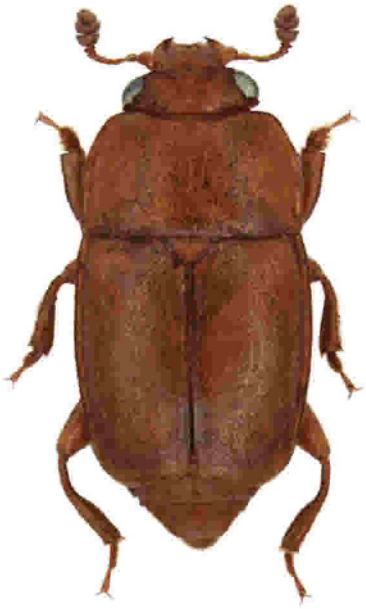
Taxonomy: Col., Nitidulidae, also as *Haptoncus luteolus*. For synonyms see Löbl and Smetana 2007.

Distribution (5): Cosmopolitan. Af 5, As 12, C 7, E 19, N 2

Commodities (29): df 13.8%, ffv 51.7%, g 3.4%, n 3.4%, os 3.4%, r 3.4%, res 3.4%, rp 3.4%, sea 3.4%, sp 3.4%, v 6.9%

Facilities: peanut shelling plants, peanut warehouses

Life history: Lindgren and Vincent 1953



Etiella zinckenella (Treitschke 1832)

Dimension: 18-25 mm wingspan

Common names: cowpea pod borer, lima bean pod borer, pea pod borer, pulse seed moth

Taxonomy: Lep., Pyralidae, originally *Phycis zinckenella.* For synonyms see Corbet and Tams 1942, Heinrich 1956 and Whalley 1973.

Distribution (7): Af 48, As 7, C 11, E 4, N 3, O 6, SA 11

Commodities (18): ffv 16.7%, g 5.6%, n 5.6%, p 66.7% broad bean (u), chickling vetch (s), chickpea (s), cowpea (s) lentil (s), lupine (s), pea (s), pigeonpea (u), v 5.6%

Natural enemies (8): *Apanteles appellator*, *Apanteles etiellae*, *Bracon gelechiae*, *Bracon pectoralis*, *Bracon piger*, *Eupelmus urozonus*, *Macrocentrus ancylivorus*, *Phanerotoma dentata*

Life history: Edmonds et al. 2000, Stone 1965

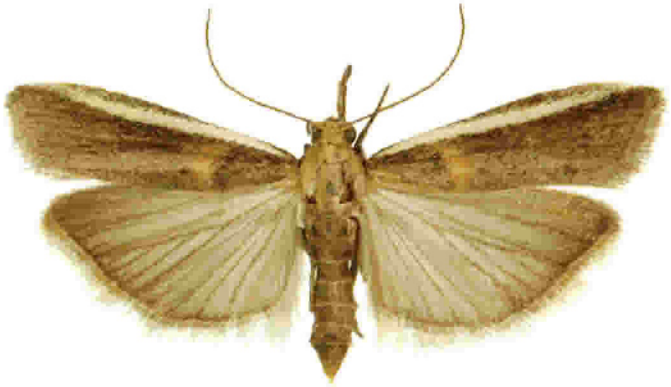


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Galleria mellonella (Linnaeus 1758)

Dimension: upto 30 mm wingspan

Common names: bee moth, greater wax moth (polilla grande de la cera (S)), honeycomb moth, wax moth (Fausse teigne de la cire (F)), grande teigne des ruches (large beehive moth (F)), große Wachsmotte (large wax moth (G)), Моль восковая большая (large wax moth (R))

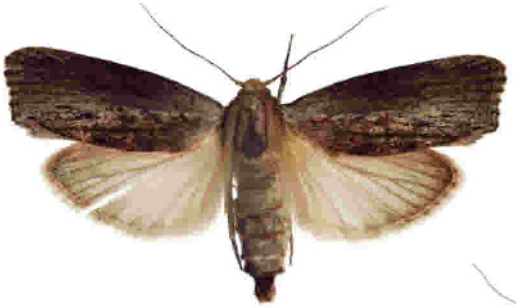
Taxonomy: Lep., Pyralidae

Distribution (6): Cosmopolitan. Af 1, As 3, E 1, N 1, O 1, SA 1

Commodities (3): aninv 66.7%, df 33.3%

Natural enemies (10): *Antrocephalus galleriae*, *Apanteles galleriae*, *Apanteles hoplites*, *Bracon gelechiae*, *Dibrachys boarmiae*, *Dibrachys cavus*, *Diadegma chrysostictos*, *Habrobracon hebetor*, *Venturia canescens*, *Xylocoris flavipes*

Life history: Cardoso et al. 2007, Warren and Huddleston 1952



Female

Male

Gibbium aequinoctiale Boieldieu 1854

Dimension: 1.7-2.5 mm long

Common name: smooth spider beetle

Taxonomy: Col., Ptinidae, syn. *Gibbium einsteini* Belles 1980. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 17, As 19, C 4, E 12, N 2, O 2, SA 3

Commodities (8): g 37.5%, me 12.5%, sea 12.5%, sp 12.5%, t 12.5%, v 12.5%

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Gibbium psylloides (de Czenpinski 1778)

Dimension: 1.7-3.2 mm long

Common names: hump beetle, shiny spider beetle, buckelkäfer (humpback beetle (G)), Притворяшка шаровидный (smooth spider beetle (R))

Taxonomy: Col., Ptinidae, originally *Scotias psylloides*, syn. *Gibbium boieldieui* Reitter, *Ptinus scotias* Fabricius 1781. For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 10, As 17, C 2, E 34, N 3, O 2, SA

Commodities (52): aninv 1.9%, anv 13.5% fishmeal (s), bc 1.9%, bg 3.8%, g 5.8%, gp 7.7% wheat flour (s), wheatfeed (m), me 7.7%, oc 5.8%, os 5.8%, osp 5.8%, p 1.9%, pp 1.9%, res 3.8%, se 3.8%, sea 11.5%, t 1.9%, v 13.5%, wp 1.9%

Facilities: bakeries, breweries, cocoa and spice warehouses, feedmills, flour mills, granaries, hotels, malt stores, peanut shelling plants, peanut warehouses, pet stores, residences, ship holds

Natural enemies (2): *Lariophagus distinguendus*, *Peregrinator biannulipes*

Life history: Howe and Burges 1952

Glischrochilus quadrisignatus (Say 1835)

Dimension: 4-7 mm long

Common names: four-spotted sap beetle, picnic beetle, nitidule fascié (fascinating sap beetle (F)), nitidule à quatre points (four points sap beetle (F)), vierfleckiger Rinden-Glanzkäfer (four spotted bark beetle (G))

Taxonomy: Col., Nitidulidae, originally *Ips quadrisignatus*. For synonyms see Löbl and Smetana 2007.

Distribution (3): North American origin. As 2, E 18, N 2

Commodities: ffv 0% apple (s), tomato (s)

Facilities: feedmills

Life history: Foott and Timmins 1979, Luckman 1963, Mussen and Chiang 1974

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Gnatocerus cornutus (Fabricius 1798)

Dimension: 3.5-5 mm long

Common names: broadhorned flour beetle (Хрущак рогатый (R)), Vierhornkäfer (four horned beetle (G)), caroma cornuda (horned beetle (S)), escarabajo cornudo de los granos (horned beetle of grain (S)), Чернотелка рогатая (horned blackbody beetle, horned darkie (R)), escarabajo cornuto de los cereales (horned cereal beetle (S)), Échocère cornue (horned echocera (F)), gorgojo cornudo de la harina (horned flour beetle (S)), gelbes Vierhorn (yellow four horn (G))

Taxonomy: Col., Tenebrionidae, originally *Trogosita cornuta* and transferred to new genus by Redtenbacher 1858, also as *Echocerus cornutus* (Fabricius 1798). For synonyms see Löbl and Smetana 2008.

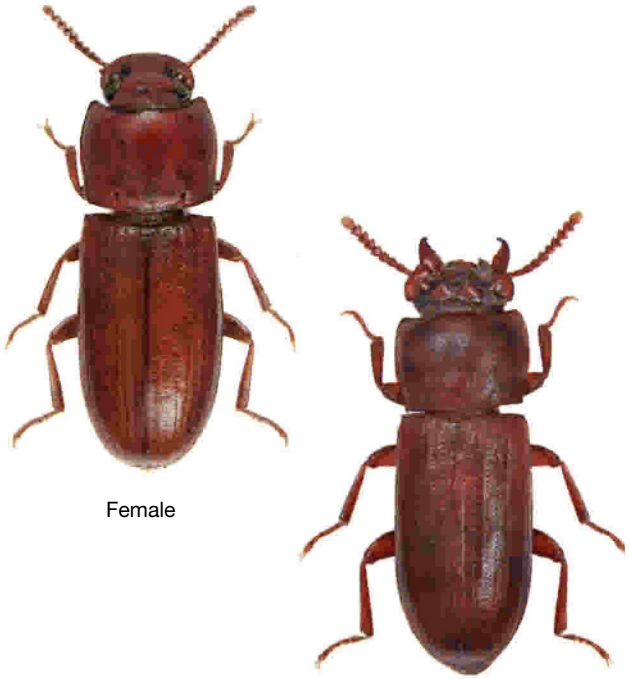
Distribution (7): Cosmopolitan. Af 11, As 7, C 3, E 6, N 3, O 4, SA 3

Commodities (66): anv 3.0%, bc 3.0%, bg 4.5%, df 1.5%, g 10.6%, gp 27.3%, me 1.5%, oc 3.0%, os 4.5% safflower (u), osp 9.1% safflower meal (s), p 3.0%, r 4.5%, res 3.0%, rp 4.5%, se 1.5%, sea 3.0%, v 12.1%

Facilities: bakeries, cocoa and spice warehouses, farm storages of rice, feedmills, flour mills, flour storages, grain warehouses, peanut shelling plants, peanut warehouses, retail grocery

Natural enemies (2): *Peregrinator biannulipes*, *Sclerodermus immigrans*

Life history: Pimentel 1949, Savvidou and Bell 1994, Tsuda and Yoshida 1984



Female

Male

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Gnatocerus maxillosus (Fabricius 1801)

Dimension: 3-4 mm long

Common name: slenderhorned flour beetle

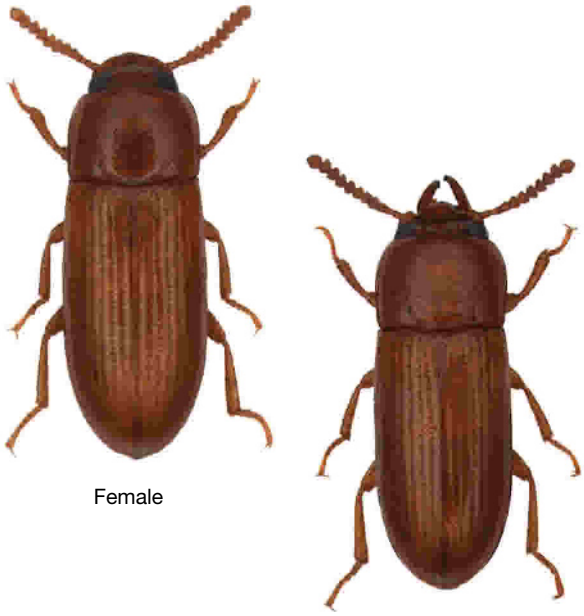
Taxonomy: Col., Tenebrionidae, originally *Trogossita maxillosus*

Distribution (6): Cosmopolitan. Af 12, As 4, C 6, E 7, N 2, SA 3

Commodities (28): bc 3.5%, g 21.4%, gp 28.6%, n 7.1%, oc 3.6%, os 7.1%, p 10.7%, r 7.1%, se 3.6%, sea 3.6%, v 3.5%

Facilities: cocoa and spice warehouses, flour mills, grain bins, peanut shelling plants, peanut warehouses

Life history: Ntifo and Nowosielski-Slepowron 1973



Female

Male

Gonocephalum prolixum (Erichson 1843)

Dimension: ca. 8 mm long

Taxonomy: Col., Tenebrionidae, originally *Opatrum prolixum* and transferred to new genus by Reitter 1904. For synonyms see Löbl and Smetana 2008.

Distribution (3): Af 9, As 3, E 3

Commodities (4): bc 25.0%, g 25.0%, os 50.0%

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Hadrobregmus pertinax Linnaeus 1758

Dimension: 4-5.5 mm long

Common names: knock beetle, trotzköpfiger Bohrkäfer (despite headed beetle (G)), Точильщик домовый (house grinder (R)), Vrillete opiniatre (obstinate beetle (F), Trotzkop (stubborn (G)), Vrillette des tables (table beetle (F)), Vrillette opiniâtre (tenacious beetle (F)), hartnäckiger Bohrkäfer (tenacious beetle (G))

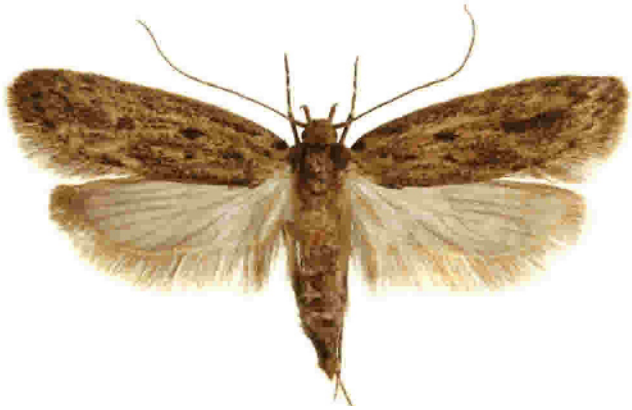
Taxonomy: Col., Anobiidae, originally *Dermestes pertinax*, also as *Anobium pertinax* (Linnaeus), For synonyms see Löbl and Smetana 2007.

Distribution (2): As 4, E 26

Commodities (1): w 100%

Facilities: furniture, museum exhibits, wooden constructions, wooden packaging

Hofmannophila pseudospretella (Stainton 1849)



Dimension: 20 mm wingspan

Common names: brown house moth, false clothes moth, seed moth (Samenmotte (G))

Taxonomy: Lep., Oecophoridae, also as *Borkhausenia pseudospretella* Stainton 1849

Distribution (4): As 1, E 2, N 2, O 2

Commodities (49): aninv 2.0% dried insect (s), anv 14.3% dried egg (s), dried milk (s), fishmeal (s), df 2.0%, g 10.2% oat (s), wheat (s), gp 18.4% noodle (s), wheat flour, germ or midlings (s), n 2.0%, oc 4.1%, os 4.1% peanut (s), osp 4.1%, p 6.1% bean (s), pea (s), soybean (s), pp 4.1%, r 4.1%, se 6.1%, t 4.1%, v 10.2% dried grass (s), yeast (s), wp 4.1%

Facilities: barley storages, breweries, flat storages of grain, flour mills, growing floors at maltings, malt storages, poultry houses, residences

Natural enemies (6): *Dibrachys boarmiae*, *Dibrachys cavus*, *Helina uliginosa*, *Hypsicera curvator*, *Venturia canescens* (lab), *Xenolytus bitinctus*

Life history: Woodroffe 1951a

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Holoparamecus caularum (Aubé 1843)

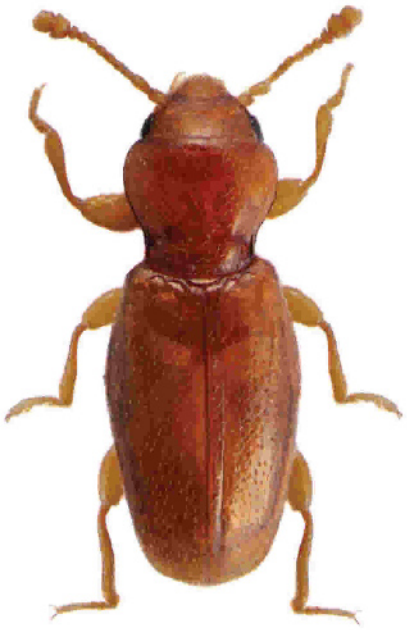
Dimension: 1-1.4 mm long

Taxonomy: Col., Endomychidae, originally *Calyptobium caularum*, also in families Lathridiidae and Merophysiidae. For synonyms see Löbl and Smetana 2007.

Distribution (5): Cosmopolitan. Af 4, As 3, E 21, N 1, O 1

Commodities (6): g 50.0%, gp 16.7%, res 16.7%, se 16.7%

Facilities: feedmills, granaries, paddy storages



Holoparamecus signatus Wollaston 1874

Dimenison: 1-1.2 mm long

Taxonomy: Col., Endomychidae, syn. *Holoparamecus capitatus* Wollaston 1874, also in families Lathridiidae and Merophysiidae

Distribution (1): As 3

Commodities (5): bc 20.0%, g 40.0%, gp 20.0%, sea 20.0%

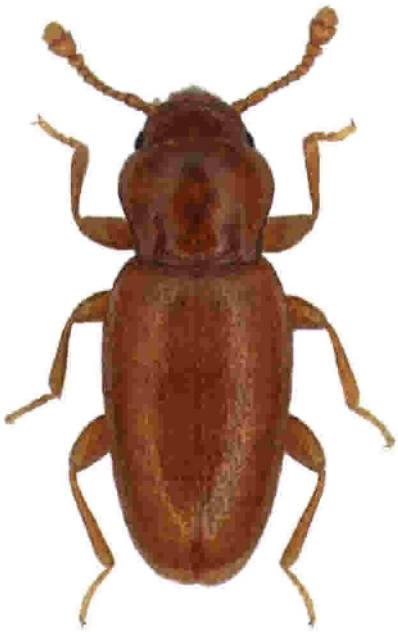


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Hypothenemus eruditus Westwood 1836

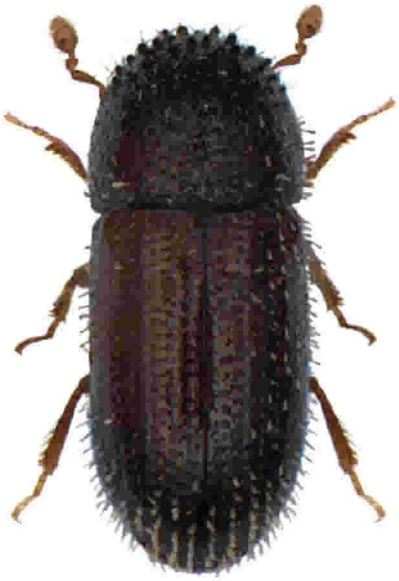
Dimension: 0.7-1.2 mm long

Taxonomy: Col., Scolytidae, syn. *Cryphalus phascoli* Eggers. For additional synonyms see Wood 1982.

Distribution (7): Af 19, As 11, C 9, E 5, N 3, O 7, SA 1

Commodities (9): bc 11.1%, g 11.1%, oc 11.1%, p 22.2%, r 22.2%, rp 11.1%, v 11.1%

Natural enemies (1): *Cephalonomia hyalinipennis*



Hypothenemus hampei (Ferrari 1867)

Dimension: 1.5-1.7 mm long

Common names: coffee berry borer (scolyte des cerises de café (F), barrenillo del grano del café (coffee bean beetle (S)), scolyte du grain de café (coffee bean borer (F)), gorgojo de la cereza del cafeto (coffee cherry weevil (S))

Taxonomy: Col., Scolytidae, originally *Cryphalus hampei*, also as *Stephanoderes hampei* (Ferrari 1867), syn. *Stephanoderes coffeae* Hagehorn 1910, *Xyleborus cofeicola* Campos Novaes 1922. For additional synonyms see Wood 1982.

Distribution: (6): Central African origin. Af 22, As 9, C 5, N 1, O 6, SA 6

Commodities (10): bc 30%, g 10.0%, n 10.0%, oc 10.0%, p 10.0%, v 30.0%

Natural enemies (4): *Cephalonomia stephanoderis*, *Heterospiluscoffeicola*, *Phymasticus coffea*, *Prorops nasuta*

Life history: Baker et al. 1992, Damon 2002

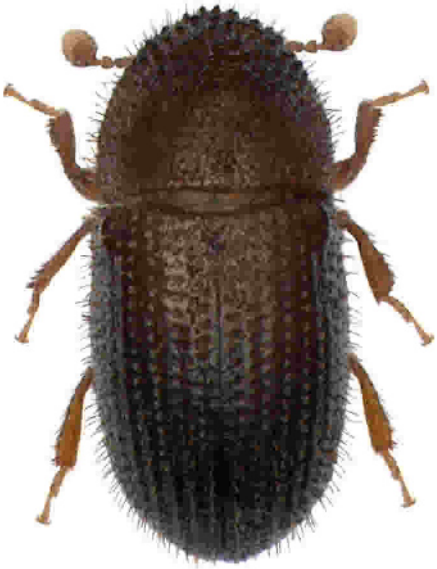


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Hypsopygia costalis (Fabricius 1775)

Dimension: 17-22 mm wingspan

Common names: clover hayworm, clover webworm, gold fringe, gold triangle, gold fringe tabby, Pyrale du foin (hay moth (F)), Heumotte (hay moth (G)), Огнёвка сенная (hay moth (R)), Heuzünsler (hay pyralid moth (G))

Taxonomy: Lep., Pyralidae

Distribution (5): Af 1, As 1, E 1, N 1, O 1

Commodities (5): g 20.0%, v 80.0%

Idaea inquinata (Scopoli 1763)

Dimension: 14-18 mm wingspan

Common names: rusty wave moth, Пяденица сенная (hay geometrid moth (R)), Heuspanner (hay spanner (G)), Herbarien-Kleinspanner (herbarium small spanner (G))

Taxonomy: Lep., Geometridae, originally *Phalaena inquinata*, also as *Acidalia herbariata* Fabricius 1798, *Geometra herbariata* Fabricius 1798, *Ptycopoda herbariata* Fabricius 1798, *Sterrha inquinata* (Scopoli 1763), syn. *Acidalia microsaria* Boisduval 1840, *Acidalia pusillaria* Hübner 1798.

Distribution (3): West-Palearctic species, widely distributed in Europe. Af 2, As 2

Commodities (5): bc 0% cocoa bean powder (u), tea leaf (u), df 0% raisin (u), g 0% maize (s), rice (s), wheat (s), gp 0% maize meal (s), wheat bran, germ or semolina (s), wheat flour (u), me 20.0% senna pod (s), np 0% almond flour (u), hazel nut flour (u), p 20.0%, r 0% angelica root (s), ginger root (u), ginseng root (s), valerian rood (s), se 0% pumpkin seed (s) sea 0% cinnamon corticle (u), fennel fruit (s), marjoram leaf (s), star anise fruit (u), vanilla capsule (u), v 60.0% chamomilla flower (s), grape leaf (u), hawthorn flower bud (s), juniper berry (s), lime flower (s), squeezed milk thistle fruit (s), passion flower leaf (s), wp 0% quassia wood fragement (u)

Facilities: food stores, hay lofts, haystacks, herbarium, residences, warehouses

Life history: Limonta et al. 2010a, b; Locatelli et al. 2005

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Korynetes caeruleus (-*a*) (DeGeer 1775)

Dimension: 3-5.2 mm

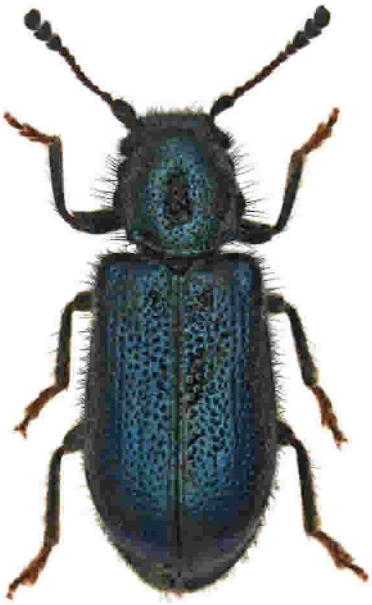
Common names: steely-blue beetle, Fellkäfer blauer (blue coat beetle (G)), Пестряк синий (blue coat beetle (R)), Corynète bleu (blue corynete (F)), Walzenkäfer blauer (rolling blue beetle (G))

Taxonomy: Col., Cleridae, originally *Clerus caeruleus* and transferred to new genus by Klug 1842. For synonyms see Löbl and Smetana 2007.

Distribution (2): Cosmopolitan. As 2, E 25

Facilities: bone-meal works, glue factories, joineries, residences

Hosts/Prey (3): *Dermestes frischii*, *Niptus hololeucus*, *Xestobium rufovillosum*



Lachesilla pedicularia (Linnaeus 1758)

Dimension: 1.5-2 mm long

Common names: cosmopolitan grain psocid, Вошь амбарная (barn louse (R)), Speicherlaus (storehouse louse (G), Вошь складская (warehouse louse (R))

Taxonomy: Pso., Lachesillidae

Distribution (6): Af 4, As 9, E 28, N 3, O 1, SA 2

Commodities (8): df 25.0%, g 37.5%, me 12.5%, r 12.5%, sea 12.5%

Facilities: bakeries, breweries, collections of natural objects, dairies, dried milk factories, feedmills, fish packing plants, flat storages of grain, flour mills, fruit and vegetable packing houses, grain elevators, oil seed processors, poultry farms, residences

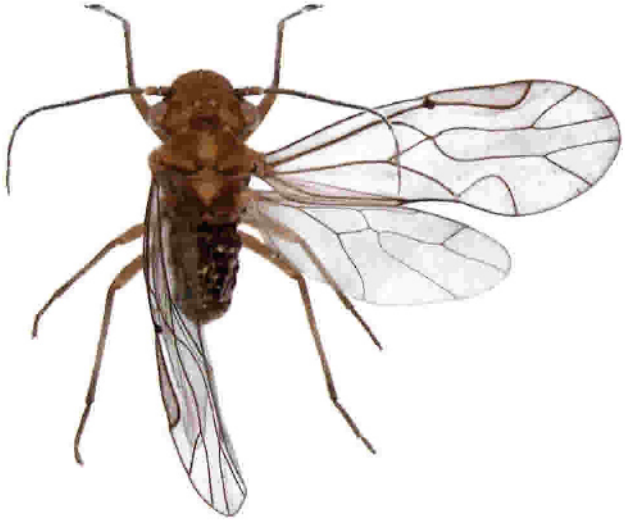


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Lasioderma serricorne (Fabricius 1792)

Dimension: 2-4 mm

Common names: cigarette beetle (coleoptere des cigarettes (F), Zigarettenkäfer (G), Жук сигаретный (R), cascarudo cigarrero (S)), tobacco beetle (vrillette du tabac (F), Жук табачный (R)), tow bug, Zigarrenkäfer (cigar beetle (G)), escarabajo serricorne (serricorne beetle (S)), kleiner Tabakkäfer (small tobacco beetle (G)), carcoma del tabaco almacenado (stored snuff beetle (S)), gorgojo del tabaco (snuff beetle (S)), coleóptero perforador del tabaco (snuff borer beetle (S)), Lasioderme du tabac (tobacco Lasioderma (F))

Taxonomy: Col., Anobiidae, originally *Ptinus serricorne* and transferred to new genus by Stephens 1833. For synonyms see Löbl and Smetana 2007.

Distribution (7): Af 21, As 28, C 9, E 30, N 3, O 7, SA 6

Commodities (222): aninv 1.3%, anv 4.1% dried sardine (s), bc 2.3% cocoa bean (m), cocoa powder (s), crushed cocoa bean (s), roasted coffee bean (s), bg 1.3%, df 2.3% carob (m), dfp 0.9% crushed carob (s), ffv 4.1%, g 4.1% maize (s), wheat (s), gp 4.1% maize flour (s), wheat bran (s), wheat flour (s, u), wheatfeed (s), me 5.4%, n 3.1%, np 0.5%, oc 4.1%, os 2.7% coconut meal (s), cotton seed (s), peanut (s), safflower (s), osp 5.0% cotton seed meal (s), safflower meal (s), p 5.9% bean (s), cowpea (s), horse bean (s), pea (s, m), pp 1.8% lentil flour (s), soybean meal (s), r 6.3% beet (m), carrot (m), licorice (s), rp 1.8%, se 11.3%, pomegranate (m), poppy (s), sea 9.9% allspice (u), anise (s), black pepper (u), caraway (m), caraway flour (u), cardamom (s), cayenne pepper (s), celery salt (u), chili pepper (s), cinnamon (s, u), clove (u), coriander (s), cumin (s), curry powder (s), fennel (s), fennel flour (s, u), garlic (s), ginger (s, m, u), mustard (m, u), nutmeg (u), oregano (u), paprika (s), thyme (u), turmeric (s, m, u), t 0.5%, v 16.7% chamomile (s), cigar tobacco (m), onion (u), roselle (s), rosemary leaf (u), tobacco (m, s), yeast (s), wp 0.5%

Facilities: barley mills**,** cigarette factories, cull fig warehouses, currant raisin storages, drug stores, empty cargo containers, feedmills, flour mills, grain elevators, grocery stores, grocery warehouses, herbariums, local yam markets, noodle factories, peanut shelling plants, peanut warehouses, pet stores, port warehouses, railroad cars, residences, retail stores, seed shops, semolina mills, soup-flavoring factories, sultana raisin storages, tobacco curing barns, tobacco fields, tobacco redrying plants, tobacco stores

Natural enemies (13): *Anisopteromalus calandrae*, *Cephalonomia gallicola*, *Dibrachys boarmiae*, *Israelius carthami*, *Lariophagus distinguendus*, *Peregrinator biannulipes*, *Plastanoxus westwoodi*, *Pteromalus cerealellae*, *Tenebroides mauritanicus*, *Thaneroclerus buqueti*, *Theocolax elegans*, *Trichogramma evanescens*, *Xylocoris flavipes*

Life history: Ashworth 1993b, Donia et al. 1961, Howe 1957, Lefkovitch and Currie 1967

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Latheticus oryzae Waterhouse 1880

Dimension: 2.5-3 mm long

Common names: longheaded flour beetle, rundköpfiger Reismehlkäfer (round headed flour beetle (G)), Хрущак круглоголовый рисовый (round headed flour beetle (R))

Taxonomy: Col., Tenebrionidae, syn. *Lyphia striolatus* Fairmaire 1892.

Distribution (7): Cosmopolitan. Indian origin. Af 12, As 21, C 1, E 21, N 3, O 2, SA 3

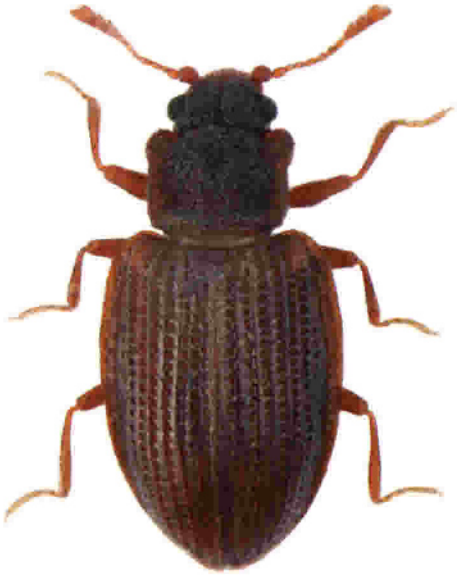
Commodities (44): anv 2.3%, bc 2.3%, df 4.5% date flour (u), g 20.5%, gp 25.0% barley flour (s), maize flour (s), millet flour (s), rice flour (s), wheat bran or flour (s), me 2.3%, n 2.3%, np 0.0% betel nut flour (u), oc 6.8%, os 6.8% safflower (u), osp 9.1% safflower meal (s), p 4.5%, pp 0.0% bean flour (u), black gram flour (s), chickpea flour (s), cowpea flour (s), lentil flour (u), moth bean flour (s), mung bean flour (s), r 2.3%, res 2.3%, rp 2.3%, se 2.3%, sea 2.3% black pepper flour (u), cinnamon flour (u), coriander flour (u), cumin flour (u), fennel flour (u), v 2.3%

Facilities: barley mills, feedmills, flat storages of grain, flour mills, grain storages, peanut shelling plants, peanut warehouses, railroad cars, semolina mills, vinyards

Natural enemies (3): *Amphibolus venator*, *Palorus shikhae*, *Xylocoris flavipes*

Life history: Hafez and Chapman 1966, Lever 1963, Nowosielski-Slepowron and Aryeetey 1980

Lathridius minutus (Linnaeus 1767)



Dimension: 1.2-2.4 mm

Common name: squarenosed fungus beetle

Taxonomy: Col., Lathridiidae, originally *Tenebrio minutus* Linnaeus, also as *Enicmus minutus* (Linnaeus 1767). For synonyms see Hinton 1945.

Distribution (6): Cosmopolitan. Af 5, As 6, E 33, N 2, O 1, SA 1

Commodities (41): anv 4.9%, bc 2.4%, df 12.2%, ffv 2.4%, g 19.5%, gp 7.3%, gs 2.4%, n 2.4%, os 4.9%, osp 4.9%, p 2.4%, pp 2.4%, res 4.9%, rp 2.4%, sp 9.8%, v 12.2%, w 2.4%

Facilities: bakeries, barley storages, breweries, cocoa and spice warehouses, currant raisin storages, empty grain bins, farm grain bins, feedmills, flat storages of grain, flour mills, grain elevators, granaries, growing floors at maltings, haystacks, herbariums, stables, sultana raisin storages, wine cellars

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Leichenum canaliculatum Fabricius 1798

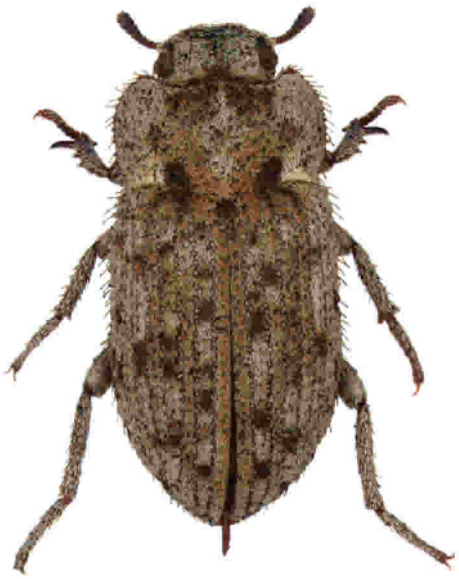
Dimension: 4-5 mm long

Common name: Madagascar beetle

Taxonomy: Col., Tenebrionidae, originally *Opatrum canaliculatum*. For synonyms see Löbl and Smetana 2008.

Distribution (5): Af 2, As 7, C 1, E 2, N 1

Commodities (1): p 100%



Liposcelis corrodens (Heymons 1909)

Dimension: 0.9-1.2 mm long

Common names: cereal psocid, cook louse, Atropos de livres (book atropos (F))

Taxonomy: Pso., Liposcelidae, syn. *Liposcelis subfuscus* Broadhead

Distribution (5): As 1, E 20, N 2, O 3, SA 1

Commodities (5): g 40.0%, gp 20.0%, oc 20.0%, os 20.0%

Facilities: bakeries, breweries, dried soup factories, flat storages of grain, flour mills, oil seed processors, poultry farms, residences, semolina plants, slaughterhouses, storehouses

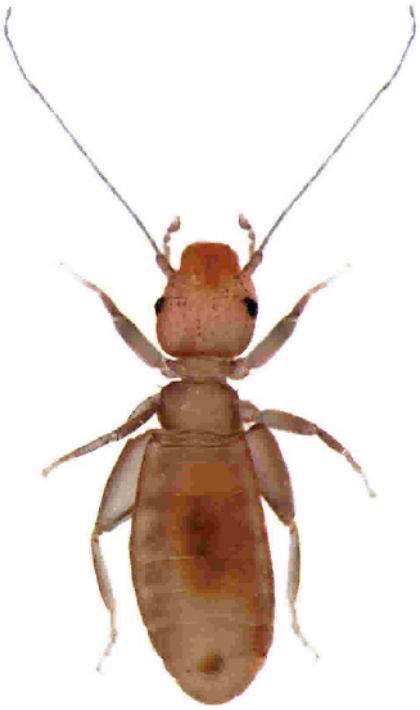


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Litargus balteatus LeConte 1856

Dimension: 2-2.5 mm long

Taxonomy: Col., Mycetophagidae. For synonyms see Löbl and Smetana 2008.

Distribution (5): Probably North American origin. Af 5, E 5, N 2, O 1, SA 1

Commodities (26): anv 3.8%, bc 7.6%, df 7.7%, g 23.1%, gp 19.2%, n 11.5%, oc 3.8%, os 7.7%, p 7.7%, sp 3.8%, v 3.8%

Facilities: farm storages of rice, feedmills, peanut shelling plants, peanut warehouses, tobacco fields

Lophocateres pusillus (Klug 1832)

Dimension: 2.7-3 mm

Common names: Siamese grain beetle (siamischer Flachkäfer (G)), Плоскотел сиамский (Siamese flat body beetle (R))

Taxonomy: Col., Trogositidae, originally *Peltis pusilla* and transferred to new family by Leveille 1910, syn. *Lophocateres nanus* Olliff 1883.

Distribution (7): Af 13, As 15, C 4, E 9, N 1, O 1, SA 6

Commodities (76): aninv 1.3%, bc 5.3%, df 5.3%, g 9.2%, gp 7.9%, n 5.3%, oc 3.9%, os 6.6%, osp 2.6%, p 17.1%, pp 3.9%, r 2.6%, res 1.3%, rp 1.3%, se 7.9%, sea 7.9%, v 10.5%

Facilities: barges, cocoa and spice warehouses, empty cargo containers, feedmills, peanut shelling plants, peanut warehouses, rice mills, rice stores

Life history: Halstead 1968b

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Lyctus africanus Lesne 1907

Dimension: 1.8-4 mm long

Common name: small powder-post beetle

Taxonomy: Col., Lyctidae, syn. *Lyctus politus* Kraus 1911

Distribution (5): Ethiopian origin. Af 11, As 7, E 8, N 1, O 1

Commodities (10): os 20.0%, r 50.0%, rp 10.0%, v 10.0%, w 10.0%

Natural enemies (3): *Denops ferrugineus*, *Sclerodermus domesticus*, *Tarsostenus univittatus*

Lyctus brunneus (Stephens 1830)

Dimension: 3-5 mm

Common names: brown powder post beetle (Lycte brun (F), brauner Splintholzkäfer (G), Древогрыз тёмно-бурый (R)), common powderpost beetle, brauner Splintkäfer (brown sapwood beetle (G)), Древогрыз одноцветный (unicolor wood borer (R))

Taxonomy: Col., Lyctidae, originally *Xylotrogus brunneus* and transferred to new genus by Wollaston 1854. For synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Probably neotropical origin. Af 14, As 9, C 1, E 19, N 2, O 1, SA 1

Commodities (12): df 8.3%, g 8.3%, me 25.0%, r 33.3%, sea 8.3%, v 8.3%, w 8.3%

Facilities: empty cargo containers

Natural enemies (8): *Eubazus pallipes*, *Monolexis fuscicornis*, *Sclerodermus domesticus*, *Sclerodermus macrogaster*, *Tarsostenus carus*, *Tarsostenus univittatus*, *Teretrius americanum*, *Theocolax formiciformis*

Life history: Gay 1953, Iwata and Nishimoto 1985

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Lyctus linearis (Goeze 1777)

Dimension: 2.5-5 mm long

Common names: European lyctus beetle, true powder post beetle, gerinnter Splintkäfer (clot sapwood beetle (G)), gemeiner Splintkäfer (common sapwood beetle (G)), gefurchter Splintholzkäfer (furrowed powder post beetle (G)), Древогрыз бороздчатый (furrowed powder post beetle (R)), Parkettkäfer (hardwood beetle (G)), Vrillette à galeries lineaires (linear galleries beetle (F))

Taxonomy: Col., Lyctidae, originally *Dermestes linearis*. For synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Af 5, As 8, E 40, N 2, O 1, SA 1

Commodities (2): g 50.0%, w 50.0%

Natural enemies (7): *Apanteles hoplites*, *Eubazus pallipes*, *Monolexis fuscicornis*, *Monophylla terminata*, *Perilampus micans*, *Sclerodermus domesticus*, *Tillus unifasciatus*

Melyris oblonga (Fabricius 1775)

Dimension: 12-18 mm long

Taxonomy: Col., Melyridae, originally *Zygia oblonga*, also in family Malachiidae. For synonyms see Löbl and Smetana 2007

Distribution (3): Af 3, As 3, E 5

Commodities (9): aninv 11.1%, df 22.2%, dfp 11.1%, g 11.1%, n 22.2%, p 11.1%, r 11.1%

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

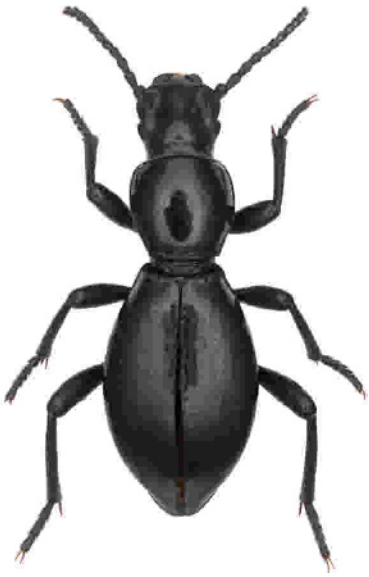
Mesostena picea Kraatz 1865

Dimension: 12-14 mm long

Taxonomy: Col., Tenebrionidae, also as *Mesostenopa picea*

Distribution (1): Af 2

Commodities (3): g 66.7%, os 33.3%



Mezium affine Boieldieu 1856

Dimension: 2.3-3.2 mm long

Common names: northern spider beetle, shiny spider beetle (ptine luisant (F))

Taxonomy: Col., Ptinidae, syn. *Mezium hirtipenne* Reiche 1864

Distribution (6): Af 9, As 3, E 24, N 2, O 2, SA 1

Commodities (9): aninv 11.1%, anv 22.2%, g 11.1%, gp 0% wheatfeed (s), oc 11.1%, se 11.1%, t 22.2%, v 11.1%

Facilities: cearal warehouses, clothing stores, cotton mills, granaries, residences, spice shops

Life history: Howe and Burges 1953b

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Mezium americanum (LaPorte de Castelnau 1840)

Dimension: 1.7-2.7 mm long

Common names: American spider beetle, black spider beetle

Taxonomy: Col., Ptinidae, originally *Gibbium americanum*, syn. *Gibbium nitidipenne* Germain 1856, *Mezium arachnides* Desbrochers de Loges 1875

Distribution (6): Af 6, As 1, E 7, N 2, O 2, SA 4

Commodities (31): anv 32.3%, df 3.2%, g 9.7%, gp 12.9%, oc 3.2%, os 3.2%, osp 6.5%, se 12.9%, sea 6.5%, t 3.2%, v 6.5%

Facilities: mills, warehouses

Migneauxia lederi Reitter 1875

Dimension: 1.2-1.5 mm long

Taxonomy: Col., Lathridiidae, syn. *Migneauxia orientalis* Reitter 1877, *Migneauxia parvicollis* Peyerimhoff 1929

Distribution (5): Cosmopolitan. Af 8, As 12, E 10, N 3, SA 1

Commodities (9): ffv 11.1%, g 33.3%, gp 22.2%, me 11.1%, p 11.1%, v 11.1%

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Mimosestes mimosae (Fabricius 1781)

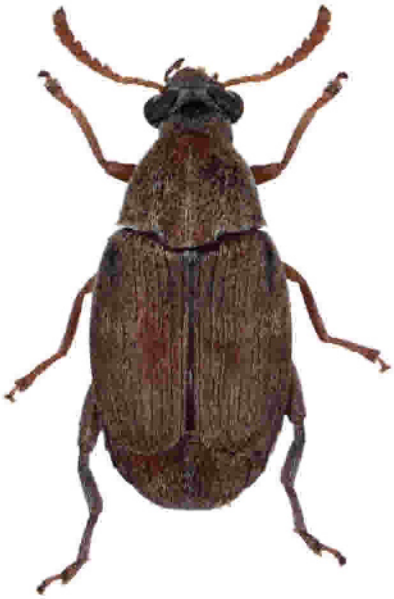
Dimension: 2-4.5 mm long

Taxonomy: Col., Bruchidae, originally *Bruchus mimosae*, also as *Mylabris mimosae*, syn. *Acanthoscelides dominicanus* Jekel. For additional synonyms see Kingsolver 2004 and Löbl and Smetana 2010.

Distribution (6): Af 3, As 1, C 11, E 7, N 2, SA 4

Commodities (1): v 100%

Natural enemies (8): *Eupelmus amicus*, *Heterospilus bruchi*, *Heterospilus prosopidis*, *Horismenus missouriensis*, *Lariophagus texanus*, *Stenocorse bruchivora*, *Urosigalphus bruchi*, *Urosigalphus neobruchi*



Monanus concinnulus (Walker 1858)

Dimension: 1.9-2.2 mm long

Taxonomy: Col., Silvanidae, syn. *Emporius signatus* (Frauenfeld 1867). For additional synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 2, As 11, C 11, E 4, N 2, O 1, SA 4

Commodities (26): aninv 3.8%, bc 7.7%, ffv 3.8%, g 7.7%, gp 11.5%, n 3.8%, os 11.5%, p 7.7%, r 3.8%, res 3.8%, sea 11.5%, v 23.1%

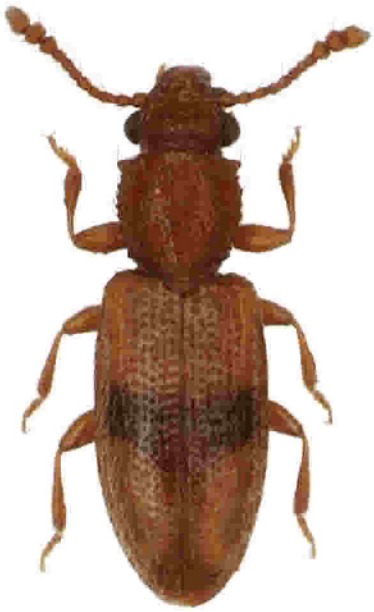


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Monopis laevigella (Denis and Schiffermüller 1775)

Dimension: 13-20 mm wingspan

Common name: skin moth

Taxonomy: Lep., Tineidae, also as *Haplotinea laevigella* (Denis and Schiffermüller), syn. *Monopis rusticella* (Clerck 1796)

Distribution (3): As 1, E 2, N 1

Commodities (6): anv 83.3%, sp 16.7%

Facilities: growing floors at maltings

Monotoma picipes Herbst 1793

Dimension: 1.9-2.5 mm long

Taxonomy: Col., Monotomidae. For synonyms see Löbl and Smetana 2007.

Distribution (5): Cosmopolitan. Af 4, As 11, C 3, E 28, N 2

Commodities (5): g 60.0%, gs 20.0%, me 20.0%

Facilities: farm grain bins, feedmills

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Murmidius ovalis (Beck 1817)

Dimension: 1.2-1.4 mm long

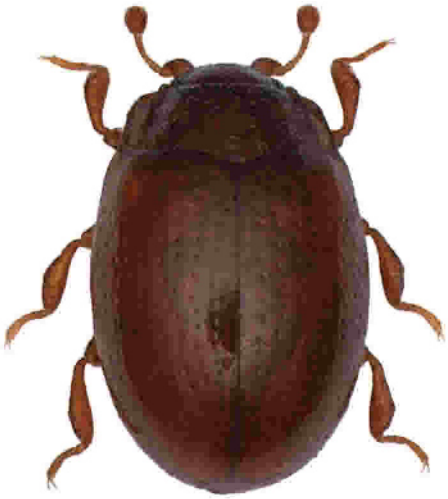
Common name: oval grain beetle

Taxonomy: Col., Murmidiidae, originally *Hister ovalis*, syn. *Ceutrocerus advena* Germar 1824, *Murmidius ferrugineus* Leach 1822

Distribution (5): Cosmopolitan. Af 1, As 11, E 1, N 3, O 1

Commodities (17): aninv 5.9%, df 11.8%, g 35.0%, gp 11.8%, osp 5.9%, res 5.9%, sea 5.9%, v 11.8%, wp 5.9%

Life history: Halstead 1968a



Mycetophagus quadriguttatus P. Muller 1821

Dimension: 3.4-4.1 mm long

Common names: spotted hairy fungus beetle, vierfleckiger Pilzkäfer (four spotted fungus beetle (G)), vierfleckiger Pilzsaftkäfer (four spotted sap fungus beetle (G)), vierfleckiger Baumschwammkäfer (four spotted touchwood beetle (G))

Taxonomy: Col., Mycetophagidae. For synonyms see Löbl and Smetana 2008.

Distribution (3): As 1, E 1, N 2

Commodities (8): g 50.0%, gs 12.5%, oc 12.5%, os 12.5%, res 12.5%

Facilities: empty grain bins, farm grain bins, feedmills, grain elevators, growing floors at maltings

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Nacerdes melanura (Linnaeus 1758)

Dimension: 9-13 mm long

Common names: wharf borer (Узконадкрылка свайная (R)), Свайник бурый (brown pile beetle (R)), Nacerde (F), Pfahlkäfer (pile beetle (G)), Жук свайный (pile beetle (R)), Schmalkäfer brauner (quick brown beetle (G)), Blumenschmalkäfer brauner (small brown flower beetle (G))

Taxonomy: Col., Oedemeridae, originally *Cantharis melanura*, also as *Anoncodes melanura*. For synonyms see Löbl and Smetana 2008.

Distribution (7): Af 2, As 7, C 1, E 6, N 2, O 3, SA 2

Commodities (2): g 50.0%, p 50.0%

Life history: Pitman et al. 2003

Nausibius clavicornis (Kugelann 1794)

Dimension: 3.5-4.5 mm long

Taxonomy: Col., Silvanidae, originally *Cucuius clavicornis*. For synonyms see Löbl and Smetana 2007.

Distribution (5): Cosmopolitan. Af 7, As 6, C 11, E 14, N 3

Commodities (10): bc 10.0%, df 10.0%, g 10.0%, gp 10.0%, me 10.0%, os 10.0%, sea 10.0%, v 30.0%

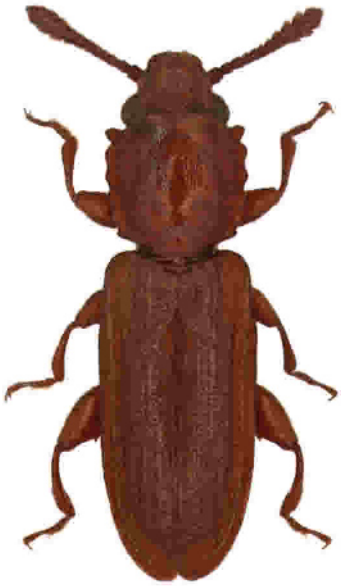


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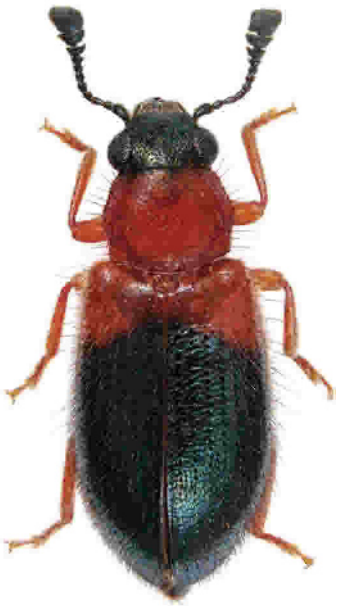
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Necrobia ruficollis (Fabricius 1775)



Dimension: 4-6 mm long

Common names: red-necked bacon beetle, red-shouldered ham beetle, zweifarbiger Kolbenkäfer (bicolor piston beetle (G)), Костоед красногрудый (red breast bone eater (R)), rothalsiger Schinkenkäfer (red necked ham beetle (G)), Nécrobie à col rouge (red necked necrobie (F)), rothalsige Kolbenkäfer (red necked piston beetle (G))

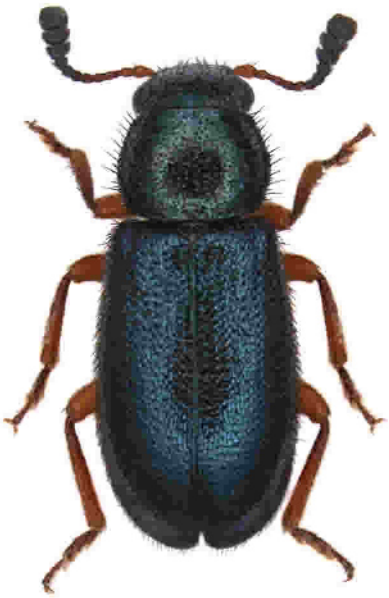
Taxonomy: Col., Cleridae, originally *Dermestes ruficollis* and transferred to new genus by Sturm 1837

Distribution (7): Cosmopolitan. Af 5, As 7, C 2, E 27, N 2, O 3, SA 3

Commodities (24): aninv 8.3%, anv 41.7%, bc 4.2%, df 4.2%, g 4.2%, gp 4.2%, me 4.2%, oc 4.2%, os 8.3%, osp 8.3%, se 4.2%, sea 4.2%

Facilities: empty cargo containers, meat packing plants, oilseed refineries, slaughterhouses

Necrobia rufipes (DeGeer 1775)



Dimension: 3.5-4.5 mm

Common names: copra beetle (Koprakäfer (G), gorgojo de la copra (S)), red-legged ham beetle, escarabajo del tocino (bacon beetle (S)), paper worm (by meat industry), destructeur de jambon et viande (ham and meat destroyer (F)), Schinkenkäfer (ham beetle (G)), Костоед красноногий (red legged bone eater (R)), Clairon pattes rouges (red legged clarion (F)), nécrobie à pattes rousses (red legged copra (F)), Nécrobie à pattes rouges (red legged copra (F)), rotbeiniger Kolbenkäfer (red legged piston beetle (G))

Taxonomy: Col., Cleridae, originally *Clerus rufipes* and transferred to new genus by Brulle 1838. For synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 21, As 21, C 9, E 31, N 3, O 10, SA 6

Commodities (106): aninv 7.5% insect larva (s), anv 21.7% dried fish (s), bc 4.2% cocoa (u), bg 1.9%, df 4.7%, ffv 2.8%, g 3.8% maize (u), gp 4.7%, me 1.9%, n 3.8%, oc 7.5%, os 4.7% palm kernel (s), peanut (m), osp 6.6% copra (m, s), p 2.8%, r 3.8%, rp 0.9%, se 2.8%, sea 6.6%, sp 0.9%, t 0.9%, v 5.2%

Facilities: carob mills, currant raisin storages, empty cargo containers, flour mills, local fish markets, oilseed refineries, pet stores, residences, sultana raisin storages, tanneries, tobacco storages, vegetable oil refineries

Life history: Canete and Gapasin 1980, Osuji 1977, Simmons and Ellington 1925

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Necrobia violacea (Linnaeus 1758)

Dimension: 3.5-4.5 mm long

Common names: black-legged ham beetle, Костоед синий (blue bone eater (R)), blauer Schinkenkäfer (blue ham beetle (G)), Kolbenkäfer blauer (blue piston beetle (G))

Taxonomy: Col., Cleridae, originally *Dermestes violacea*. For synonyms see Löbl and Smetana 2007.

Distribution (4): Cosmopolitan. Af 1, As 7, E 28, N 2

Commodities (6): anv 83.3%, g 16.7%

Facilities: meat packing plants, slaughterhouses

Hosts/Prey (1): *Dermestes frischii*

Nemapogon cloacella (Haworth 1828)

Dimension: 10-18 mm wingspan

Common names: cork moth (Teigne des bouchons (F), Teigne du liège (F), Korkmotte (G)), dark mottled clothes moth, Моль настоящая грибная (fungi moth (R)), Schleusenmotte (lock moth (G))

Taxonomy: Lep., Tineidae, also as *Tinea cloacella* Haworth 1828, syn. *Tinea infimella* Herrich-Schaffer 1851

Distribution (3): Cosmopolitan. Af 1, As 1, E 6

Commodities (5): g 20.0%, v 60.0%, wp 20.0%

Facilities: wine cellars

Natural enemies (5): *Conomorium patulum*, *Elodia ambulatoria*, *Lissonata segmentator*, *Meteorus cespitator*, *Meteorus ruficeps*

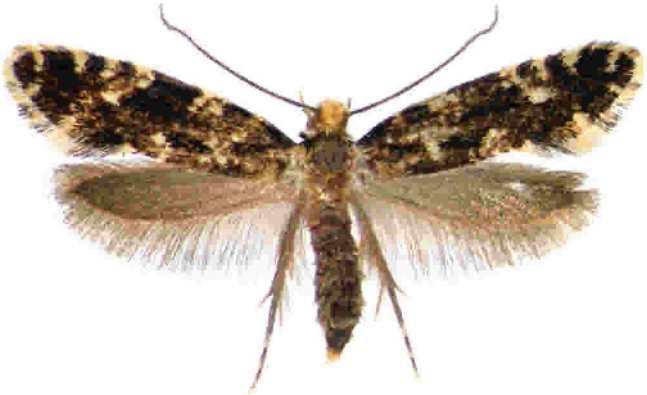


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Nemapogon granella (Linnaeus 1758)

Dimension: 9-12 mm wingspan

Common names: corn moth (Kornmotte (G)), European grain moth, maize moth, mottled grain moth, wolf moth, Моль настоящая (common moth (R)), Kornwurm (corn worm (G)), Getreidemotte weiße (grain mites (G)), Teigne des grains (grain moth (F)), Моль зерновая (grain moth (R)), Моль амбарная (storage moth (R)), Teigne du blé (wheat moth (F))

Taxonomy: Lep., Tineidae, originally *Phalaena granella*, also as *Tinea granella*. For synonyms see Robinson and N ielsen 1993.

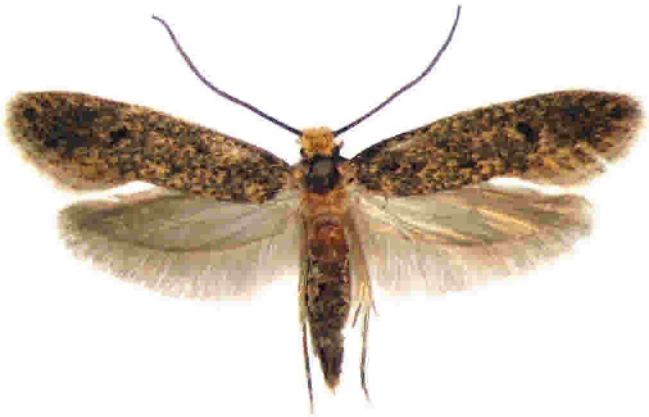
Distribution (6): Cosmopolitan. Probably of palaearctic origin. Af 3, As 6, E 9, N 2, O 1, SA 3

Commodities (43): anv 2.3%, bc 2.3%, bg 2.3%, df 13.9%, ffv 2.3%, g 16.3%, gp 9.3%, gs 2.3%, me 2.3%, n 13.9%, oc 2.3%, os 4.7%, p 2.3%, pp 2.3%, r 2.3%, se 7.0%, sp 2.3%, v 7.0%, wp 2.3%

Facilities: bakeries, barley mills, feedmills, flat storages of grain, flour mills, grain bins, grain elevators, granaries, malt storage at maltings, warehouses, wine cellars

Natural enemies (8): *Chremylus elaphus*, *Dibrachys cavus*, *Goniozus columbianus*, *Hemiteles bipunctator*, *Hemiteles tineae*, *Nemeritis caudatula*, *Venturia canescens*, *Xenolytus bitinctus*

Niditinea fuscella (Linnaeus 1728)



Dimension: 11 mm wingspan

Common names: brown-dotted clothes moth, common clothes moth, poultry house moth, Моль норовая (burrow moth (R)), Моль сухофруктовая (dried fruit moth (R)), Nestermotte (nest moth (G))

Taxonomy: Lep., Tineidae, syn. *Acedes fuscipunctella* (Haworth 1828), *Niditinea fuscipunctella* (Haworth 1828), *Tinea fuscipunctella* Haworth 1828

Distribution (4): Cosmopolitan. Af 2, As 6, E 4, O 1

Commodities (26): anv 23.1%, bc 3.8%, df 7.7%, g 7.7%, gp 7.7, n 7.7%, os 11.5%, osp 7.7%, p 3.8%, res 3.8%, se 3.8%, t 11.5%

Facilities: bakeries, barley storages at maltings, feedmills, flour mills, flour warehouses, provender mills, rice mills, stables

Natural enemies (6): *Apanteles carpatus*, *Chremylus elaphus*, *Hypsicera curvator*, *Meteorus cespitator*, *Spathius exarator*, *Xenolytus bitinctus*

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Niptus hololeucus (Faldermann 1835)

Dimension: 3-4.5 mm long

Common names: golden spider beetle (Ptine d'oré (F)), yellow spider beetle (Ptine jaune (F)), Messingkäfer (brass beetle (G)), Притворяшка латунный (brass spider beetle (R)), messinggelber Diebkäfer (brass sticker thief beetle (G)), Притворяшка гарбатый (humpback spider beetle (R)), Притворяшка шелковидный (silk shammer (R))

Taxonomy: Col., Ptinidae, originally *Ptinus hololeucus* Falderman 1835, syn. *Niptus brevesetosus* Pic 1956

Distribution (5): Cosmopolitan. Af 6, As 24, E 41, N 2, O 2

Commodities (50): aninv 4.0%, anv 14.0% fishmeal (u), bc 4.0%, bg 6.0%, ffv 2.0%, g 14.0%, gp 18.0% wheat flour (u), wheatfeed (m), me 6.0%, oc 8.0%, osp 2.0%, pp 2.0%, r 2.0%, se 2.0%, sea 2.0%, t 6.0%, v 4.0%, wp 4.0%

Facilities: barley storages, breweries, brush factories, cocoa and spice warehouses, grain elevators, growing floors at maltings, malt storages

Natural enemies (1): *Cephalonomia gallicola*

Life history: Howe and Burges 1952

Nitidula bipunctata (Linnaeus 1758)

Dimension: 3-5.2 mm long

Common names: Трупоедка двуточечная (two pointed dead body eater (R)), zweipunktiger Glanzkäfer (two point beetle (G)), Блестянка двуточечная (two pointed trincket (R))

Taxonomy: Col., Nitidulidae, originally *Silpha bipunctata*. For synonyms see Löbl and Smetana 2007.

Distribution (3): As 4, E 25, N 2

Commodities (7): anv 42.9%, bg 28.6%, g 28.6%

Facilities: farm grain bins

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Omonadus floralis (Linnaeus 1758)

Dimension: 2.7-3.5 mm long

Common names: narrownecked grain beetle, shiny flower beetle

Taxonomy: Col., Anthicidae, originally *Meloe floralis*, also as *Anthicus floralis*. For additional synonyms see Löbl and Smetana 2008.

Distribution (7): Cosmopolitan. Af 10, As 18, C 5, E 41, N 3, O 2, SA 1

Commodities (29): bc 3.4%, df 10.3%, ffv 3.4%, g 20.7%, gp 3.4%, n 3.4%, os 10.3%, osp 3.4%, p 3.4%, pp 3.4%, r 6.9%, se 10.3%, sp 3.4%, v 13.8%

Facilities: empty grain bins, farm storages of rice, feedmills, flat storages of grain, flour mills, rice mills

Omonadus formicarius (Goeze 1777)

Dimension: 3-3.5 mm long

Taxonomy: Col., Anthicidae, originally *Meloe formicarius*. also as *Anthicus formicarius*. For synonyms see Löbl and Smetana 2008.

Distribution (6): Cosmopolitan. Af 4, As 22, C 2, E 40, N 3, O 1

Facilities: empty grain bins

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Omosita colon (Linnaeus 1758)

Dimension: 2-3 mm long

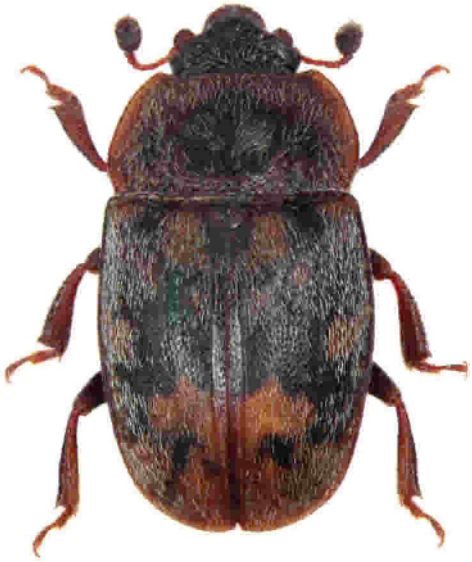
Common names: doppelpunktiger Aas-Glanzkäfer (double punk tiger carrion beetle (G))

Taxonomy: Col., Nitidulidae, originally *Silpha colon*. For synonyms see Löbl and Smetana 2007.

Distribution (5): Af 1, As 7, E 30, N 2, O

Commodities (2): g 50.0%, res 50.0%

Facilities: empty grain bins, feedmills, granaries



Orphilus niger P. Rossi 1790

Dimension: 3-4 mm long

Taxonomy: Col., Dermestidae, originally *Byrrhus niger*, syn. *Anthrenus glaber* Creutzer in Panzer 1796, *Anthrenus glabratus* Fabricius 1801

Distribution (3): Af 3, As 3, E 25

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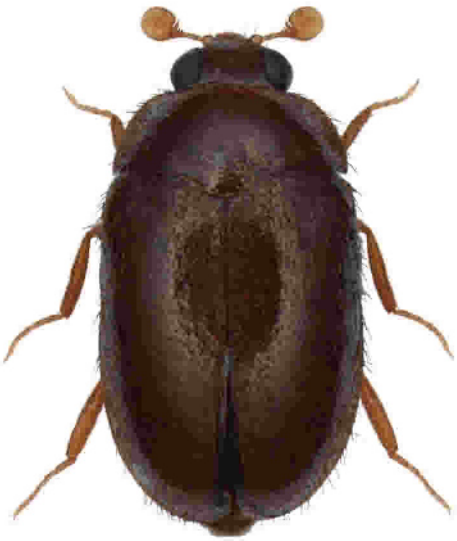
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Orphinus fulvipes (Guérin-Méneville 1838)



Dimension: 1.7-3.5 mm long

Taxonomy: Col., Dermestidae, originally *Globicornis fulvipes*. For synonyms see Löbl and Smetana 2007.

Distribution (7): Af 5, As 7, C 10, E 3, N 2, O 1, SA 2

Commodities (18): aninv 16.7%, anv 5.6%, bc 5.5%, g 11.1%, n 16.7%, os 11.1%, p 5.6%, se 5.6%, sea 16.7%, v 5.5%

Facilities: warehouses

Oryzaephilus mercator (Fauvel 1889)

Dimension: 2.2-3.1 mm long

Common names: merchant grain beetle (cucujide des grains oléagineaux (F), Erdnußplattkäfer (G)), Плоскотелка арахисовая (flat body arachid (peanut) beetle (R)), Erdnußschmalkäfer (peanut beetle (G))

Taxonomy: Col., Silvanidae, originally *Silvanus mercator* and transferred to new genus by Ganglbauer 1899, syn. *Silvanus gossypii* Chittenden 1897

Distribution (7): Cosmopolitan. Af 26, As 19, C 5, E 11, N 3, O 9, SA 4

Commodities (139): anv 4.3%, bc 2.9%, bg 2.2%, df 6.5% apricot (u), date (m), fig (s), mulberry (s), prune (m), raisin (m, s), dfp 0% apricot meal (s), date meal (m, u), fig meal (s, m), raisin meal (m, u), ffv 3.6%, g 6.5% maize (s), millet (s), oat (s), wheat (u), gp 10.1% cracked rice (s), cracked wheat (s), ground millet (s), maize meal (s), polished rice (u), rice meal (u), rolled oat (s), wheatfeed (s), wheat meal (s), me 0.7%, n 6.5% almond (s), cashew (s), hazelnut (s), pine nut (u), pistachio (s), walnut (s), np 0.7% almond meal (s), cashew meal (s), oc 2.9%, os 7.2% flax (s), peanut (s, u), rape (s), osp 12.2% coconut meal (s), cottonseed meal (u), ground flax (s), peanut meal (s, u), soybean meal (u), p 3.6% broad bean (u), cowpea (u), soybean (u), pp 1.4% crushed broad bean (u), r 4.3%, rp 1.4%, se 4.3% clover (u), milled African mango seed (s), mustard (m, u), sunflower (s), sea 6.5%, v 12.2% grass meal (u), sugar(s)

Facilities: bakeries, barley mills, canneries, cocoa storages, cull fig warehouses, currant raisin storages, empty cargo containers, farm grain bins, feed stores, flour mills, granaries, groceries, grocery warehouses, kitchens, maize mills, packing plants, peanut shelling plants, peanut warehouses, pet stores, residences, retail stores, sultana raisin storages

Natural enemies (1): *Holepyris sylvanidis*

Life history: Komson and Stewart 1968, Lale et al. 1996

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Oryzaephilus surinamensis (Linnaeus 1758)

Dimension: 2.5-3.5 mm

Common names: sawtoothed grain beetle (Getreideplattkäfer (G)), silvanus del maiz (maize silvanus (S)), Getreideschmalkäfer (narrow grain beetle (G)), carcoma aserrado de los granos (serrated grain beetle (S)), Silvain dentele (serrated silvanus (F)), Мукоед сурынамский (Surinam flour eater (R)), gorgojo dentado (toothed beetle (S)), cucujide dentelé des grains (toothed grain beetle (F), carcoma dentada de los granos (toothed grain beetle (S)), Ver denté des grains (toothed grain worm (F))

Taxonomy: Col., Silvanidae, originally *Dermestes surinamensis* and transferred to new genus by Ganglbauer 1899. For synonyms see Löbl and Smetana 2007.

Distribution: (7): Cosmopolitan. Af 25, As 28, C 8, E 22, N 3, O 7, SA 11

Commodities (163): aninv 1.8%, anv 1.2% dried milk (m), bc 3.0%, bg 1.8%, df 9.8% damaged prune (s), prune (s), raisin (s), dfp 0.6%, ffv 2.5%, g 6.7% maize (s), millet (s), oat (s), polished rice (u), teff (u), wheat (s, u), gp 10.4% ground millet (s), maize meal (s), cracked barley (s), cracked oat (s), cracked rice (s), rice meal (u), rolled oat (s), wheat cracked, kibbled, meal or semolina (s), wheatfeed (s), me 3.7%, n 5.5% almond (s), np 1.8%, oc 4.3%, os 4.9% damaged peanut (s), flax (s), peanut (s, u), rape (s), safflower (u), sunflower (s), osp 6.1% broken safflower (s), coconut meal (m), cottonseed meal (u), cracked peanut (u), ground flax (s), ground rapeseed (m, u), ground sunflower (s), peanut meal (u), safflower meal (u), p 4.3% broad bean (u), soybean (u), pp 2.5% cracked cowpea (u), crushed broad bean (s), soybean meal (u), r 2.5%, res 0.6%, rp 0.6%, se 6.7% clover (u), mustard (u), sea 5.5%, ground mustard (u), v 13.0% alfalfa pellet (u), grass meal (u), ground clover (u), ryegrass pellet (u), sugar (s)

Facilities: bakeries, barley mills, barley storages, breweries, currant raisin storages, empty cargo containers, farms, farm storages of rice, feedmills, flat storages of grain, flour mills, grain elevators, growing floors at maltings, malt storages, peanut shelling plants, peanut warehouses, pet stores, port warehouses, railroad cars, residences, retail groceries, rice mills, seedmen (seed dealers), semolina mills, sultana raisin storages, tobacco curing barns, warehouses

Natural enemies (7): *Cephalonomia meridionalis*, *Cephalonomia tarsalis*, *Holepyris sylvanidis*, *Palorus shikhae*, *Peregrinator biannulipes*, *Xylocoris cursitans*, *Xylocoris flavipes*

Life history: Hagstrum and Milliken 1988, Komson and Stewart 1968, Lergemueller, E. 1958, White and Sinha 1981

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Pagiocerus frontalis (Fabricius 1801)

Dimension: 2.5 mm

Common name: barrenador de la mazorca (corn ear borer (S))

Taxonomy: Col., Scolytidae, originally *Bostrichus frontalis* and transferred to new genus by Eggers 1929, syn. *Hylastinus fiorii* Eggers 1908, *Pagiocerus zeae* Eggers 1928. For additional synonyms see Wood 1982.

Distribution (3): C 7, N 2, SA 7

Commodities (3): bc 33.3% coffee bean (u), coffee cherry (u), ffv 0% avocado (u), g 33.3% barley (u), maize (s), quinua (u), gp 0% maize meal (u), oat (u), wheat (u), p 0% broad bean (u), kidney bean (u), lentil (u), lupine (u), pea (u), se 33.3% avocado (s), cherimoya (u), w 0% Eucalyptus (u), laural (u)

Life history: Eidt-Wendt and Schulz 1991

Palorus depressus Fabricius 1790

Dimension: 2.5-2.7 mm long

Common name: kleinäugiger Reismehlkäfer (small eyed flour beetle (G))

Taxonomy: Col., Tenebrionidae, originally *Hypophlaeus depressus*, syn. *Caenocorse formiceticola* Munster 1928, *Ips unicolor* A. G. Olivier 1790

Distribution (3): Af 2, O 1, SA 1

Commodities (1): r 100%

Facilities: mills, storages

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Palorus subdepressus (Wollaston 1864)

Dimension: 2.8-3 mm

Common name: depressed flour beetle

Taxonomy: Col., Tenebrionidae, originally *Hypophloeus subdepressus* and transferred to new genus by Fleischer 1900, also as *Caenocorse subdepressa* Wollaston 1864, syn. *Palorus bifoveolatus* Baudi di Selve 1876

Distribution (7): Cosmopolitan. Probably of West African origin. Af 13, As 17, C 1, E 4, N 3, O 7, SA 4

Commodities (47): bc 4.2%, bg 2.1%, df 2.1%, g 17.0%, gp 14.9% wheat flour (s), n 6.4%, oc 4.3%, os 10.6%, osp 8.5%, p 6.4%, r 4.3%, res 4.3%, rp 4.3%, sea 4.3%, v 6.4%

Facilities: bakeries, empty grain bins, farms, feedmills, flour mills, grain elevators, granaries, hog parlors, peanut shelling plants, peanut warehouses

Natural enemies (1): *Peregrinator biannulipes*

Life history: Halstead 1967

Pharaxonotha kirschii Reitter 1875

Dimension: 4-4.5 mm long

Common names: Mexican grain beetle, mexikanischer Getreidekäfer (Mexican rice weevil (G))

Taxonomy: Col., Languriidae, syn. *Thallisella conradti* Gorham 1898. Also in the families Cryptophagidae and Erotylidae.

Distribution (4): C 1, E 1, N 1, SA

Commodities (14): bg 14.3, g 14.3, gp 14.3%, oc 7.1%, p 7.1%, r 14.3%, res 7.1%, sea 14.3%, v 7.1%

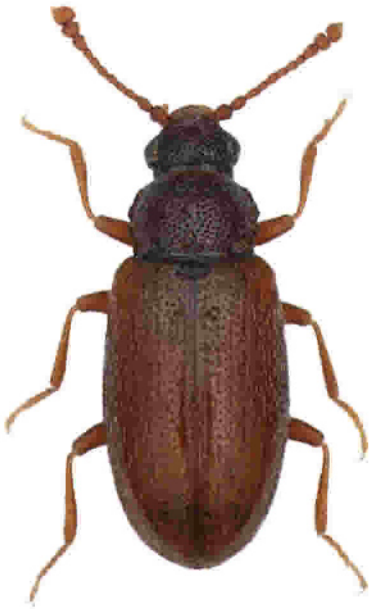

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Phradonoma nobile (Reitter 1881)

Dimension: 2.2-3.2 mm

Taxonomy: Col., Dermestidae, originally *Trogoderma nobile* and transferred to new genus by Dalla Torre 1911, syn. *Phradonoma distincta* Kalik 1954, *Trogoderma paulonotata* Pic 1908, *Trogoderma tamaricis* Pic 1894

Distribution (3): Af 12, As 15, E 4

Commodities (13): anv 7.7%, bc 7.7%, df 15.4%, g 7.7%, gp 15.4%, me 7.7%, os 15.4%, osp 23.1%

Phradonoma tricolor (Arrow 1915)

Dimension: 1.9-2.4 mm long

Taxonomy: Col., Dermestidae

Distribution (3): Af 1, As 4, E 2

Commodities (1): os 100%

Facilities: salad oil factories

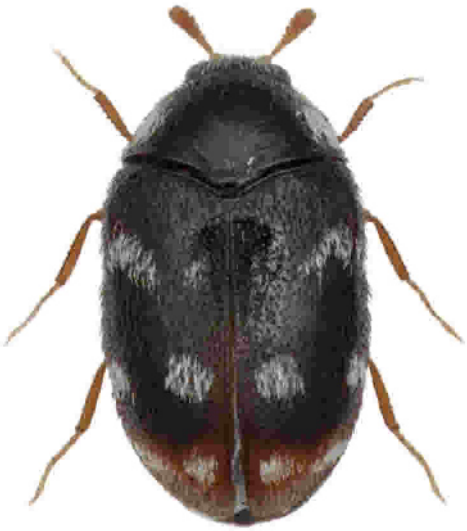

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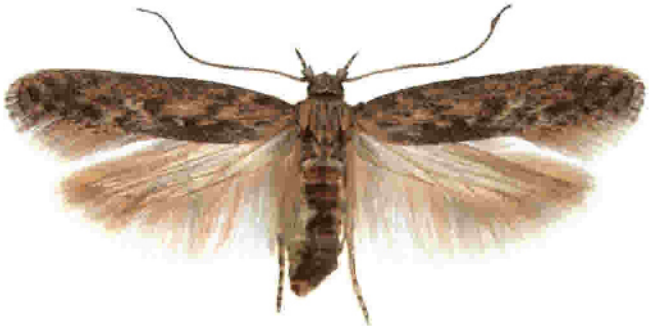
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

***Phthorimaea operculella* (Zeller 1873)**



Dimension: 10-12 mm wingspan

Common names: potato tuber moth, potato tuber worm, tobacco splitworm

Taxonomy: Lep., Gelechiidae, syn. *Gelechia operculella* Zeller 1873, *Gnorimoschema operculella* (Zeller 1873)

Distribution (7): Probably South American origin. Af 14, As 17, C 1, E 7, N 3, O 2, SA

Commodities (5): ffv 40%, r 20%, sea 20%, v 20%

Natural enemies (39): *Agathis gibbosa*, *Agathis unicolor*, *Apanteles appellator*, *Apanteles carpatus*, *Apanteles hoplites*, *Apanteles scutellaris*, *Apanteles subandinus*, *Apsilophrys oeceticola*, *Bracon gelechiae*, *Campoplex haywardi*, *Campoplex phthorimaeae*, *Chelonus blackburni*, *Chelonus curvimaculatus*, *Chelonus kellieae*, *Chelonus phthorimaeae*, *Chelonus subcontractus*, *Copidosoma desantisi*, *Copidosoma koehleri*, *Copidosoma phthorimaeae*, *Diadegma chrysostictos*, *Diadegma mollipla*, *Diadegma pulchripes*, *Dibrachys cavus*, *Goniozus gallicola*, *Habrobracon hebetor*, *Macrocentrus ancylivorus*, *Nidicola marginata*, *Orgilus jenniae*, *Orgilus lepidus*, *Orgilus parcus*, *Orgilus pimpinellae*, *Pnigalio pectinicornis*, *Pristomerus spinator*, *Pristomerus vulnerator*, *Pteromalus cerealellae*, *Sympiesis viridula*, *Temelucha picta*, *Trichogramma minutum*, *Venturia canescens* (lab)

Life history: Sporleder et al. 2004

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Pimelia grandis Klug 1830

Dimension: 28-33 mm long

Taxonomy: Col., Tenebrionidae, syn. *Pimelia denticostata* Koch 1935, *Pimelia sudanica* Fairmaire 1882

Distribution (1): Af 1

Commodities (1): v 100%

Plochionus pallens (Fabricius 1775)

Dimension: 7-9 mm long

Taxonomy: Col., Carabidae, originally *Carabus pallens*. For synonyms see Löbl and Smetana 2003.

Distribution (7): Af 3, As 8, C 2, E 5, N 2, O 4, SA 1

Commodities (13): bc 7.7%, df 15.4%, g 7.7%, gp 7.7%, os 23.1%, osp 15.4%, res 7.7%, sea 15.4%

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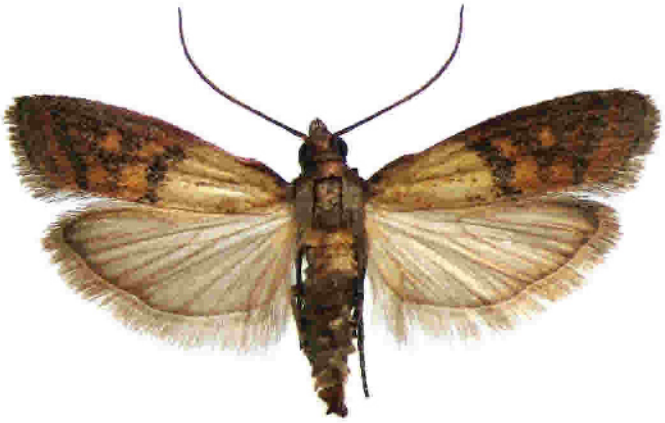
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

***Plodia interpunctella* (Hübner 1813)**



Dimension: 14-22 mm wingspan

Common names: cloaked-not-horn moth, dried fruit moth (polilla de la fruta seca (S)), horn compressed vegetable moth, Indianmeal moth (Моль индийская мучная (R)), mealworm moth, Dörrobstmotte kupferrote (coppery dry fruit moth (G)), Моль южная амбарная (south storage moth (R))

Taxonomy: Lep., Pyralidae, originally *Tinea interpunctella*, syn *Tinea zeae* Fitch 1856. For additional synonyms see Corbet and Tams 1943, Heinrich 1956 and Neunzig 1990.

Distribution (7): Cosmopolitan. Af 15, As 21, C 2, E 29, N 2, O 1, SA 4

Commodities (179): aninv 2.2%, anv 2.8% dried milk (u), bc 2.8% chocolate (m), cocoa bean (m), bg 2.2%, df 10.0% apricot (s), date (m), dog rose (s), prune (s, m), raisin (s, m), pear (s), sultana (s), dfp 1.7%, ffv 3.3% fig (s), g 6.7% barley (s), buckwheat (m), cracked rice (s), maize (s, m, u), rice (s), rye (s), sorghum (s), wheat (s, m, u), gp 7.8% buckwheat flour (s), maize flour (u), maize germ or meal (s), polished rice (m), rice bran (s), rice meal (s), wheat bran, meal or semolina (s), wheat flour (s, u), me 5.0%, n 6.1% almond (s), hazel (s), pistachio (s), pecan (u), walnut (s), np 2.8% ground and/or roasted almond (s), ground hazelnut (m), roasted hazelnut (s), ground walnut (u), oc 5.0% animal feed (s), confectionery (s), os 3.9% peanut (s), safflower (u), sesame (s), osp 3.9% peanut meal (u), safflower meal (u), p 5.0% cowpea (s), chickpea (s), soybean (s), pp 1.7% dried soymilk (s), soybean flour (s), soybean meal (s), r 1.1%, rp 1.1%, se 11.2% hemp (s), poppy (m), sea 5.6%, cayenne pepper (m), chilli pepper (u), coriander (u), fennel (u), garlic (s), ground chicory (s), red pepper (s), v 7.8% dried cabbage (s), dried carrot (s), dried green paak ts'oi (s), dried onion (s), orange peel (u), seaweed (u), sugar (s)

Facilities: bakeries, barley mills, canneries, cereal factories, chocolate factories, cull fig warehouses, empty cargo containers, farm storages of rice, feedmills, flat storages of grain, flour mills, grain bins, grain elevators, groceries, orchards, packing plants, peanut shelling plants, peanut warehouses, pet stores, port warehouses, raisin- processing plants, railroad cars, retail stores, soup flavoring factories, tobacco curing barns, tobacco fields, warehouses

Natural enemies (23): *Angitia kiehtani*, *Apanteles nephoptericis*, *Clausicella floridensis*, *Clausicella neomexicana*, *Diadegma chrysostictos*, *Dibrachys cavus*, *Eupelmus cushmani*, *Habrobracon breviconris*, *Habrobracon hebetor*, *Holepyris glabratus*, *Liposcelis bostrychophilus*, *Macrocentrus ancylivorus*, *Mesostenus gracilis*, *Nidicola marginata*, *Peregrinator biannulipes*, *Plastanoxus monroi*, *Psilochalcis brevialata*, *Trichogramma evanescens*, *Trichogramma minutum*, *Trichogramma pretiosum*, *Venturia canescens*, *Xylocoris cursitans*, *Xylocoris flavipes*

Life history: Bell 1975, Hamlin et al. 1931, Huang and Subramanyam 2003, Imura 1981, Imura and Sinha 1986, Mohandass et al. 2007, Subramanyam and Hagstrum 1993

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Prostephanus truncatus (Horn 1878)

Dimension: 3.3-4.5 mm

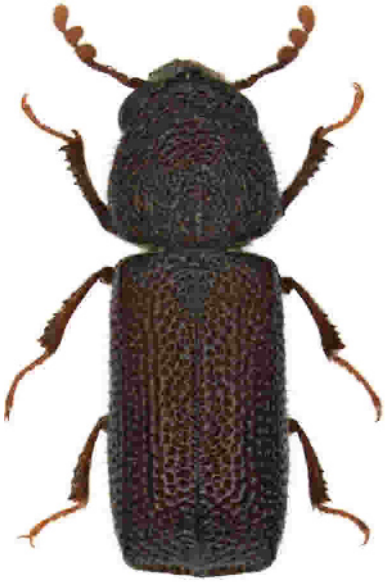
Common names: greater grain borer, larger grain borer (grand capucin du grain (F), barrenador grande de los granos (S)), scania beetle, großer Kornbohrer (large corn drill (G))

Taxonomy: Col., Bostrichidae, originally *Dinoderus truncatus* and transferred to new genus by Lesne 1808

Distribution (6): Meso-American origin. Af 17, As 7, C 6, E 2, N 3, SA 3

Commodities (9): bc 0% cocoa bean (u), coffee bean (u), g 22.2% maize (s), paddy (u), wheat (m), os 0% peanut (u), p 0% cowpea (u), kidney bean (u), lima bean (u), r 33.3%, rp 22.2%, v 11.1%, w 11.1%

Life history: Demianyk and Sinha 1988, Nansen and Meikle 2002, Subramayam and Hagstrum 1991



Pseudeurostus hilleri (Reitter 1877)

Dimension: 1.9-2.8 mm long

Common name: globular spider beetle

Taxonomy: Col., Ptinidae, originally *Niptus hilleri*, syn. *Eurostus alienus* Brown 1940. For additional synonyms see Löbl and Smetana 2007.

Distribution (4): Af 2, As 4, E 4, N 2

Commodities (10): anv 0% fishmeal (u), g 30.0%, gp 30.0% wheatfeed (s), wheat flour (s), oc 10.0%, sp 10.0%, v 20.0%

Facilities: barley storages, farm grain bins, feedmills, granaries, growing floors at maltings, malt storages, warehouses

Life history: Howe and Bull 1956, Howe and Burges 1952

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Ptinus fur (Linnaeus 1758)

Dimension: 2.4-5 mm long

Common names: whitemarked spider beetle, gemeiner Diebkäfer (common thief beetle (G)), kräuter Diebkäfer (herb thief beetle (G)), ptine bigarré (mottled spider beetle (F)), Ptine voleur (spider thief beetle (F)), Вор притворяшка (spider thief beetle (R)), Точильщик притворяшка (spider thief beetle (R))

Taxonomy: Col., Ptinidae, originally *Cerambyx fur*. For synonyms see Löbl and Smetana 2007.

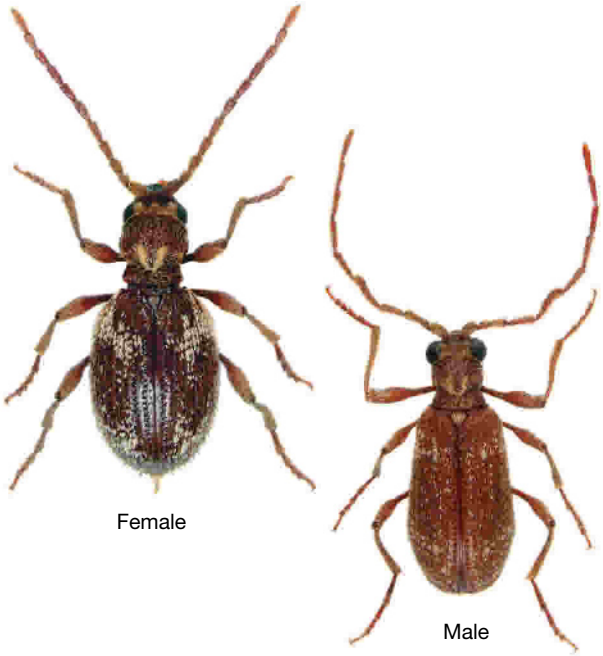
Distribution (5): Cosmopolitan. Af 9, As 22, E 44, N 2, O 2

Commodities (50): aniv 2.0%, anv 14.0% fishmeal (s), bc 2.0%, bg 4.0%, df 4.0%, ffv 2.0%, g 10.0%, gp 12.0% wheatfeed (s), me 6.0%, n 2.0%, oc 2.0%, os 2.0%, r 4.0%, se 6.0%, sea 12.0%, t 2.0%, v 10.0%, w 2.0%, wp 2.0%

Facilities: barley storages, cracker store, drug store, empty cargo containers, feedmills, grain bins, grain elevators, granaries, growing floors at maltings, malt storages, museums, residences, seed store, warehouses

Natural enemies (8): *Cephalonomia gallicola*, *Cephalonomia xambeui*, *Cryptus ptinivorus*, *Dimachus discolor*, *Doryctes leucogaster*, *Helcabolus sulcatus*, *Lariophagus distinguendus*, *Spathius exarator*

Life history: Howe and Burges 1951



Ptinus japonicus Reitter 1877

Dimension: 2-4.3 mm long

Taxonomy: Col., Ptinidae

Distribution (3): Af 2, As 5, E 2

Commodities (8): g 12.5%, gp 12.5%, me 12.5%, os 12.5%, p 25.0%, sp 12.5%, v 12.5%

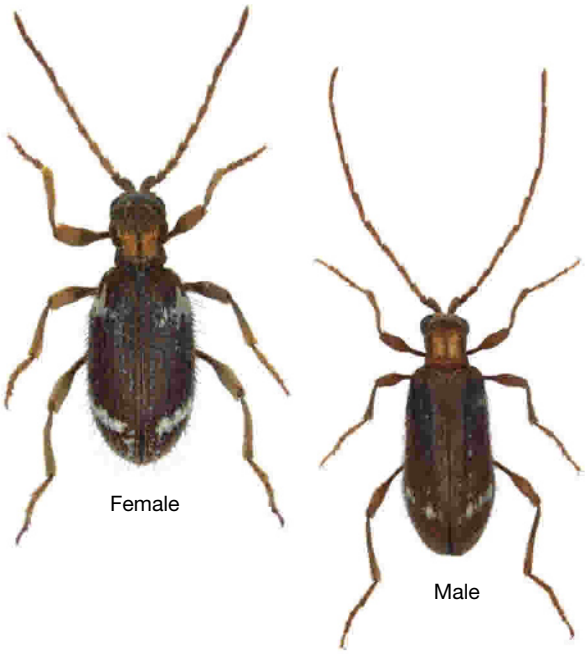


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Ptinus latro Fabricius 1775

Dimension: 2-4.5 mm

Common names: brown spider beetle (ptine brun (F)), dunkelbrauner Diebkäfer (dark brown thief beetle (G)), Притворяшка тёмно-коричневый (dark brown thief beetle (R)),

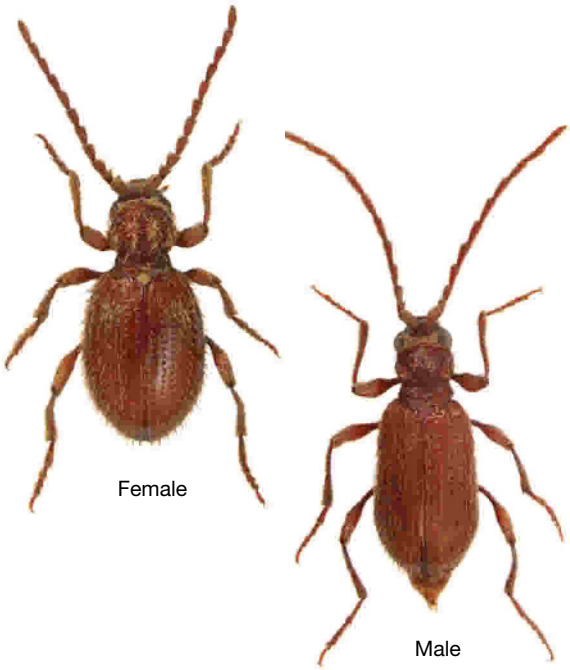
Taxonomy: Col., Ptinidae, syn. *Ptinus clavipes* Panzer 1792, *Ptinus hirellus* Sturm 1837, *Ptinus testaceus* Olivier 1790 (non Thunberg 1784). For additional synonyms see Löbl and Smetana 2007

Distribution (6): Cosmopolitan. Af 10, As 22, C 1, E 43, N 2, O 3

Commodities (51): aninv 2.0%, anv 5.9%, bc 2.0%, df 3.9%, g 13.7%, gp 7.8% wheatfeed (s), me 5.9%, n 2.0%, oc 3.9%, os 7.8%, osp 2.0%, p 2.0%, pp 2.0%, r 5.9%, res 5.9%, se 11.8%, \sea 2.0%, sp 2.0%, t 3.9%, v 7.8%

Facilities: cellar, cocoa, sugar and dried fruit warehouses, farm grain bins, feedmills, flat storages of grain, grain elevators, granaries, henhouse, peanut shelling plants, peanut warehouses

Life history: Howe 1959



Ptinus pusillus Sturm 1837

Dimension: 1.8-3 mm long

Common names: kleiner Diebkäfer (smaller thief beetle (G)), Притворяшка малый (smaller thief beetle (R))

Taxonomy: Col., Ptinidae

Distribution (2): Af 1, E 19

Commodities (1): g 0% wheatfeed (s), res 100%

Facilities: barley storages, feedmills, granaries, growing floors at maltings, maize shops, malt storages

Life history: Howe 1956b

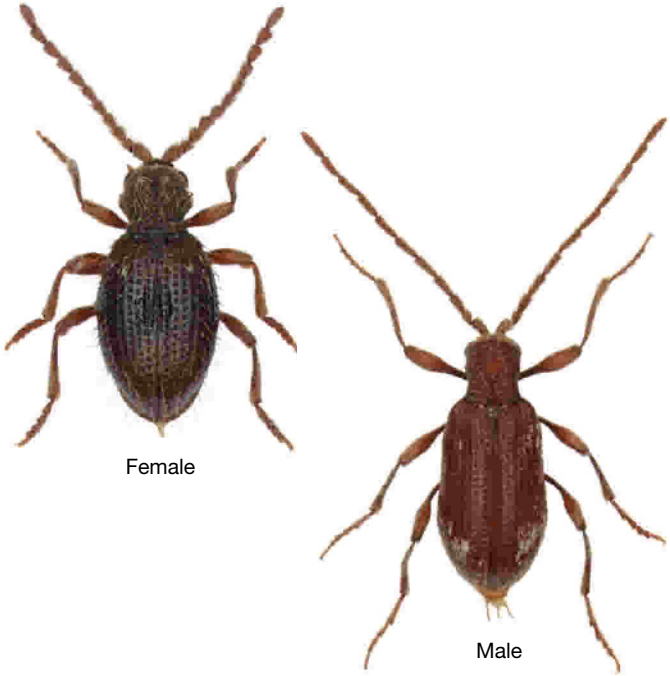


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Ptinus raptor Sturm 1837

Dimension: 2.5-4 mm long

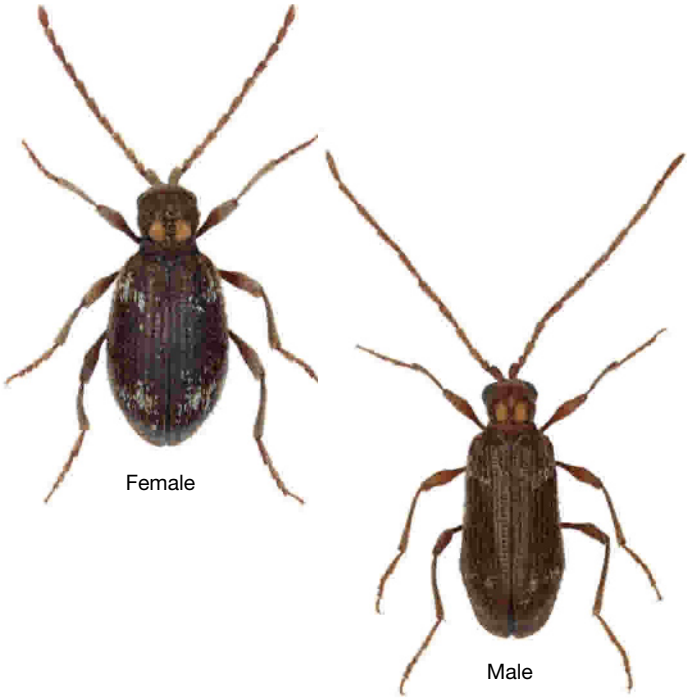
Common names: Canadian spider beetle, Eastern spider beetle, ptine oriental (Oriental spider beetle (F))

Taxonomy: Col., Ptinidae, syn. *Ptinus obscuripennis* Pic 1929, *Ptinus transbaicalicus* Pic 1929

Distribution (4): Af 2, As 4, E 29, N 2

Commodities (8): anv 12.5%, g 50.0%, gp 12.5%, gs 12.5%, v 12.5%

Facilities: farm storages of rice, grain elevators, warehouses



Ptinus tectus Boieldieu 1856

Dimension: 2.5-4 mm long

Common names: Australian spider beetle, australische Diebkäfer (Australian thief beetle (G)), ptine ocellé (ocellated spider beetle (F))

Taxonomy: Col., Ptinidae, syn. *Ptinus ocellus* W. J. Brown 1929, *Ptinus pilosus* White and Butler 1846

Distribution (7): Cosmopolitan. Af 7, As 12, C 1, E 36, N 2, O 3, SA 2

Commodities (115): aninv 3.5% dried insect (s), anv 11.3% beef (u), casein (s), dried milk (s), egg (m), fishmeal (s), herring meal (u), meat meal (s), bc 3.7%, bg 0.9%, df 6.1%, ffv 2.6% cabbage (s), carrot (s), ground cabbage (s), ground carrot (s), g 6.1% wheat (s), gp 13.9% rice flour (s), wheat bran, flour, germ or meal (s), wheatfeed (s), me 1.7%, n 2.6%, oc 7.0%, os 2.6%, osp 5.2% copra meal (s), cottonseed meal (s), p 2.6%, pp 2.6% pea flour (s), soybean meal (s), r 1.7% beet (u), ground beet (u), ground potato (m), potato (u), rp 0.9%, se 5.2%, sea 6.1%, t 1.7%, v 11.1% alfalfa pellet (m), grass meal (s), ground onion (m), ground swede (s), onion (m), rye grass pellet (m), swede (m), yeast (s), w 0.9%

Facilities: bakeries**,** barley storages, biscuit factories, breweries, flat storages of grain, flour mills, grain bins, growing floors at maltings, malt storages

Natural enemies (6): *Cephalonomia gallicola*, *Dibrachys boarmiae*, *Dimachus discolor*, *Hemitrichus seniculus*, *Lariophagus distinguendus*, *Theocolax elegans*

Life history: Howe and Burges 1953a

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Ptinus villiger (Reitter 1884)

Dimension: 2-2.4 mm long

Common names: hairy spider beetle (Ptine velu (F)), behaarter Diebkäfer (hairy thief beetle (G)), Притворяшка волосистый (hairy thief beetle (R))

Taxonomy: Col., Ptinidae, originally *Bruchus villiger*, syn. *Ptinus balticus* Iablokoff-Khnzorian and Karapetyan 1991

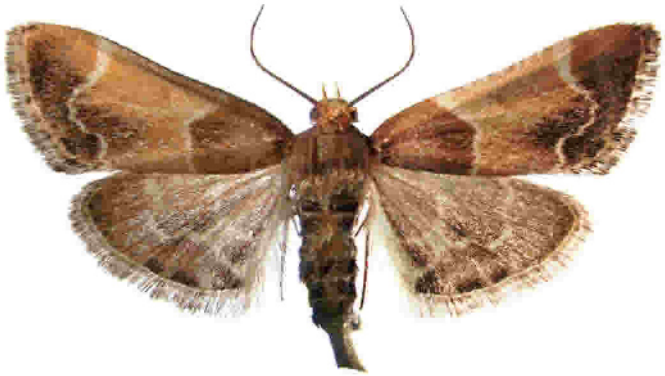
Distribution (3): As 4, E 27, N 2

Commodities (11): g 18.2%, gp 54.5%, oc 9.1%, p 9.1%, se 9.1%

Facilities: empty grain bins, feedmills, granaries, residences, warehouses

Life history: Howe and Burges 1955

Pyralis farinalis (Linnaeus 1758)



Dimension: 19-32 mm wingspan

Common names: meal moth (polilla de la harina (S)), common meal moth, common meal tabby, cosmopolitan meal moth, grain-snout moth, meal-snout moth, snout moth, polilla parda de la harina (brown meal moth (S)), Pyrale de la farine (flour moth (F)), Teigne de la farine (flour moth (F)), Огнёвка мучная (flour moth (R)), Mehlzünsler (flour pyralid moth (G))

Taxonomy: Lep., Pyralidae

Distribution (6): Af 3, As 11, E 7, N 2, O 2, SA 1

Commodities (46): anv 4.3%, df 2.2%, g 15.2%, gp 10.9%, gs 2.2%, me 2.2%, np 2.2%, oc 2.2%, os 8.7%, osp 4.3%, p 8.7%, pp 4.3%, r 13.0%, res 4.3%, se 2.2%, sea 4.3%, v 8.7%

Facilities: bakeries, barley storages, breweries, cull fig warehouses, empty grain bins, feedmills, flat storages of grain, flour mills, grain elevators, growing floor at maltings, horse barns, malt storages, orchards, peanut shelling plants, peanut warehouses, residences, retail groceries

Natural enemies (7): *Apanteles carpatus*, *Goniozus columbianus*, *Hypsicera curvator*, *Melanophora roralis*, *Peregrinator biannulipes*, *Phytomyptera tarsali*, *Venturia canescens* (lab)

Life history: Curtis and Landolt 1992

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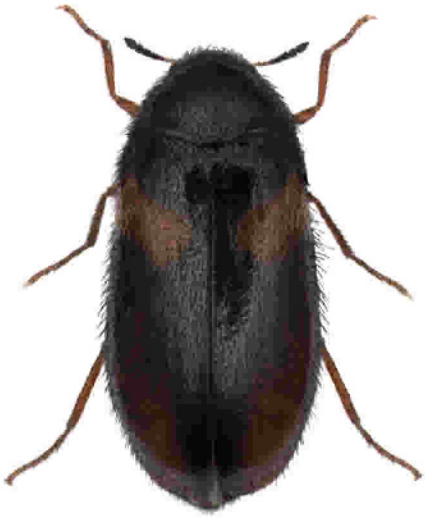
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Reesa vespulae (Milliron 1939)



Dimension: 2.8-3.8 mm long

Common names: museum nuisance, Nordamerikanische Wespenkafer (North American wasp beetle (G))

Taxonomy: Col., Dermestidae, originally *Perimegatoma vespulae* Milliron 1939

Distribution (6): North American origin. Af 4, As 2, E 17, N 2, O 2, SA 1

Commodities (24): aninv 4.2%, anv 12.5%, bg 4.2%, g 16.7%, gp 8.3%, n 4.2%, oc 4.2%, p 4.2%, se 29.2%, v 12.5%

Facilities: drug stores, empty grain bins, food stores, museums, residences

Rhyzopertha dominica (Fabricius 1792)

Dimension: 2.5-3 mm

Common names: Australian wheat weevil, lesser grain borer (petit perceur des cereals (F), barrenador menon de los granos taladrillo (S)), Getreidekapuziner (cereal capucin (G)), Bostriche des grains (grain bark beetle (F)), escarabajo de los granos (grain beetle (S)), Capucin des grains (grain borer (F)), Barrenillo de los granos (grain borer (S)), taladrillo de los cereales (harvest grain drill (S)), pequeño barrenador del trigo (smaller grain borer (S))

Taxonomy: Col., Bostrichidae, originally *Synodendron dominicum* and transferred to new genus by Lesne 1924. For synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Probably Indian or Malaysian region origin. Af 27, As 27, C 7, E 29, N 3, O 8, SA 6

Commodities (115): aninv 0.9%, anv 1.7%, bc 2.6%, bg 2.6%, df 2.6% apple (m), ffv 0.9%, g 8.7% barley (s), maize (s), millet (s), oat (u), paddy (s), rice (s, u), rye (s), sorghum (s), teff (u), wheat (s), gp 15.7% broken barley (s), broken millet (s), broken sorghum (s), broken wheat (s), ground buckwheat (s, u), oat flake (s), polished rice (u), rice flour (s), wheat flour (s), me 2.6%, n 0.9% acorn (m), oc 7.0%, os 2.6% peanut (s, m), safflower (u), osp 4.3%, p 9.6% black gram (u), broad bean (u), chickpea (u), cowpea (m, u), kidney bean (u), lentil (u), moth bean (u), mung bean (u), pea (u), pigeonpea (u), soybean (u), pp 2.6% broken black gram (s), broken chickpea (s), broken cowpea (s), broken kidney bean (u), broken lentil (u), broken moth bean (s), broken mung bean (s), broken pea (s), broken pigeonpea (u), broken soybean (u), crushed broad bean (u), oc 0.0% ground dog biscuit (s), r 7.8% potato (m), res 0.9%, rp 2.6%, se 6.1%, sea 6.1%, v 8.7% dried parsley (u), w 0.9%, wp 1.7%

Facilities: barley mills, combine harvesters, empty cargo containers, farm grain bins, farm storages of rice, feedmills, flat storages of grain, flour mills, food stores, grain elevators, local maize markets, local sorghum markets, local yam markets, peanut shelling plants, peanut warehouses, pet stores, port warehouses, railroad cars, rice mills, semolina mills, stables, tobacco curing barns

Natural enemies (10): *Anisopteromalus calandrae*, *Cephalonomia rhizoperthae*, *Cerocephala dinoderi*, *Lariophagus distinguendus*, *Peregrinator biannulipes*, *Pteromalus cerealellae*, *Rhabdepyris rhizoperthae*, *Teretrius nigrescens*, *Theocolax elegans*, *Xylocoris flavipes*

Life history: Edde 2012, Howe 1950, Longstaff 1999, Stemley 1962

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Sennius morosus (Sharp 1885)

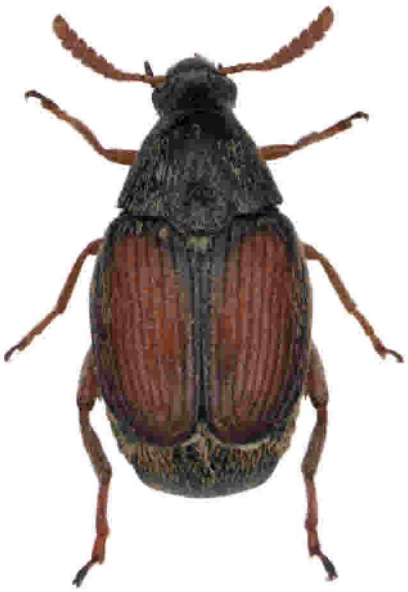
Dimension: 1.3-2.6 mm long

Taxonomy: Col., Bruchidae, originally *Bruchus morosus*, also as *Acanthoscelides morosus*

Distribution: (2): C 1, N 2

Commodities (1): p 100%

Natural enemies (6): *Eupelmus amicus*, *Heterospilus prosopidis*, *Horismenus missouriensis*, *Stenocorse bruchivora*, *Urosigalphus mexicanus*, *Zatropis incertus*



Silvanus bidentatus (Fabricius 1804)

Dimension: 2.5-3.5 mm long

Taxonomy: Col., Silvanidae, originally *Dermestes bidentatus*. For synonyms see Löbl and Smetana 2007.

Distribution (4): As 8, E 23, N 2, O 1

Commodities (1): g 100%

Facilities: feedmills

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Silvanus unidentatus (A. G. Olivier 1790)

Dimension: 2.1-2.9 mm long

Taxonomy: Col., Silvanidae

Distribution (5): Cosmopolitan. Af 3, As 5, E 27, N 1, SA 1

Commodities (1): g 100%

Facilities: empty cargo containers

Sitophilus granarius (Linnaeus 1758)

Dimension: 2-5 mm long

Common names: granary weevil (calandre des grains (F), Charançon de granier (F), Долгоносик амбарный (R)), gorgojo negro (black weevil (S)), Kornkäfer (corn beetle (G)), Kornrüsselkäfer (grain weevil (G)), Charançon du blé (wheat weevil (F)), gorgojo del trigo (wheat weevil (S)

Taxonomy: Col., Curculionidae, originally *Curculio granaria.* For synonyms see Vaurie 1983.

Distribution (6): Af 11, As 17, E 19, N 3, O 3, SA 5

Commodities (52): anv 1.9%, bc 0% cocoa bean (u), coffee bean (u), df 1.9%, ffv 1.9%, g 21.1% barley (s), buckwheat (s), maize (s), oat (s, m, u), paddy (u), rice (s), rye (s), sorghum (s), triticale (s), wheat (s), gp 26.9% noodle (s), wheat bran, flour or meal (u), me 1.9%, n 3.8% acorn (s), almond (u), chestnut (s), oc 3.8%, os 3.8% peanut (u), safflower (u), osp 1.9%, p 5.8% broad bean (u), lupine (u), pea (u), soybean (u), pp 1.9% crushed broad bean (u), soybean meal (u), r 1.9%, res 3.8%, rp 1.9%, se 5.8%, t 1.9%, v 7.7% alfalfa pellet (u), rye grass pellet (u)

Facilities: bakeries, barley storages, breweries, currant raisin storages, feedmills, flat storages of grain, flour mills, grain bins, grain elevators, growing floors at maltings, kitchens, malt storages, pet stores, railroad cars, seedmen (seed dealers), stables, sultana raisin storages, warehouses

Natural enemies (13): *Anisopteromalus calandrae*, *Cephalonomia tarsalis*, *Cerocephala cornigera*, *Chremylus elaphus*, *Dibrachys cavus*, *Holepyris sylvanidis*, *Lariophagus distinguendus*, *Meraporus requisitus*, *Peregrinator biannulipes*, *Pteromalus cerealellae*, *Pteromalus tritici*, *Theocolax elegans*, *Theocolax formiciformis*

Life history: Campbell et al. 1976, Easton and Segrove 1947, Kirpatrick and Wilbur 1965, Longstaff 1981

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Sitophilus oryzae (Linnaeus 1763)

Dimension: 2.5-4 mm

Common names: lesser grain weevil, rice weevil (Charançon du riz (F), Reiskäfer (G), gorgojo del arroz (S)), Calandra du riz (rice calandra (F))

Taxonomy: Col., Curculionidae, originally *Curculio oryzae* and transferred to new genus by Kuschel 1961, also as *Calandra oryzae*, syn. *Calandra minor* Sasaki 1899, *Calandra sasakii* Takahashi 1929. For additional synonyms see Vaurie 1983.

Distribution (7): Cosmopolitan. Oriental origin. Af 38, As 31, C 13, E 21, N 3, O 10, SA 13

Commodities (104): aninv 1.0%, anv 1.9%, bc 1.0%, bg 1.0%, df 1.9%, ffv 2.9%, g 12.5% barley (s), buckwheat (s), maize (s), oat (s), rice (s), sorghum (s), teff (u), triticale (s), wheat (s), gp 17.3%, me 1.0%, n 4.8% acorn (s), chestnut (s), oc 1.9%, os 3.8% safflower (u), osp 5.8%, p 9.6% broad bean (u), pp 3.8% crushed broad bean (u), split pea (s), r 4.8%, res 1.9%, rp 2.9%, se 7.7%, sea 3.8%, t 1.0%, v 7.7% tamarind (s)

Facilities: barley mills, breweries, combine harvesters, currant storages, empty cargo containers, farm storages of rice, feedmills, feed stores, flat storages of grain, flour mills, grain elevators, local sorghum markets, peanut shelling plants, peanut warehouses, pet stores, port warehouses, railroad cars, retail groceries, rice mills, seedmen (seed dealers), semolina mills, stables, warehouses

Natural enemies (17): *Anisopteromalus calandrae*, *Cephalonomiatarsalis*, *Cephalonomia waterstoni*, *Cerocephala cornigera*, *Cerocephala dinoderi*, *Chremylus elaphus*, *Dibrachys cavus*, *Holepyris sylvanidis*, *Lariophagus distinguendus*, *Meroporus requisitus*, *Peregrinator biannulipes*, *Plastanoxus fukuokensis*, *Pteromalus cerealellae*, *Pteromalus tritici*, *Theocolax elegans*, *Theocolax formiciformis*, *Zatropis incertus*

Life history: Dobie 1973, Longstaff 1981, 1983; Sharifi and Mills 1971a

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Sitophilus zeamais Motschulsky 1855

Dimension: 3.5-5 mm

Common names: corn weevil, greater grain weevil, maize weevil (charançon du mais (F), la Plata Maiskäfer (G), Долгоносик кукурузный (R), gorgojo del maiz (S)), Calandra du mais (corn calandra (F)), Maiskäfer (maize beetle (G)

Taxonomy: Col., Curculionidae, originally *Calandra zeamais* and transferred to new genus by Kuschel 1961, also as *Calandra oryzae* (Linnaeus 1763) "large strain", syn. *Calandra platensis* Zacher 1922. For additional synonyms see Vaurie 1983.

Distribution (7): Cosmopolitan. Oriental origin. Af 21, As 17, C 6, E 8, N 3, O 7, SA 8

Commodities (72): aninv 1.4%, anv 1.4%, bc 2.8%, bg 1.4%, df 2.8%, dfp 1.4%, ffv 1.4% melon (u), g 15.3% barley (s), buckwheat (s), maize (s), millet (s), oat (s), rice (s), sorghum (s), triticale (s), wheat (s), gp 18.1% ground sorghum (u), me 1.4%, n 4.2% acorn (s), chestnut (s), np 1.4%, oc 1.4%, os 2.8% peanut (u), osp 2.8%, p 16.7% broad bean (u), bambara groundnut (m), cowpea (u), soybean (u), pp 1.4% crushed broad bean (u), r 9.7%, rp 4.2% cassava chip (s), yam chip (s), se 2.8%, sea 0% pepper (u), v 5.5%

Facilities: barley mills, farm storages of rice, feedmills, flat storages of grain, local maize markets, peanut shelling plants, peanut warehouses, pet stores, railroad cars, rice mills

Natural enemies (8): *Anisopteromalus calandrae*, *Cephalonomia tarsalis*, *Cerocephala dinoderi*, *Lariophagus distinguendus*, *Peregrinator biannulipes*, *Pteromalus cerealellae*, *Theocolax elegans*, *Zatropus incertus*

Life history: Longstaff 1981, Throne 1994, Sharifi and Mills 1971b

Sitotroga cerealella (Olivier 1789)

Dimension: 13-19 mm wingspan

Common names: Angoumois grain moth (Teigne angumoise du grain (F)), French grain moth (Getreidemotte französische (G)), grain moth (Моль зерновая (R), polilla de los cereales (S)), rice grain moth, rice moth, Моль ячменая (barley moth (R)), Alucite des céréales (grain alucita (F)), kleiner Kornwurm (small grain worm (G))

Taxonomy: Lep., Gelechiidae

Distribution (7): Cosmopolitan. Af 20, As 21, C 2, E 16, N 2, O 2, SA 8

Commodities (28): bc 3.6%, dfp 3.6%, g 28.6% maize (s), rice (s), sorghum (s), teff (u), wheat (s), gp 21.4%, me 3.6%, oc 3.6%, os 7.1% safflower (u), osp 3.6%, p 3.6%, res 3.6%, se 14.3%, sea 3.6%

Facilities: bakeries, farm storages of rice, feedmills, flat storage of grain, flour mills, grain elevators, local maize markets, local sorghum markets, oilseed refineries, peanut shelling plants, peanut warehouses, railroad cars, residences, retail groceries, tobacco curing barns, tobacco fields, warehouses

Natural enemies (13): *Anisopteromalus calandrae*, *Bracon pectoralis*, *Chelonus blackburni*, *Dibrachys boarmiae*, *Dibrachys clisiocampae*, *Habrobracon hebetor*, *Nidicola marginata*, *Pteromalus cerealellae*, *Pteromalus pyrophilus*, *Theocolax elegans*, *Trichogramma evanescens*, *Trichogramma minutum*, *Xylocoris flavipes*

Life history: Hansen et al. 2004, Mills and Wilbur 1967, Perez-Mendoza et al. 2004, Warren 1956

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Sphaericus gibboides (Boieldieu 1854)

Dimension: 1.6-2.8 mm

Common name: humpbacked spider beetle

Taxonomy: Col., Ptinidae, originally *Trigonogenius gibboides* and transferred to new genus by Kiesenwetter 1877, syn. *Sphaericus brasiliensis* (Pic 1930)

Distribution (6): Af 1, As 1, E 5, N 2, O 1, SA 1

Commodities (26): aninv 3.8%, anv 11.5%, gp 3.8%, me 3.8%, n 3.8%, oc 7.7%, r 3.8%, se 7.7%, sea 34.6%, t 3.8%, v 15.4%

Facilities: herbarium

Stegobium paniceum (Linnaeus 1758)

Dimension: 2-5 mm long

Common names: biscuit beetle, bread beetle (Vrilette du pain (F), Brotkäfer (G), carcoma panadera (S)), drug store beetle (Coléoptère des drogueries (F)), stégobie des pharmacies (F), carcoma de las drogas (S)), library beetle, spice beetle, vrillette boulangère (bakery beetle (F)), Brotkäfer (bread drill G), Точильщик хлебный (bread grinder (R))

Taxonomy: Col., Anobiidae, originally *Dermestes paniceus* and transferred to new genera by Thomson 1863 (*Sitodrepa panicea*) and Motschulsky 1860. For synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. Af 15, As 22, C 3, E 33, N 3, O 6, SA 5

Commodities (177): aninv 1.7%, anv 6.2% meat meal (s), dried milk (u), bc 2.8%, bg 2.8%, df 1.1%, ffv 1.1%, g 5.7% barley (s), maize (s), gp 5.7% oatmeal flour (s), polished rice (u), wheatfeed (s), wheat flour (s), me 10.2%, n 2.8%, np 0.6%, oc 6.2%, os 1.7% safflower (s), osp 3.9% safflower meal (s), p 5.1%, pp 0.6% ground pea (s), lentil flour (s), pea flour (s), soybean meal (s), r 3.9%, rp 2.3%, se 8.5% pomegranate (u), poppy (s), sea 13.6% aniseed (u), black mustard (m), caraway (s), cardamom (u), chili pepper powder (u), coriander (s), cumin (s), fennel powder (s), garlic (u), ginger (s, u), turmeric (s, u), t 0.6%, v 11.9% alfalfa pellets (m), onion (m), rye grass pellet (m), w 0.6%, wp 0.6%

Facilities: bakeries, dried milk factories, empty cargo containers, farm grain bins, farm storages of rice, feedmills, flour mills, food distribution warehouses, grain elevators, groceries, libraries, noodle factories, peanut shelling plants, peanut warehouses, pet stores, residences, retail stores, seedmen (seed dealers), ships, tobacco curing barns, tobacco fields, warehouses

Natural enemies (14): *Anisopteromalus calandrae*, *Cephalonomia gallicola*, *Dibrachys boarmiae*, *Dibrachys cavus*, *Dimachus discolor*, *Entedon longiventris*, *Habritys brevicornis*, *Lariophagus distinguendus*, *Peregrinator biannulipes*, *Pteromalus cerealellae*, *Spathius exarator*, *Spathius pedestris*, *Theocolax elegans*, *Tilloidea notatus*

Life history: Lefkovitch 1967, Momoi and Sadamori 1982

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Stelidota geminata (Say 1825)

Dimension: 2-3 mm long

Common name: strawberry sap beetle

Taxonomy: Col., Nitidulidae, originally *Nitidula geminata*.

Distribution (4): Af, As 1, E 7, N 1

Commodities (2): g 50%, os 50%

Facilities: peanut shelling plants, peanut warehouses

Natural enemies (1): *Microctonus nitidulidis*

Life history: Weber and Connell 1975

Stephostethus lardarius (DeGeer 1775)

Dimension: 2.3-2.8 mm long

Taxonomy: Col., Lathridiidae, originally *Tenebrio lardarius*, also as *Lathridius lardarius.* For synonyms see Löbl and Smetana 2007.

Distribution (3): As 1, E 25, N 1

Facilities: barley storages at maltings

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Tachyporus hypnorum (Fabricius 1775)

Dimension: 3-4 mm long

Taxonomy: Col., Staphylinidae, originally *Staphylinus hypnorum*. For synonyms see Löbl and Smetana 2004.

Distribution (3): Af 3, As 12, E 42

Facilities: flour milling areas

Natural enemies (2): *Centistes lucidator*, *Codrus gracilis*

Tenebrio guineensis Imhoff 1843

Dimension: 14-18 mm long

Taxonomy: Col., Tenebrionidae

Distribution (1): Af 4

Commodities (8): anv 12.5%, bc 12.5%, g 25.0%, n 12.5%, os 12.5%, p 12.5%, r 12.5%

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Tenebrio molitor Linnaeus 1758

Dimension: 12-16 mm long

Common names: yellow mealworm (Ténébrion meunier (F)), gewöhnliche Mehlkäfer (common meal beetle (G)), Ténébrion de la farine (flour darkling beetle (F)), Хрущак большой мучной (large flour beetle (R)), gusano de la harina (mealworm (S)), escarabajo molinero (mill beetle (S))

Taxonomy: Col., Tenebrionidae

Distribution (7): Cosmopolitan. Af 4, As 8, C 2, E 7, N 2, O 3, SA 3

Commodities (51): aninv 2.0%, anv 9.8%, bg 5.9%, df 5.9%, g 15.7% barley (s), wheat (m), gp 19.6% ground barley (s), ground buckwheat (s), ground millet (s), oat flake (s), wheat bran, flour or semolina (s), n 2.0%, oc 9.8%, os 3.9% safflower (u), osp 2.0% safflower meal (s), p 3.9%, pp 2.0% soybean meal (u), r 2.0%, res 3.9%, rp 2.0%, se 2.0%, sea 2.0%, t 2.0%, v 3.9%

Facilities: bakeries, barley storages, breweries, farms, feedmills, flat storages of grain, flour mills, food shops, grain elevators, growing floors at maltings, maize storages, malt storages, oilseed refineries, peanut shelling plants, peanut warehouses, railroad cars

Natural enemies (2): *Nidicola marginata*, *Venturia canescens*

Life history: Cotton 1927, Koura et al. 1972, Ludwig 1956

Tenebrio obscurus (*-um*) Fabricius 1792

Dimension: 13.5-18 mm

Common names: dark mealworm (ténébrion obscure (F), dunkler Mehlkäfer (G), Хрущак тёмный мучной (R), gusano oscuro de la harina (dark mealworm (S)), tenebrio oscuro (dark tenebrio (S))

Taxonomy: Col., Tenebrionidae. For synonyms see Löbl and Smetana 2008.

Distribution (7): Cosmopolitan. Af 3, As 8, C 1, E 5, N 2, O 2, SA 2

Commodities (42): aninv 2.3%, anv 7.0%, bg 4.7%, df 9.3%, g 9.3%, gp 16.3%, gs 7.0%, me 2.3%, n 2.3%, oc 9.3%, os 4.7%, osp 4.7%, p 4.7%, pp 2.3% soybean meal (u), r 2.3%, res 2.3%, rp 2.3%, se 2.3%, sea 2.3%, t 2.3%

Facilities: barley mills, feedmills, flour mills, grain elevators, grain storages, grocery stores, railroad cars

Natural enemies (2): *Goniozus columbianus*, *Peregrinator biannulipes*

Life history: Cotton 1927, Fiore 1960

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Tenebroides mauritanicus (Linnaeus 1758)

Dimension: 6-11 mm

Common names: cadelle (Зерновка мавританская (R), Козявка мавританская (R)), bolting cloth beetle, bread beetle, wheat beetle, escarabajo cadelle (cadelle beetle (S)), schwarzer Getreideager (black grain rodent (G)), gusano del trigo (grain worm (S)), carcoma grande de los granos (large grain beetle (S)), großer Brotkäfer (larger bread beetle (G)), trogosita morisca (Moorish trogosita (S))

Taxonomy: Col., Trogositidae, originally *Tenebrio mauritanicus* and transferred to new genus by Schönherr 1806. For synonyms see Löbl and Smetana 2007.

Distribution (7): Cosmopolitan. African origin. Af 23, As 19, C 3, E 31, N 3, O 9, SA 5

Commodities (121): anv 3.3%, bc 2.5%, bg 2.5%, df 5.0%, ffv 1.7%, g 7.4% rice (s), wheat (s), gp 13.2% wheat flour (s), gs 0.8%, me 3.3%, n 6.6%, np 1.7%, oc 2.5%, os 5.8%, osp 8.3%, p 6.6%, pp 2.5% soybean meal (u), r 3.3%, res 0.8%, rp 4.1%, se 4.1%, sea 5.0%, v 9.1%

Facilities: bakeries, barley mills, barley storages at maltings, currant raisin storages, farms, feedmills, flat storages of grain, flour mills, flour storages, grain elevators, grain storages, local yam markets, oilseed refineries, peanut shelling plants, peanut warehouses, railroad cars, residences, rice mills, sultana raisin storages, warehouses

Hosts/Prey (1): *Lasioderma serricorne*

Life history: Bond and Monro 1954

Thaneroclerus buqueti (Lefebvre 1835)

Dimension: 6 mm

Taxonomy: Col., Cleridae, originally *Clerus buquet* and transferred to new genus by Lefebvre 1838, syn. *Clerus dermestoides* Klug 1842, *Metademius tabacci* Matsumura 1935, *Thaneroclerus girodi* Chevrolat 1880

Distribution (6): Asian origin. Af 5, As 10, C 2, E 9, N 1, O 1

Commodities (24): anv 12.5%, bc 8.3%, df 4.2%, g 4.2%, gp 4.2%, me 4.2%, os 8.3%, osp 8.3%, r 8.3%, rp 4.2%, se 4.2%, sea 20.8%, v 8.3%

Facilities: drug stores, warehouses

Hosts/Prey (1): *Lasioderma serricorne* and other anobiid

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Thes bergrothi (Reitter 1881)

Dimension: 1.8-2.2 mm long

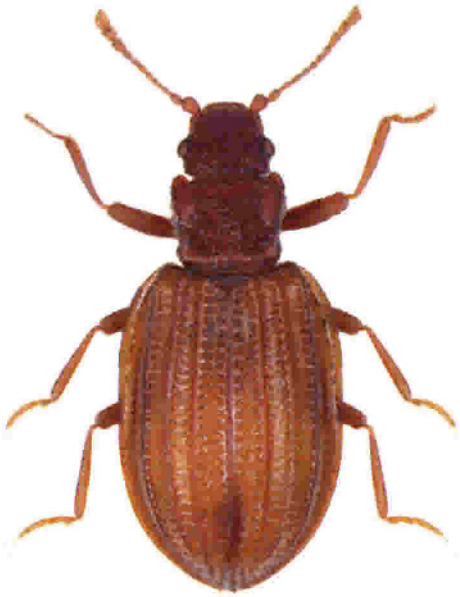
Common name: ridgewinged fungus beetle

Taxonomy: Col., Lathridiidae, originally *Lathridius bergrothi.* For synonyms see Löbl and Smetana 2007.

Distribution (4): Af, As 1, E 24, N 1

Commodities (8): anv 12.5%, bc 12.5%, df 12.5%, ffv 12.5%, g 12.5%, gp 12.5%, me 12.5%, v 12.5%

Facilities: cocoa and spice warehouses, empty cargo containers, feedmills, herbariums



Thorictodes heydeni Reitter 1875

Dimension: 1.3-1.4 mm long

Taxonomy: Col., Dermestidae, syn. *Thaumaphrastus karanisensis* Blaisdell 1927

Distribution (6): Cosmopolitan. Af 11, As 13, C 2, E 4, N 2, O 1

Commodities (32): anv 9.4%, g 18.8%, gp 18.8%, me 3.1%, oc 3.1%, os 9.4%, osp 12.5%, p 9.4%, pp 3.1%, r 3.1%, res 3.1%, rp 3.1%, se 3.1%

Life history: Chatterji and Sarup 1959

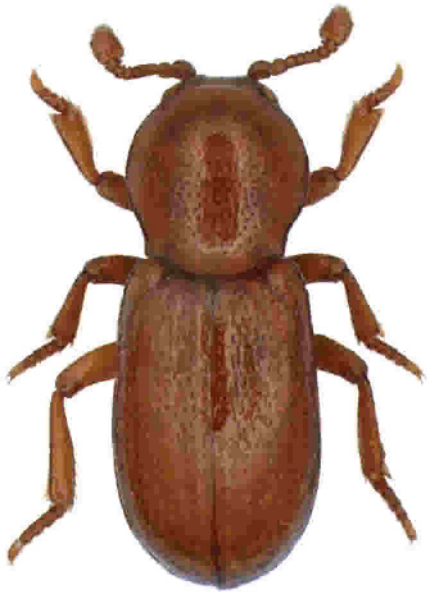


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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Thylodrias contractus Motschulsky 1839

Dimension: male 2-3 mm long, female 3-4.5 mm long

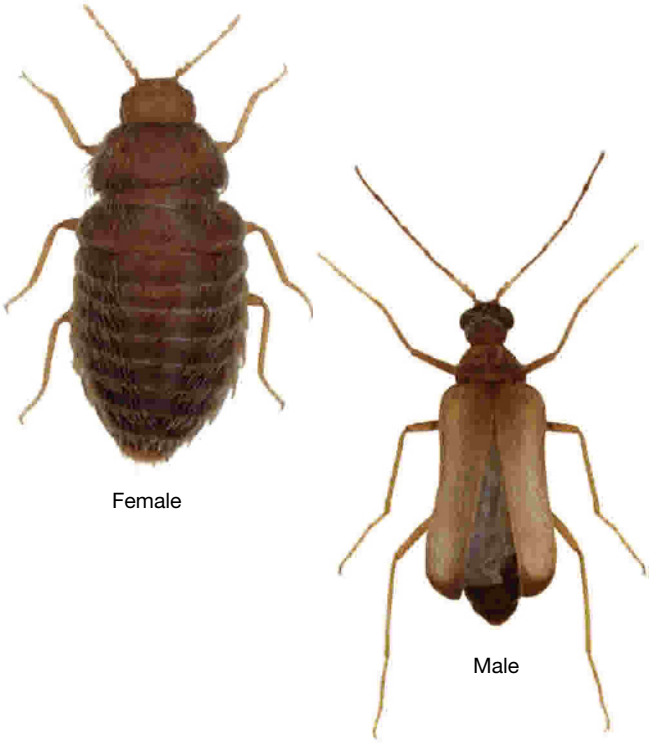
Common names: odd beetle, thylodrias (F)

Taxonomy: Col., Dermestidae, syn. *Hospitopterus efflatouni* Pic 1921, *Ignotus aenigmaticus* Slosson 1903.

Distribution: (5): Central Asian origin. Af 1, As 1, E 2, N 2, O 1

Commodities (20): aninv 10.0%, anv 10.0%, g 10.0%, gp 10.0%, me 5.0%, oc 20.0%, p 5.0%, se 10.0%, sea 5.0%, t 10.0%, wp 5.0%

Natural enemies (1): *Laelius utilis*



Tinea pallescentella Stainton 1851

Dimension: 12-15 mm wingspan

Common name: large pale clothes moth

Taxonomy: Lep., Tineidae. For synonyms see Robinson and Nielson 1993.

Distribution (3): E 5, N, SA

Commodities (19): anv 60.0%, g 15.0%, gp 10.0%, osp 10.0%, t 5.0%

Natural enemies (1): *Xenolytus bitinctus*

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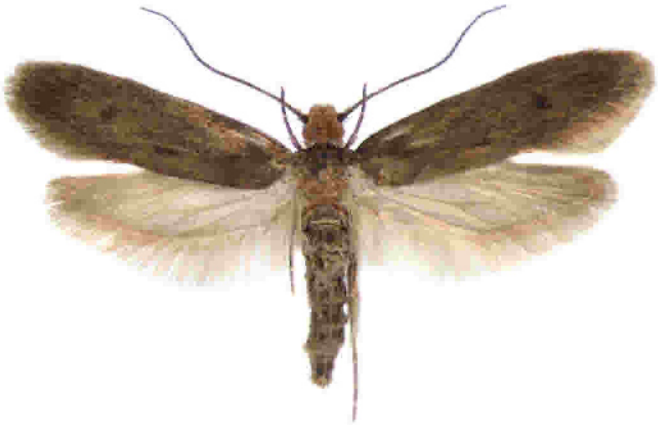
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Tinea pellionella (Linnaeus 1758)



Dimension: 9-16 mm wingspan

Common names: casemaking clothes moth, Teigne commune (common moth (F)), Pelzmotte (fur coat moth (G)), Моль шубная (skin coat moth (R)), Mite à fourreau (sleeve moth (F))

Taxonomy: Lep., Tineidae. For synonyms see Robinson and Nielson 1993.

Distribution (5): Af 2, As 4, E 2, N 1, O 2

Commodities (33): aninv 0% silk (u), anv 33.3% hog bristle (u), horn (u), wool fabric (s), g 6.1%, me 6.1%, n 3.0%, os 9.1%, pp 3.0%, r 3.0%, se 3.0%, sea 9.1%, t 6.1% cotton fabric (u), v 18.2% jute (u)

Facilities: barley storages at maltings, bulk wool storages, feed mills, flour mills, poultry houses, residences

Natural enemies (4): *Apanteles carpatus*, *Chremylus elaphus*, *Gelis cinctus*, *Hypsicera curvator*

Life history: Cheema 1956

Tineola bisselliella (Hummel 1823)

Dimension: 9-16 mm wingspan

Common names: common clothes moth in Australia and England, webbing clothes moth in New Zealand and United States, polilla de la ropa (case-making clothes moth (S)), Mite des vêtementes (clothes moth (F)), teigne des vetements (clothes moth (F)), Kleidermotte (clothes moth (G)), Моль мебельная (furniture moth (R))

Taxonomy: Lep., Tineidae, originally *Tinea bisselliella*, syn. *Tineola furciferella* Zagulajev 1954. For additional synonyms see Robinson and Nielson 1993.

Distribution (5): Cosmopolitan. Af 4, As 5, E 3, N 2, O 3

Commodities (39): aninv 0% dried insects (s), silk (u), anv 43.6% blood serum (s), chicken or crow feather (s), egg albumen (s), fishmeal (s), fish scale (u), human hair (m), mouse, rabbit or rat fur (s), wool (m), bg 2.6%, g 12.8%, gp 5.1% wheat flour (s), me 5.1%, oc 12.8% granulated gelatin (u), osp 2.6%, pp 2.6% soybean meal (s), se 5.1%, t 5.1% cloth (m), flannel (u), wp 2.6%

Facilities: bulk wool storages, feedmills, grain storages, museums, theater clothes collections, tanneries

Natural enemies (11): *Apanteles carpatus*, *Apanteles ensiger*, *Baryscapus tineivorus*, *Chremylus elaphus*, *Gelis cinctus*, *Hemiteles bipunctator*, *Hypsicera curvator*, *Meteorus cespitator*, *Scenopinus fenestralis*, *Trichogramma brassicae*, *Trichogramma evanescens*

Life history: Cox and Pinniger 2007, Griswold 1944, Griswold and Crowell 1936

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TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Tribolium castaneum (Herbst 1797)

Dimension: 2.3-3.5 mm long

Common names: red flour beetle (tribolium rouge de la farine (F), Хрущак булавоусый мучной (R)), rust-red flour beetle, gorgojo castano de la harina (brown flour beetle (S)), tribolio castaneo (brown Tribolium (S)), rotbrauner Reismehlkäfer (red brown rice flour beetle (G)), Petit ver de la farine (small flour worm (F))

Taxonomy: Col., Tenebrionidae, originally *Colydium castaneum* and transferred to new genus by Macleay 1825, syn. *Dermestes navalis* Fabricius 1797 (nom supprimé), *Ips testaceum* Fabricius 1798, *Tenebrio bifoveolatum* Duftschmid 1812, *Tenebrio ferrugineum* Fabricius 1787, *Tribolium navale* Fabricius

Distribution (7): Cosmopolitan. Oriental origin. Af 46, As 35, C 14, E 19, N 3, O 14, SA 12

Commodities (233): aninv 2.1%, anv 3.4%, bc 1.7%, bg 1.3%, df 3.0%, dfp 0.4%, ffv 2.1%, g 4.3% hungary rice (s), maize (s), millet (s), rice (u), sorghum (s), teff (s), wheat (s), gp 11.1% barley flour (s), cracked or ground barley (s), ground buckwheat (s), maize cracked, flour, grit or meal (s), millet flour, meal or semolina (s), oat cracked, flour or rolled (s), polished rice (u), rice flour (s), rice meal (u), sorghum flour or meal (s), wheat bran, flour, meal or semolina (s), wheatfeed (s), gs 0.4%, me 2.1%, n 5.1% walnut (m), np 0.4%, oc 5.6%, os 4.7% cottonseed (u), flax (s), peanut (m, u), rape (s), safflower (u), sesame (s), sunflower (s), osp 6.9% broken peanut (s), broken safflower (s), cottonseed flour (u), ground flax (s), ground rape (s, u), ground sunflower (s), peanut meal (u), safflower meal (s), p 6.0%, broad bean (u), soybean (u), pp 3.9% chickpea flour (u), cowpea flour (s), cracked cowpea (u), crushed broad bean (s), lentil flour (s, m), moth bean flour (s), mung bean flour (s), pea flour (m), pigeonpea flour (m), soybean cracked or flour (s), soybean meal (s, u), r 4.3% cassava flour (m), res 1.3%, rp 1.3% cassava meal (s), yam flour or meal (s), se 6.9% clover (m), ground clover (s, u), ground flax (s), ground mustard (u), mustard (u), sea 5.1%, sp 0.4%, t 1.7%, v 13.4% cellulose (u), dried mushroom (s), dried parsley (s, m), hemp (s), w 0.4%, wp 0.4%

Facilities: bakeries, barley mills, barley storages, central stores, combine harvesters, cull fig warehouses, currant storages, empty cargo containers, farm grain bins, farm storages of rice, feedmills, feed stores, flat storages of grain, flour mills, grain elevators, grocery warehouses, growing floors at maltings, henhouses, local yam markets, malt storages, noodle drying rooms, oilseed refineries, peanut shelling plants, peanut warehouses, pet stores, port warehouses, railroad cars, residences, retail stores, rice mills, semolina mills, stables

Natural enemies (8): *Amphibolus venator*, *Cephalonomia tarsalis*, *Palorus shikhae*, *Peregrinator biannulipes*, *Rhabdepyris zea*, *Sclerodermus immigrans*, *Trichogramma evanescens*, *Xylocoris flavipes*

Life history: Hagstrum and Milliken 1988, Howe 1956a, 1962a; Lhaloui et al. 1988, Park and Frank 1948, White 1987

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Tribolium confusum Jacquelin du Val 1861

Dimension: 2.6-5 mm long

Common names: confused flour beetle (gorgojo confuso de la harina (S)), Amerikanischer Reismehlkäfer (American flour beetle (G)), escarabajo americano de la harina (American flour beetle (S)), tribolium brun de la farine (brown flour beetle (F)), Tribolium de la farine de riz (rice flour beetle (F)), Хрущак малый мучной (small flour beetle (R))

Taxonomy: Col., Tenebrionidae

Distribution (6): Cosmopolitan. Ethiopian origin. Af 12, As 22, E 15, N 3, O 3, SA 5

Commodities (138): aninv 1.4%, anv 2.2%, bc 2.9% tea (u), bg 2.2% biscuit (m, s), df 3.6%, dfp 0.7%, ffv 0.7%, g 7.2% hungary rice (s), maize (u), millet (s), rice (s), wheat (s), gp 16.7% cracked barley (s), cracked maize (s), cracked oat (s), cracked soybean (u), crack wheat (s, m), graham flour (s), ground barley (s), ground buckwheat (s), ground millet (s), maize meal (s), millet flour or semolina (s), polished rice (u), rice flake (m), rice meal (s), rolled oat (s), wheat bran, flour or meal (s), wheat semolina (s, m), me 2.9%, n 3.6%, np 2.2%, oc 2.9%, os 5.1% flax (s), peanut (s, m, u), rape (s), safflower (u), sunflower (s), osp 12.5% broken safflower (s), cracked peanut (u), ground flax (s, u), ground rape (m, u), ground sunflower (s), safflower meal (s), peanut meal (u), p 6.5% broad bean (u), soybean (u), pp 1.4% cracked cowpea (u), crushed broad bean (s), soybean meal (u), r 2.9%, res 2.2%, rp 1.4%, se 3.6% clover (m), ground clover (m, u), ground mustard (u), mustard (u), sea 5.1%, t 0.7%, v 9.5% dried mushroom (s), dried parsley (s), hemp (s), herb (s, m), malt coffee (m)

Facilities: bakeries, barley mills, barley storages, brewery, currant raisin storages, farms storages of rice, feedmills, flat storages of grain, flour mills, grain bins, grain elevators, growing floors at maltings, local yam markets, malt storages, noodle drying rooms, peanut shelling plants, peanut warehouses, pet stores, port warehouses, railroad cars, residences, rice mills, semolina mills, sultana raisin storages, wheat bins

Natural enemies (9): *Amphibolus venator*, *Cerocephala dinoderi*, *Dufouriellus ater*, *Nidicola marginata*, *Peregrinator biannulipes*, *Rhabdepyris zea*, *Xylocoris cursitans*, *Xylocoris flavipes*, *Xylocoris sordidus*

Life history: Hagstrum and Milliken 1988, Howe 1960, Park and Frank 1948

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Tribolium destructor Uyttenboogaart 1933

Dimension: 4.5-5.7 mm long

Common names: dark flour beetle, destructive flour beetle, false black flour beetle, large flour beetle (großer Reismehlkäfer (G)), Хрущак разрушитель (destroyer beetle (R))

Taxonomy: Col., Tenebrionidae

Distribution (4): Cosmopolitan. African origin. Af 4, As 7, E 20, N 2

Commodities (22): anv 9.1%, df 4.5%, g 9.1% teff (m), wheat (m), gp 27.3%, n 9.1%, oc 4.5%, os 13.6%, res 4.5%, rp 4.5%, se 4.5%, t 4.5%, v 4.5%

Facilities: retail stores, seedhouses

Tribolium madens (Charpentier 1825)

Dimension: 3.9-5.1 mm long

Common names: black flour beetle (schwarzer Reismehlkäfer (G)), European black flour beetle, Хрущак чёрый мучной (black flour beetle (R)), tribolium moir d'Europe (European flour beetle (F))

Taxonomy: Col., Tenebrionidae, originally *Tenebrio madens* and transferred to new genus by Redtenbacher 1858, syn. *Margus obscurum* W. Redtenbacher 1842

Distribution (4): Af 1, As 1, E 9, N 1

Commodities (10): g 30.0%, gp 40.0%, os 10.0%, p 10.0%, se 10.0%

Facilities: grain storages, flour mills, warehouses

Life history: Howe 1962b, Park 1945, Smith and Barker 1991

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Trichophaga tapetzella (Linnaeus 1758)

Dimension: 12-22 mm wingspan

Common names: carpet moth (Teigne des tapis (F), Mite des tapis (F), Tapetenmotte (G), Моль меховая (R)), tapestry moth, white tip clothes moth, Моль шерстяная (wool moth (R))

Taxonomy: Lep., Tineidae, originally *Phalaena tapetzella*, syn. *Tinea palaestrica* (Butler 1877)

Distribution (6): Cosmopolitan. Af 2, As 7, E 6, N 1, O 3, SA 2

Commodities (15): anv 46.7%, oc 6.7%, t 33.3%, v 6.7%, wp 6.7%

Facilities: barns, granaries, stables

Natural enemies: *Apanteles carpatus*, *Meteorus cespitator*

Trigonogenius globosus Solier 1849

Dimension: 2-3.9 mm long

Common names: globular spider beetle (ptine globuleux (F)), chilenische Diebkäfer (Chilean thief beetle (G))

Taxonomy: Col., Ptinidae, originally *Ptinus globosus*. For synonyms see Löbl and Smetana 2007

Distribution (7): Cosmopolitan. Af 6, As 5, C 1, E 17, N 2, O 3, SA 6

Commodities (46): aninv 2.2%, anv 4.3% fishmeal (m), df 6.5%, g 13.0%, gp 17.4% wheatfeed (s), wheat flour (s), me 4.3%, os 8.7%, osp 8.7%, p 2.2%, res 4.3%, se 10.9%, sea 4.3%, t 4.3%, v 8.7% alfalfa pellet (m), rye grass pellet (m)

Facilities: barley storages, chocolate factories, cotton mills,flour mills, growing floors at maltings, granaries, maize mills, malt storages at maltings, residences, warehouses

Life history: Howe and Burges 1952

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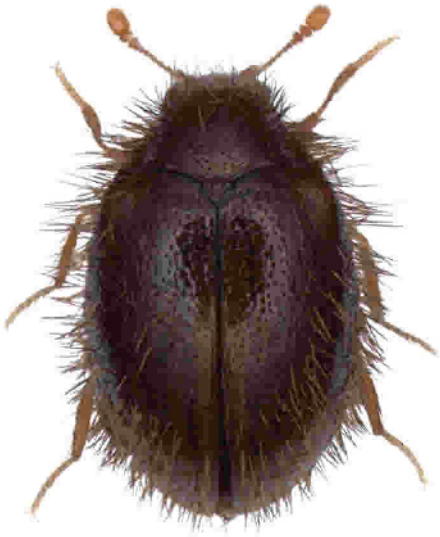
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Trinodes rufescens Reitter 1877



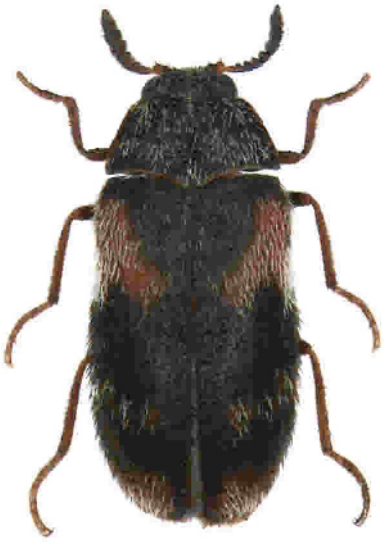
Dimension: 2 mm long

Taxonomy: Col., Dermestidae

Distribution (2): Af 1, As 2

Commodities (3): aninv 66.7%, os 33.3%

Trogoderma angustum (Solier 1849)



Dimension: 2.5-4 mm long

Taxonomy: Col., Dermestidae, originally *Euhopalus angustum*, syn. *Trogoderma bifasciatum* Linnaeus, *Pseudomegatoma boliviensis* Pic 1915

Distribution (1): E 15

Commodities (8): aninv 12.5%, anv 37.5% casein (u), dried beef (s), dried egg (u), dried milk (u), duck feather (u), fishmeal (u), hamster hide (u), whale meal (u), wool cloth (u), bc 12.5% chocolate (u), cocoa oilcake (s, u), cocoa meal (u), cocoa powder (u), coffee (u), bg 0% biscuit (u), dog biscuit (s), df 0% apple (u), apricot (u), prune (u), raisin (u), g 12.5% barley (s), maize (s), rice (s), rye (s), wheat (s), gp 0% noodle (s), oatmeal (s), wheat flour (u), me 0% angelica root (s), avens root (u), barberry (u), boldo leaf (u), buckthorn berry (u), burnet root (s), cats paw flower (u), chamomilla flower (u), comfrey root (u), conduran bark (u), corn flower (u), elderberry flower (u), elecampane root (u), gentian root (u), hay flower (u), hibiscus root (u), Ireland ecumenical moss (u), Island moss (u), lemon balm leaf (u), linden flower (u), lovage root (s), mallow flower (u), primrose root (u), salvia root (u), sarsaparilla (u), valerian (s), white bryony root (s),mistletoe leaf (u), nettle leaf (s), plantain herb (u), poplar bud (u), poppy (s), unripe poppy head (u), rose hip (u), sage leaf (u), senna leaf (u), senna pod (s), toadflax (u), verbascum flower (u), walnut leaf (u), water fennel (u), white horehound (u), white nettle flower (u), wormwood herb (u), n 12.5% almond (s), Brazil (u), hazel (s), walnut (s), np 0% walnut oilcake (s), osp 0% copra meal (u), cottonseed oilcake (s), linseed meal (u), palm kernel oilcake (s), rape oilcake (s), sunflower oilcake (s), p 0% bean pod (u), lentil (u), pea (s), pp 0% soybean meal (u), r 0% dried potato (s), ginger (s), rp 0% licorice powder (s), potato powder (u), se 0% apricot (s), mustard (u), sea 0% aniseed (s), caraway (s), clove (u), coriander (s), dill seed (u), nutmeg (u), thyme (u), v 12.5% dried blueberry (u), dried mushroom (u), pollen (s), yeast (u)

Facilities: museums, residences

Natural enemies (1): *Laelius pedatus*

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Trogoderma glabrum (Herbst 1783)

Dimension: 2-4.2 mm long

Common name: glabrous cabinet beetle

Taxonomy: Col., Dermestidae, originally *Anthrenus glabrum*, syn. *Trogoderma boron* Beal 1954, *Trogoderma niger* (Herbst 1797). For additional synonyms see Löbl and Smetana 2007.

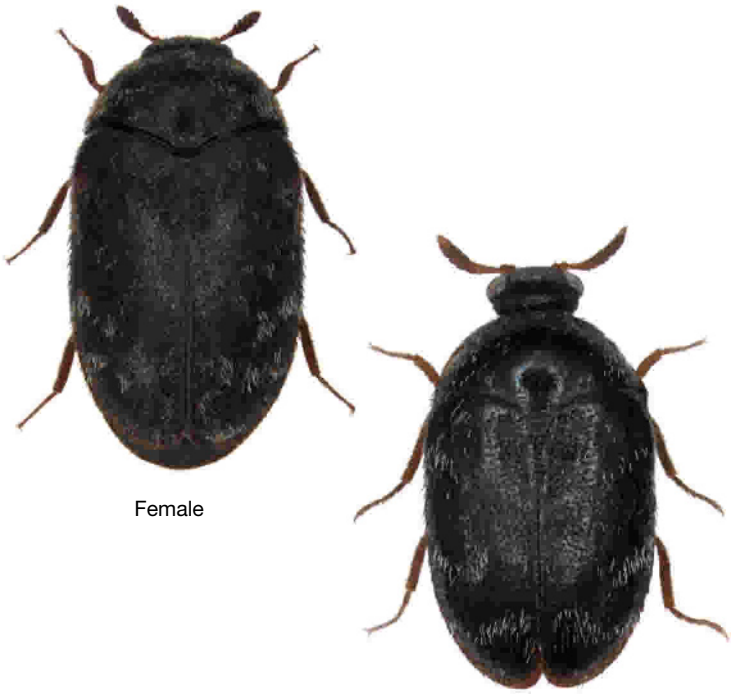
Distribution (5): Af 3, As 8, C 2, E 20, N 3

Commodities (21): aninv 4.8% dried insect (m), pollen (s), anv 9.5% fishmeal (u), dried milk (m), df 0% raisin (u), g 28.6% barley (u), maize (s), oat (u), wheat (s), gp 28.6% cracked maize (m), maize meal (m), noodle (u), oatmeal (m), polished rice (u), rolled oat (m), rolled barley (s), rye (m), sorghum (u), wheat flour (s), wheat flour with germ (s), wheat germ (s), n 4.8% almond (u), walnut (u), oc 4.8% cat food (s), egg noodle (m), kibbled dog food (s), poultry laying mash (s), os 0% peanut (u), safflower (s), osp 4.8% broken safflower (u), safflower meal (s), p 4.8% cowpea (u), kidney bean (u), lima bean (u), pp 4.8%, se 4.8%

Facilities: feedmills, grain bins, grain elevators, railroad cars, warehouses

Natural enemies: *Laelius pedatus*

Life history: Archer and Strong 1975, Kantack and Staples 1969



Female

Male

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Trogoderma granarium Everts 1898

Dimension: 1.7-3 mm long

Common names: khapra beetle (Khaprakäfer (G), Жук капровый (R), escarabajo khapra (S)), Кожеед зерновой (grain carpet beetle (R)), Dermeste des grains (grain dermestid (F)), Trogoderme du grain (grain Trogoderma (F)), Кожеед пестроцветный (variegated carpet beetle (R))

Taxonomy: Col., Dermestidae, syn. *Trogoderma afrum* Priesner 1951, *Trogoderma khapra* Arrow 1917, *Trogoderma quinquefasciata* Leesberg 1906

Distribution (7): Cosmopolitan. Indian origin. Af 30, As 29, C 1, E 23, N 2, O 2, SA 2

Commodities (96): anv 0% beef blood (u), dried milk (m, u), bc 3.1% coffee bean (u), bg 0% cracker (m), df 1.0% apricot (u), date (u), prune (u), raisin (u), ffv 1.0% peach (u), g 10.4% barley (s), maize (m, u), oat (m), rice (s), rye (m), shelled maize (s), wheat (s), gp 10.4% barley cereal (m), cracked oat (s), cracked rice (s), ground barley (s), ground buckwheat (s), ground maize (s), ground rice (s), instant white rice (u), maize cereal (u), maize meal (s), malt (s), noodle (m, u), oatmeal (s), polished rice (m), precooked oatmeal (m), rice flake (m), rolled barley (s), rolled oat (s), wheatfeed (s), wheat flour, germ or semolina (s), me 2.1%, n 3.1%, np 2.1% almond meat (s), kola nut (s), pecan meat (s), walnut meat (s), oc 1.0% egg noodle (u), ground dog food (u), gelatin (u), halvah (u), pablum (s), os 6.3% flax (s, u), peanut (s), sesame seed (s), osp 9.4% copra meal (u), cottonseed (u), ground flax (u), p 10.4% black gram (s), chickpea (s), cowpea (s), hyacinth bean (u), lentil (m), lima bean (s, m), mung bean (s), pigeonpea (s), pinto bean (s, m), soybean (m), pp 2.1% cracked pea (m), lentil flour (m), soybean meal (s), r 1.0%, rp 2.1% tapioca (u), se 22.9% alfalfa (u), grass (u), sea 4.2%, t 1.0%, v 6.3% herb (m), dried mushroom (m), yeast (m, u), wp 0% cork (u), paper (u)

Facilities: breweries, cereal factories, dried food warehouses, farm grain storage, feed mills, flat storages of grain, flour mills, grain elevator, malting houses, malt storages at maltings, nut storage and packing houses, powdered milk factories, seed establishments, semolina mills

Natural enemies (6): *Amphibolus venator*, *Anisopteromaluscalandrae*, *Dinarmus basalis*, *Laelius pedatus*, *Theocolax elegans*, *Xylocoris flavipes*

Life history: Hadaway 1956, Odeyemi and Hassan 1993

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Trogoderma grassmani Beal 1954

Dimension: 2-3 mm long

Taxonomy: Col., Dermestidae

Distribution (2): N 2, O 1

Commodities (22): anv 9.1%, g 13.6%, gp 4.5%, oc 13.6%, os 13.6%, p 4.5%, r 4.5%, se 36.4%

Trogoderma inclusum LeConte 1854

Dimension: 3.5 mm long

Common names: larger cabinet beetle, mottled dermestid, trogoderme des denrées (food Trogoderma (F))

Taxonomy: Col., Dermestidae, synomized with European species *Trogoderma versicolor* in 1919 and again separated into two species in 1956. For additional synonyms see Löbl and Smetana 2007.

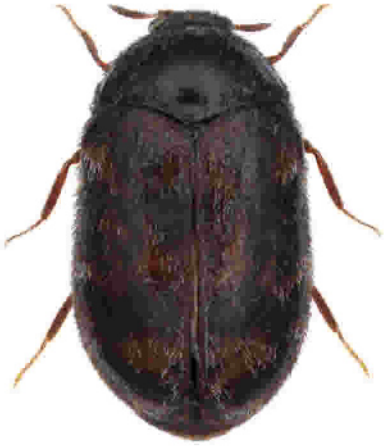
Distribution (6): Af 6, As 7, E 4, N 3, O 3, SA 1

Commodities (59): aninv 5.1% dried insect (u), pollen (s), anv 8.5% fishmeal (u), dried milk (m), bg 1.7%, df 8.5% raisin (u), dfp 1.7%, g 15.3% barley (u), maize (u), oat (u), rye (u), sorghum (u), wheat (m), gp 8.5% maize meal (m), malt (s), noodle (u), oatmeal (m), polished rice (u), rolled barley (s), rolled oat (s), wheat flour or germ (m), n 3.4% almond (u), walnut (u), oc 1.7% cat food (s), egg noodle (m), kibbled dog food (s), poultry laying mash (s), os 8.5% peanut (u), safflower (s), osp 3.4% broken safflower (u), safflower meal (s), p 8.5% cowpea (u), kidney bean (u), lima bean (u), pp 1.7%, res 1.7%, rp 1.7%, se 10.2%, sea 1.7%, t 1.7%, v 6.8%

Facilities: currant factories, currant raisin storages, dried milk factories, feedmills, flat storages of grain, flour mills, grain bins, retail groceries, seedmen (seed dealers), sultana raisin storages

Natural enemies: *Laelius utilis*

Life history: Hadaway 1956, Strong 1975



Female

Male

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Trogoderma ornatum (Say 1825)

Dimension: 1.9-3.6 mm long

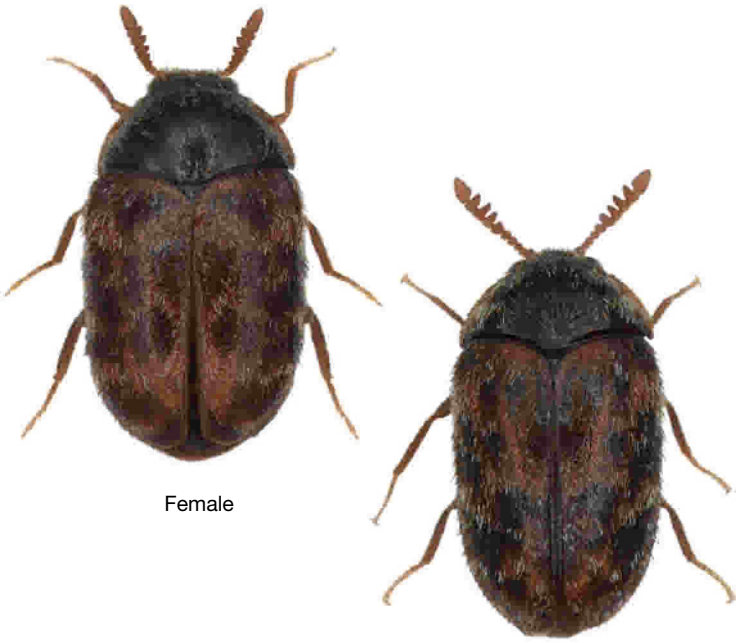
Common name: ornate cabinet beetle

Taxonomy: Col., Dermestidae, originally *Megatoma ornatum*, syn. *Trogoderma tarsale* Melsheimer. For additional synonyms see Löbl and Smetana 2007.

Distribution (5): As 1, C, N 3, O 1, SA 1

Commodities (54): aninv 5.6%, anv 11.1%, df 3.7%, ffv 1.9%, g 16.7%, gp 3.7%, n 1.9%, np 1.9%, oc 3.7%, os 5.6%, osp 7.4%, p 7.4%, r 1.9%, se 16.7%, sea 5.6%, t 1.9%, v 3.7%

Natural enemies (2): *Laelius centratus*, *Laelius utilis*



Female

Male

Trogoderma simplex Jayne 1882

Dimension: 2.2-4.4 mm long

Common name: plain cabinet beetle

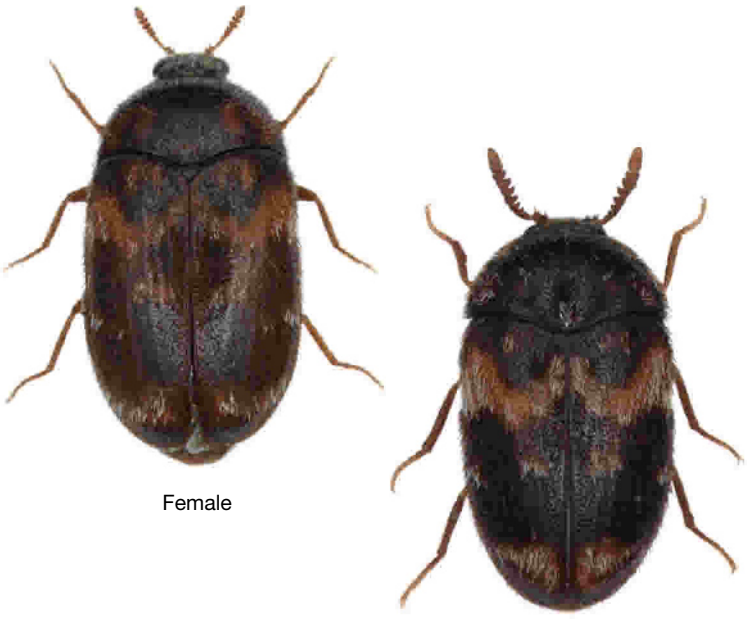
Taxonomy: Col., Dermestidae, syn. *Trogoderma ajax* Casey 1924, *Trogoderma pollens* Casey 1900

Distribution (2): C 1, N 3

Commodities (65): aninv 4.6% dried insect (u), anv 6.2% dried milk (u), fishmeal (u), df 1.5% raisin (u), g 13.9% barley (u), maize (m), oat (m), rye (m), sorghum (u), wheat (m), gp 12.3% maize meal (m), noodle (u), oatmeal (m), polished rice (u), rolled barley (m), rolled oat (u), wheat flour or germ (u), n 1.5% almond (u), walnut (u), np 6.2%, oc 3.1% cat food (s), egg noodle (m), kibbled dog food (s), poultry laying mash (s), os 9.2% peanut (u), safflower (m), osp 3.1% safflower meal (u), p 3.1% cowpea (u), kidney bean (u), lima bean (u), pp 1.5%, r 1.5%, se 27.7%, v 4.6% pollen (s)

Facilities: cottonseed storages, grain storage bins, insect collections

Natural enemies (2): *Laelius centratus*, *Laelius simplex*



Female

Male

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Trogoderma sternale Jayne 1882

Dimension: 1.9-3.4 mm long

Taxonomy: Col., Dermestidae. For synonyms see Mroczkowski 1968.

Distribution (4): Af 1, C 1, N 3, SA 1

Commodities (102): aninv 3.9%, anv 3.9%, bc 1.0%, bg 1.0%, df 2.9%, g 6.9%, gp 8.8%, n 2.9%, np 4.9%, oc 2.9%, os 4.9%, osp 4.9%, p 2.9%, pp 1.0%, r 1.0%, res 1.0%, rp 1.0%, se 37.3%, sea 2.0%, v 4.9%

Facilities: peanut shelling plants, peanut warehouses

Female

Male

Trogoderma variabile Ballion 1878

Dimension: 2.7-3.5 mm long

Common names: warehouse beetle (trogoderme des entrepôts (F)), trogoderme des graines (grain Trogoderma (F))

Taxonomy: Col., Dermestidae, syn. *Trogoderma parabile* Beal 1954, *Trogoderma persica* Pic 1914. For additional synonyms see Löbl and Smetana 2007.

Distribution (6): Cosmopolitan. Central Asian origin. Af 2, As 12, E 10, N 3, O 2, SA 1

Commodities (119): aninv 2.5% dried insect (m), pollen (s), anv 6.7% dried milk (m, u), fishmeal (m), bc 0.8%, bg 0.8%, df 3.4% raisin (u), g 9.2% barley (s), oat (m), maize (s), rice (s), rye (m), shelled maize (s), sorghum (m), wheat (s), gp 7.6% barley cereal (u), instant oatmeal (s), maize cereal (u), maize meal (s, m), noodle (m), oatmeal (s), polished rice (m), rolled barley (s), rolled oat (s), wheatfeed (s), wheat flour (s, m), wheat germ (s), white rice (u), me 1.7%, n 5.0%, np 2.5%, oc 8.4% cat food (s), kibbled or ground dog food (s), egg noodle (s), flax (u), gelatin (u), pablum (s), poultry laying mash (s), os 4.2% safflower (s), osp 0.8% copra meal (u), safflower meal (u), p 6.7% cowpea (m), kidney bean (u), lima bean (u), pinto bean (u), r 0.8%, rp 0.8%, se 28.6%, sea 3.4%, t 0.8%, v 4.8% yeast (u)

Female

Male

Facilities: bakeries, dried milk factories, feedmills, flour mills, grain bins, granaries, peanut shelling plants, peanut warehouses, railroad cars

Natural enemies (2): *Laelius centratus*, *Laelius pedatus*

Life history: Partida and Strong 1975

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Trogoderma versicolor (Creutzer 1799)

Dimension: 2-5 mm long

Common name: European larger cabinet beetle

Taxonomy: Col., Dermestidae, originally *Anthrenus versicolor*, synomized with American species, *Trogoderma inclusum*, in 1919 and again separated into two species in 1956. For synonyms see Löbl and Smetana 2007.

Distribution (5): Cosmopolitan. Af 4, As 16, E 26, N, O 1

Commodities (35): aninv 5.7%, anv 14.3%, df 8.6%, ffv 2.9%, g 20.0% maize (s), wheat (s), gp 8.6% oatmeal (s), wheat flour (s), n 5.7%, os 5.7%, osp 11.4%, p 2.9%, r 2.9%, se 8.6%, sea 2.9%

Facilities: date packing houses

Natural enemies (1): *Laelius utilis*

Female

Male

Typhaea haagi Reitter 1874

Dimension: 2.2-2.6 mm long

Taxonomy: Col., Mycetophagidae, syn. *Typhaea decipiens* (Lohse 1989)

Distribution (2): As 2, E 14

Commodities (3): df 33.3%, g 33.3%, p 33.3%

Facilities: containers, grain elevators, grain storages

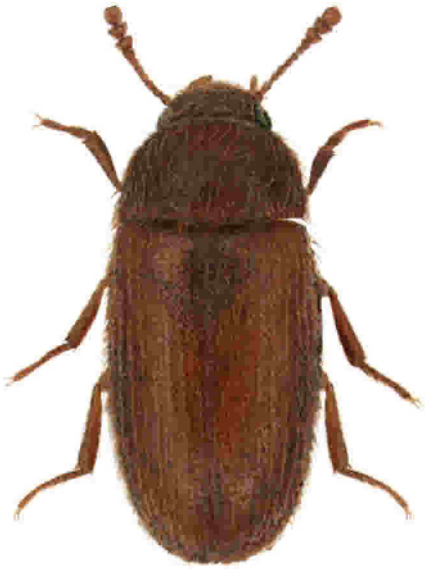


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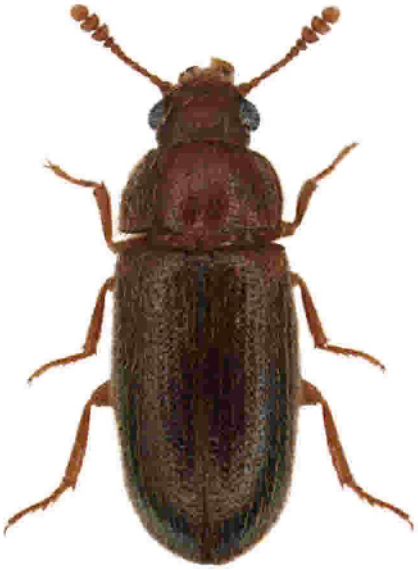
TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Typhaea stercorea (Linnaeus 1758)



Dimension: 2.4-3 mm long

Common names: hairy fungus beetle (mycetophage des cereals (F), haariger Pilzkafer (G)), haybug, Грибоед (fungi eater (R)), Gorgojo pubescente de los hongos (pubescent fungus beetle (S))

Taxonomy: Col., Mycetophagidae, originally *Dermestes stercoreus* and transferred to new genus by Bedel 1904, syn. *Typhaea fumata* Linnaeus 1767. For additional synonyms see Löbl and Smetana 2008.

Distribution (7): Cosmopolitan. Af 9, As 11, C 2, E 7, N 3, O 1, SA 3

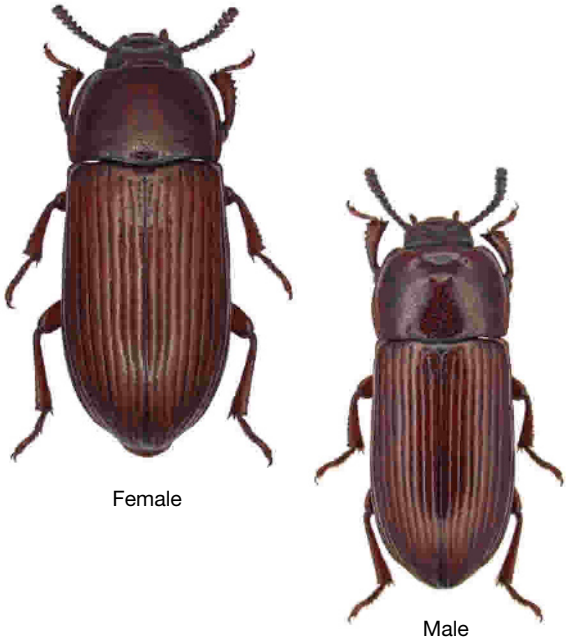
Commodities (77): anv 3.9%, bc 5.2%, df 5.2%, ffv 3.9%, g 13.0%, gp 7.8% kibbled wheat (s), me 2.6%, n 3.9%, np 1.3%, os 10.4%, osp 5.2%, p 6.5%, pp 0% soybean meal (u), r 2.6%, res 2.6%, rp 1.3%, se 2.6%, sea 7.8%, sp 1.3%, v 13.0%

Facilities: barley storages, date packing houses, empty cargo containers, farm storages of rice, feedmills, flat storagesof grain, flour mills, grain elevators, malt storages at maltings, peanut shelling plants, peanut warehouses, pet stores, railroad cars, rice mills, semolina mills, tobacco curing barns

Natural enemies (1): *Xylocoris flavipes*

Life history: Jacob 1988

Uloma culinaris Linnaeus 1758



Dimension: 9-12 mm long

Common names: Küchenkäfer (kitchen beetle (G)), Чернотелка продуктовая (black body foodstuff beetle (R))

Taxonomy: Col., Tenebrionidae, originally *Tenebrio culinaris*. For synonyms see Löbl and Smetana 2008.

Distribution (2): As 3, E 32

Facilities: granaries, hotels, meat shops

(*continued on next page*)

TABLE 2.2 Insect species associated with stored products (*continued from previous page*)

Xestobium rufovillosum (DeGeer 1774)

Dimension: 5-9 mm long

Common names: death watch beetle, Vrillette damier (checkered beetle (F)), bunter Klopfkäfer (colorful knock beetle (G)),bunter Pochkäfer (colorful knock beetle (G)), Vrillette marquetée (inlay beetle (F)), Grande vrillette (large beetle (F)), anobie roux (red anobie (F)), Точильщик пёстрый (spotted grinder (R))

Taxonomy: Col., Anobiidae, originally *Ptinus rufovillosum*. For synonyms see Löbl and Smetana 2007.

Distribution (5): Af 1, As 4, E 32, N 1, O

Natural enemies (2): *Korynetes coeruleus*, *Sclerodermus domesticus*

Life history: Fisher 1937, 1938, 1940

Zabrotes subfasciatus (Boheman 1833)

Dimension: 1.6-2.2 mm long

Common names: Brazil bean weevil, Mexican bean weevil, bruche brésilienne (Brazilian weevil (F)), Brasilbohnenkäfer (Brazilian weevil (G)), Зерновка бразильская бобовая (Brazilian weevil (R)), gorgojo del Brasil (Brazil weevil (S)), gorgojo de los pallares (lima bean weevil (S)), gorgojo pinto del frijol (pinto bean weevil (S)), Gorgojo del frijol almacenado (stored bean weevil (S))

Taxonomy: Col., Bruchidae, originally *Spermophagus subfasciatus* and transferred to new genus by Zacher 1930. For synonyms see Löbl and Smetana 2010.

Distribution (6): Cosmopolitan. Central American, South American or West Indian origin. Af 11, As 10, C 8, E 12, N 2, SA 7

Commodities (20): g 5.0%, p 95.0% cowpea (s), kidney bean (s)

Natural enemies (13): *Anisopteromalus calandrae*, *Dinarmus basalis*, *Dinarmus colemani*, *Dinarmus vagabundus*, *Eupelmus orientalis*, *Eupelmus swezeyi*, *Eupelmus terryi*, *Heterospilus prosopidis*, *Stenocorse bruchivora*, *Theocolax elegans*, *Triaspis thoracica*, *Uscana mukerji*, *Uscana semifumipennis*

Life history: Howe and Currie 1964, Utida 1971

TABLE 2.3 Numbers of stored-product insect species reported for each country and region.

African islands (14)	
Canary Is.	74
Cape Verde Is.	2
Comoro Is.	3
Fernando Po (Bioka)	1
Madagascar	29
Madeira	56
Mascarene Is.	2
Mauritius	14
Reunion Is.	7
Rodrigues Is.	3
Sao Tome Is.	2
Seychelles	12
St. Helena	3
Tristan da Cunha	1
Average No. Species	**14.9**
African mainlands (47)	
Algeria	107
Angola	15
Benin	8
Botswana	13
Burkina Faso	8
Burundi	18
Cameroon	12
Central African Republic	6
Chad	4
Congo	54
Djibouti	3
Egypt	124
Equatorial Guinea	3
Eritrea	4
Ethiopia	46
Gabon	5
Gambia	9
Ghana	42
Guinea	9
Guinea-Bissau	4
Ivory Coast	20
Kenya	44
Lesotho	12
Liberia	7
Libya	64
Malawi	40
Mali	16
Mauritania	3
Morocco	111
Mozambique	21
Namibia	5
Natal	2
Niger	6
Nigeria	107
Rwanda	20
Senegal	26
Sierra Leone	29
Somalia	18
South Africa	66
Sudan	34
Swaziland	37
Tanzania	41
Togo	11
Tunisia	88
Uganda	62
Zambia	19
Zimbabwe	20
Average No. Species	**30.3**
Asian islands (19)	
Andaman Is.	1
Bahrain	5
Bonin Is.	3
Borneo	11
Brunei	6
Celebes	3
Hong Kong	23
Indonesia	38
Java	26
Kurile Is.	2
Moluccas (Maluku)	1
Philippines	45
Sabah	2
Sakhalin Is.	1
Sarawak	17
Sri Lanka	53
Sumatra	4
Sunda Is.	2
Taiwan	69
Average No. Species	**16.4**
Asian mainlands (39)	
Afghanistan	59
Amur	2
Arab Emirates	16
Bangladesh	20
Bhutan	19
Cambodia	6
China	162
India	117
Iran	98
Iraq	55
Israel	101
Japan	144
Jordan	34
Kazakhstan	43
Korea	77
Kuwait	14
Kyrgyzstan	24
Laos	4
Lebanon	51
Malaysia	54
Mongolia	39
Myanmar (Burma)	31
Nei Mongol Zizhiqu	1
Nepal	43
Oman	12
Pakistan	68
Qatar	9
Saudi Arabia	53
Siberia	57
Singapore	25
Syria	61
Tajikistan	32
Thailand	74
Tibet	2
Turkey	124
Turkmenistan	44
Uzbekistan	35
Vietnam	29
Yemen	46
Average No. Species	**48.3**
Caribbean islands (26)	
Antigua and Barbados	11
Bahamas	6
Bermuda	3
Cayman Is.	1
Cuba	31
Dominica	3
Dominican Republic	12
Grand Cayman	1
Grenada	23
Guadeloupe	14
Haiti	5
Jamaica	47
Leeward Is.	1
Martinique	1
Montserrat	1
Mustique	1
Puerto Rico	31
St. Bartholomew	1
St. Croix	3
St. Eustatius	1
St. Kitts-Nevis	2

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TABLE 2.3 (*continued from previous page*)

St. Lucia	8
St. Vincent	5
Trinidad and Tobago	21
Virgin Is.	2
West Indies	14
Average No. Species	**9.3**
Central America (8)	
Belize	15
Canal Zone	1
Costa Rica	16
El Salvador	7
Guatemala	24
Honduras	28
Nicaragua	26
Panama	22
Average No. Species	**17.4**
European islands (16)	
Azores	55
Corsica (Corse)	7
Crete (Kriti)	10
Cyprus	66
Faroe Is.	5
Greenland	6
Guernsey	2
Iceland	26
Isle of Scilly	1
Jersey	3
Malta	37
Orkney Is.	2
Sardinia	8
Shetland Is.	2
Sicily	14
Svalbard	1
Average No. Species	**15.3**
European mainlands (49)	
Albania	41
Andorra	9
Armenia	43
Austria	120
Azerbaijan	30
Batavia	1
Belarus	67
Belgium	109
Bosnia Herzegovina	53
Bulgaria	77
Croatia	85
Czech Republic	124
Denmark	110
England	175
Estonia	56
Finland	105
France	153
Georgia	51
Germany	157
Gibraltar	5
Greece	128
Hungary	110
Ireland	83
Italy	171
Lapland	1
Latvia	71
Liechtenstein	26
Lithuania	57
Luxembourg	28
Macedonia	31
Moldavia	24
Monaco	1
Netherlands	114
Norway	78
Poland	124
Portugal	94
Respublika Krym	1
Romania	78
Russia	129
Scotland	11
Serbia and Montenegro	54
Slovakia	95
Slovenia	52
Spain	139
Sweden	111
Switzerland	111
Ukraine	72
Wales	4
Yugoslavia	22
Average No. Species	**73.3**
North America (3)	
Canada	136
Mexico	84
United States	177
Average No. Species	**132.0**
Oceania islands (22)	
Campbell Is.	1
Caroline Is.	1
Cook Is.	6
Fiji	31
French Polynesia	5
Kiribati	1
Mariana Is.	2
Marquesas Is.	2
Micronesia	22
New Caledonia	31
Niue	8
Papua New Guinea	34
S. Mariana Is.	1
Samoa	22
Society Is.	1
Solomon Is.	15
Tahiti	7
Tasmania	13
Tonga	14
Tungaru	2
Vanuatu	4
Wallis Is.	1
Average No. Species	**10.2**
Oceania mainlands (2)	
Australia	118
New Zealand	69
Average No. Species	**93.5**
South American islands (5)	
Curacao	2
Easter Is.	1
Falklands	1
Galapagos	2
Grenadines	1
Average No. Species	**1.4**
South American mainlands (13)	
Argentina	55
Bolivia	10
Brazil	62
Chile	61
Colombia	27
Ecuador	30
French Guiana	5
Guyana	14
Paraguay	10
Peru	50
Suriname	10
Uruguay	14
Venezuela	35
Average No. Species	**29.4**
Total Records 9262	

TABLE 2.4 Comparison of species list for nine countries that have reported large numbers of species.

Species	Country									
	Australia	Brazil	China	Egypt	England	Italy	Nigeria	Turkey	USA	No. Countries
Alphitobius diaperinus	•	•	•	•	•	•	•	•	•	9
Alphitobius laevigatus	•	•	•	•	•	•	•	•	•	9
Cadra cautella	•	•	•	•	•	•	•	•	•	9
Callosobruchus chinensis	•	•	•	•	•	•	•	•	•	9
Callosobruchus maculatus	•	•	•	•	•	•	•	•	•	9
Carpophilus dimidiatus	•	•	•	•	•	•	•	•	•	9
Carpophilus marginellus	•	•	•	•	•	•	•	•	•	9
Carpophilus mutilatus	•	•	•	•	•	•	•	•	•	9
Cryptolestes ferrugineus	•	•	•	•	•	•	•	•	•	9
Cryptolestes pusillus	•	•	•	•	•	•	•	•	•	9
Dermestes ater	•	•	•	•	•	•	•	•	•	9
Lasioderma serricorne	•	•	•	•	•	•	•	•	•	9
Mezium affine	•	•	•	•	•	•	•	•	•	9
Necrobia rufipes	•	•	•	•	•	•	•	•	•	9
Oryzaephilus surinamensis	•	•	•	•	•	•	•	•	•	9
Plodia interpunctella	•	•	•	•	•	•	•	•	•	9
Rhyzopertha dominica	•	•	•	•	•	•	•	•	•	9
Sitophilus granarius	•	•	•	•	•	•	•	•	•	9
Sitophilus oryzae	•	•	•	•	•	•	•	•	•	9
Sitotroga cerealella	•	•	•	•	•	•	•	•	•	9
Tenebroides mauritanicus	•	•	•	•	•	•	•	•	•	9
Tribolium castaneum	•	•	•	•	•	•	•	•	•	9
Typhaea stercorea	•	•	•	•	•	•	•	•	•	9
Acanthoscelides obtectus	•		•	•	•	•	•	•	•	8
Ahasverus advena	•	•	•	•	•	•	•		•	8
Alphitophagus bifasciatus	•		•	•	•	•	•	•	•	8
Anthrenus verbasci	•		•	•	•	•	•	•	•	8
Attagenus fasciatus	•		•	•	•	•	•	•	•	8
Carpophilus hemipterus	•		•	•	•	•	•	•	•	8
Carpophilus obsoletus	•		•	•	•	•	•	•	•	8
Corcyra cephalonica	•	•	•	•	•		•	•	•	8
Creophilus maxillosus	•	•	•	•	•	•		•	•	8
Cryptolestes turcicus		•	•	•	•	•	•	•	•	8
Cryptophagus cellaris	•		•	•	•	•	•	•	•	8
Dermestes carnivorus	•	•	•	•	•	•	•		•	8

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TABLE 2.4 (*continued from previous page*)

Species	Country									
	Australia	Brazil	China	Egypt	England	Italy	Nigeria	Turkey	USA	No. Countries
Dermestes lardarius	●		●	●	●	●	●	●	●	8
Dermestes maculatus	●		●	●	●	●	●	●	●	8
Ephestia elutella	●	●	●	●	●	●		●	●	8
Ephestia kuehniella	●		●	●	●	●	●	●	●	8
Gibbium psylloides	●		●	●	●	●	●	●	●	8
Gnatocerus cornutus	●	●	●	●	●	●		●	●	8
Latheticus oryzae	●		●	●	●	●	●	●	●	8
Lophocateres pusillus	●	●	●	●	●	●	●		●	8
Niptus hololeucus	●		●	●	●	●	●	●	●	8
Omonadus floralis	●		●	●	●	●	●	●	●	8
Oryzaephilus mercator	●	●	●	●	●		●	●	●	8
Ptinus fur	●		●	●	●	●	●	●	●	8
Ptinus latro	●		●	●	●	●	●	●	●	8
Ptinus tectus	●		●	●	●	●	●	●	●	8
Stegobium paniceum	●		●	●	●	●	●	●	●	8
Tribolium confusum	●	●	●	●		●	●	●	●	8
Trogoderma granarium	●		●	●	●	●	●	●	●	8
Anthrenus flavipes	●		●	●	●	●	●		●	7
Anthrenus pimpinellae	●		●	●	●	●		●	●	7
Araecerus fasciculatus	●	●	●	●	●		●		●	7
Attagenus unicolor	●		●		●	●	●	●	●	7
Bruchus pisorum	●	●	●	●		●		●	●	7
Bruchus rufimanus	●		●	●	●	●		●	●	7
Cadra figulilella	●		●	●	●	●		●	●	7
Callosobruchus phaseoli	●	●	●		●	●	●		●	7
Carcinops pumilio	●		●	●	●	●	●		●	7
Carpophilus humeralis	●		●	●	●	●	●		●	7
Cartodere nodifer	●	●	●		●	●		●	●	7
Coccotrypes dactyliperda	●	●	●	●	●	●			●	7
Dermestes frischii			●	●	●	●	●	●	●	7
Dinoderus minutus		●	●	●	●	●	●		●	7
Etiella zinckenella	●	●	●	●		●	●		●	7
Gibbium aequinoctiale	●	●	●	●	●	●		●		7
Lathridius minutus	●		●	●	●	●		●	●	7
Lyctus africanus	●			●	●	●	●	●	●	7

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TABLE 2.4 (*continued from previous page*)

Species	Country									
	Australia	Brazil	China	Egypt	England	Italy	Nigeria	Turkey	USA	No. Countries
Lyctus brunneus	●		●	●	●	●	●		●	7
Lyctus linearis	●		●	●	●	●		●	●	7
Necrobia ruficollis	●		●	●	●	●	●		●	7
Nemapogon granella	●		●	●	●	●		●	●	7
Palorus subdepressus	●	●	●	●			●	●	●	7
Phthorimaea operculella	●		●	●	●	●		●	●	7
Pyralis farinalis	●		●	●	●	●		●	●	7
Sitophilus zeamais	●	●	●		●	●	●		●	7
Tenebrio molitor	●	●	●	●		●		●	●	7
Thaneroclerus buqueti	●		●	●	●	●	●		●	7
Trigonogenius globosus	●		●	●	●	●	●		●	7
Zabrotes subfasciatus		●	●		●	●	●	●	●	7
Aglossa dimidiata	●		●		●	●	●		●	6
Anobium punctatum			●	●	●	●		●	●	6
Anthrenus scrophulariae	●		●	●	●	●			●	6
Atomaria lewisi	●	●	●		●	●			●	6
Attagenus pellio	●		●	●	●	●		●		6
Bruchus lentis			●	●	●	●		●	●	6
Callosobruchus analis	●	●	●	●	●			●		6
Cartodere constricta	●		●	●	●	●			●	6
Cathartus quadricollis		●	●		●	●	●		●	6
Corticaria elongata			●		●	●	●	●	●	6
Corticaria pubescens	●		●		●	●		●	●	6
Cortinicara gibbosa			●	●	●	●		●	●	6
Cryptolestes pusilloides	●	●	●		●	●			●	6
Cryptophagus acutangulus	●		●	●	●	●			●	6
Cryptophagus dentatus			●	●	●	●		●	●	6
Cryptophilus integer	●		●	●	●	●			●	6
Dinoderus bifoveolatus			●	●	●	●	●		●	6
Gnatocerus maxillosus		●	●		●	●	●		●	6
Hypothenemus eruditus	●			●	●	●	●		●	6
Lachesilla pedicularia	●		●		●	●		●	●	6
Nacerdes melanura	●	●	●		●		●		●	6
Omonadus formicarius			●	●	●	●		●	●	6
Orphinus fulvipes	●	●	●		●		●		●	6

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TABLE 2.4 (*continued from previous page*)

Species	Country									
	Australia	Brazil	China	Egypt	England	Italy	Nigeria	Turkey	USA	No. Countries
Tenebrio obscurus	●		●	●		●		●	●	6
Thorictodes heydeni			●	●		●	●	●	●	6
Tineola bisselliella	●		●	●	●		●		●	6
Trichophaga tapetzella	●	●	●		●	●			●	6
Trogoderma versicolor	●		●	●	●	●		●		6
Aglossa pinguinalis	●		●	●	●	●				5
Anthrenus coloratus				●	●	●		●	●	5
Attagenus lobatus			●	●		●		●	●	5
Bostrychoplites cornutus				●	●	●	●	●		5
Bruchidius atrolineatus		●		●		●	●	●		5
Cadra calidella				●	●	●	●	●		5
Caryedon pallidus				●	●	●	●	●		5
Cryptophagus pilosus			●		●	●		●	●	5
Cryptophagus scutellatus			●		●	●		●	●	5
Dienerella arga			●	●	●	●			●	5
Enicmus histrio			●		●	●	●	●		5
Holoparamecus caularum	●		●		●	●			●	5
Litargus balteatus	●	●				●	●		●	5
Mezium americanum	●	●	●			●			●	5
Migneauxia lederi			●	●	●		●		●	5
Mimosestes mimosae		●		●		●		●	●	5
Monotoma picipes			●		●	●		●	●	5
Murmidius ovalis	●		●		●		●		●	5
Nausibius clavicornis			●		●	●	●		●	5
Niditinea fuscella	●			●	●	●	●			5
Nitidula bipunctata			●		●	●		●	●	5
Omosita colon			●		●	●		●	●	5
Plochionus pallens		●	●			●	●		●	5
Silvanus bidentatus			●		●	●	●		●	5
Silvanus unidentatus			●		●	●		●	●	5
Thylodrias contractus	●		●	●	●				●	5
Tinea pellionella	●			●	●			●	●	5
Trogoderma inclusum	●			●	●			●	●	5
Trogoderma variabile	●		●		●	●			●	5
Achroia grisella				●	●		●		●	4

(*continued on next page*)

TABLE 2.4 (*continued from previous page*)

Species	Country									
	Australia	Brazil	China	Egypt	England	Italy	Nigeria	Turkey	USA	No. Countries
Anthrenus fuscus					•	•		•	•	4
Attagenus bifasciatus				•	•	•		•		4
Blaps lethifera			•		•	•		•		4
Bruchidius lividimanus				•	•	•		•		4
Bruchus atomarius			•		•	•		•		4
Bruchus brachialis			•			•		•	•	4
Bruchus ervi			•	•		•		•		4
Bruchus rufipes					•	•		•	•	4
Caryedon serratus	•					•	•		•	4
Corticaria serrata					•	•		•	•	4
Cryptolestes spartii				•	•	•		•		4
Cryptophagus saginatus					•	•		•	•	4
Cryptophagus setulosus					•	•		•	•	4
Cryptophagus subfumatus			•		•	•			•	4
Cydia pomonella					•	•		•	•	4
Dermestes haemorrhoidalis		•		•	•	•				4
Dermestes murinus			•		•	•		•		4
Dermestes peruvianus				•	•	•			•	4
Dienerella filiformis					•	•		•	•	4
Dienerella filum			•		•	•			•	4
Dinoderus ocellaris	•		•		•				•	4
Epuraea luteolus						•	•	•	•	4
Galleria mellonella	•			•	•				•	4
Hadrobregmus pertinax			•		•	•		•		4
Hofmannophila pseudospretella	•		•		•				•	4
Liposcelis corrodens	•				•	•			•	4
Monanus concinnulus			•			•	•		•	4
Necrobia violacea			•		•	•			•	4
Prostephanus truncatus		•	•				•		•	4
Pseudeurostus hilleri			•		•		•		•	4
Reesa vespulae	•			•	•				•	4
Tachyporus hypnorum			•		•	•		•		4
Trogoderma glabrum			•		•	•			•	4
Xestobium rufovillosum					•	•		•	•	4
Cryptophagus scanicus					•	•		•		3

(*continued on next page*)

TABLE 2.4 (*continued from previous page*)

Species	Country									
	Australia	Brazil	China	Egypt	England	Italy	Nigeria	Turkey	USA	No. Countries
Cylas formicarius	•		•						•	3
Dermestes undulatus			•		•				•	3
Dinoderus japonicus	•		•						•	3
Endrosis sarcitrella	•				•				•	3
Epauloecus unicolor			•		•		•			3
Glischrochilus quadrisignatus						•		•	•	3
Gonocephalum prolixum				•		•	•			3
Hypsopygia costalis	•				•				•	3
Melyris oblonga				•		•		•		3
Monopis laevigella			•		•				•	3
Nemapogon cloacella					•	•		•		3
Orphilus niger				•		•		•		3
Ptinus pusillus					•	•	•			3
Ptinus raptor					•	•			•	3
Ptinus villiger			•		•				•	3
Sphaericus gibboides			•			•			•	3
Stelidota geminata						•		•	•	3
Thes bergrothi			•		•	•				3
Uloma culinaris					•	•		•		3
Attagenus pantherinus						•		•		2
Attagenus smirnovi	•				•					2
Blaps mortisaga					•			•		2
Carpophilus pallipennis							•		•	2
Dermestes vorax			•			•				2
Dinoderus brevis			•		•					2
Hypothenemus hampei		•					•			2
Korynetes caeruleus					•	•				2
Leichenum canaliculatum							•		•	2
Mesostena picea				•			•			2
Mycetophagus quadriguttatus			•						•	2
Palorus depressus	•	•								2
Phradonoma nobile				•			•			2
Stephostethus lardarius					•	•				2
Tribolium destructor					•				•	2
Trinodes rufescens			•				•			2

(*continued on next page*)

TABLE 2.4 (*continued from previous page*)

Species	Country									
	Australia	Brazil	China	Egypt	England	Italy	Nigeria	Turkey	USA	No. Countries
Trogoderma angustum					•	•				2
Trogoderma sternale							•		•	2
Anthrenus nipponensis			•							1
Blaps japonensis			•							1
Bruchidius sahlbergi				•						1
Cephimallota colonella			•							1
Cynaeus angustus									•	1
Dermestes caninus									•	1
Dermestes marmoratus									•	1
Dermestes tessellatocollis			•							1
Holoparamecus signatus			•							1
Idaea inquinata								•		1
Pagiocerus frontalis									•	1
Phradonoma tricolor							•			1
Pimelia grandis							•			1
Ptinus japonicus			•							1
Sennius morosus									•	1
Tenebrio guineensis							•			1
Tinea pallescentella					•					1
Tribolium madens				•						1
Trogoderma grassmani									•	1
Trogoderma ornatum									•	1
Trogoderma simplex									•	1
Typhaea haagi			•							1
Total No. Species	118	62	162	124	175	171	107	124	177	

TABLE 2.5 Insect species reported in countries other than those in Table 2.4.

Afghanistan (59)
Aglossa pinguinalis
Alphitobius diaperinus
Alphitobius laevigatus
Anthrenus coloratus
Anthrenus flavipes
Atomaria lewisi
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Attagenus unicolor
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus mutilatus
Cartodere constricta
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dienerella filiformis
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Migneauxia lederi
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Phradonoma nobile
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus tectus
Reesa vespulae
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Tachyporus hypnorum
Tribolium castaneum
Trogoderma granarium
Trogoderma variabile
Trogoderma versicolor

Albania (41)
Acanthoscelides obtectus
Ahasverus advena
Anthrenus fuscus
Attagenus bifasciatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchidius lividimanus
Bruchus brachialis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra cautella
Cadra figulilella
Carcinops pumilio
Carpophilus hemipterus
Carpophilus mutilatus
Creophilus maxillosus
Cryptophagus scanicus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium psylloides
Korynetes caeruleus
Lyctus linearis
Mezium affine
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphilus niger
Oryzaephilus mercator
Ptinus fur
Ptinus latro
Tribolium castaneum
Uloma culinaris

Algeria (107)
Acanthoscelides obtectus
Aglossa dimidiata
Ahasverus advena
Alphitobius diaperinus
Alphitophagus bifasciatus
Anobium punctatum
Anthrenus coloratus
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carcinops pumilio
Carpophilus hemipterus
Carpophilus obsoletus
Corticaria serrata
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus saginatus
Cryptophagus setulosus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dienerella arga
Dienerella filum
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Gonocephalum prolixum
Holoparamecus caularum
Hypothenemus eruditus
Lachesilla pedicularia
Lasioderma serricorne
Lophocateres pusillus
Lyctus africanus
Lyctus linearis
Melyris oblonga
Mezium affine
Mezium americanum
Migneauxia lederi
Mimosestes mimosae
Monotoma picipes
Necrobia rufipes
Nemapogon cloacella
Nemapogon granella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphilus niger
Oryzaephilus surinamensis
Palorus subdepressus
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Ptinus fur

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Ptinus latro
Ptinus tectus
Reesa vespulae
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Sphaericus gibboides
Stegobium paniceum
Tachyporus hypnorum
Tenebrio obscurus
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trichophaga tapetzella
Trigonogenius globosus
Trogoderma glabrum
Trogoderma granarium
Trogoderma inclusum
Trogoderma versicolor
Xestobium rufovillosum
Zabrotes subfasciatus

Amur (2)
Plodia interpunctella
Ptinus raptor

Andaman Is. (1)
Hypothenemus eruditus

Andorra (9)
Attagenus pellio
Attagenus unicolor
Cryptophagus dentatus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Epuraea luteolus

Angola (15)
Bruchidius atrolineatus
Callosobruchus phaseoli
Carpophilus mutilatus
Cylas formicarius
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Lophocateres pusillus
Mezium affine
Sitophilus zeamais
Tribolium castaneum
Trogoderma granarium

Antigua and Barbados (11)
Alphitobius diaperinus
Attagenus fasciatus
Caryedon serratus
Cryptolestes pusillus
Cylas formicarius
Oryzaephilus mercator
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Tribolium castaneum

Arab Emirates (16)
Anthrenus coloratus
Attagenus pellio
Carpophilus dimidiatus
Carpophilus obsoletus
Cryptolestes ferrugineus
Cryptolestes pusillus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dienerella arga
Epuraea luteolus
Migneauxia lederi
Omonadus formicarius
Phradonoma nobile
Tribolium castaneum

Argentina (55)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Attagenus pellio
Bruchus rufimanus
Cadra cautella
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus marginellus
Carpophilus mutilatus
Cartodere nodifer
Coccotrypes dactyliperda
Corticaria elongata
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophagus cellaris
Dermestes ater
Dermestes haemorrhoidalis
Dermestes peruvianus
Ephestia elutella
Etiella zinckenella
Gnatocerus cornutus
Hypothenemus eruditus
Hypothenemus hampei
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lyctus linearis
Mezium americanum
Nacerdes melanura
Necrobia ruficollis
Necrobia rufipes
Nemapogon granella
Oryzaephilus mercator
Oryzaephilus surinamensis
Pagiocerus frontalis
Plodia interpunctella
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebrio molitor
Tenebrio obscurus
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Trigonogenius globosus
Zabrotes subfasciatus

Armenia (43)
Acanthoscelides obtectus
Alphitobius laevigatus
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Bruchus brachialis
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Corticaria elongata
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes turcicus
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus scanicus
Cryptophagus scutellatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella filiformis
Gibbium aequinoctiale
Gibbium psylloides
Lachesilla pedicularia
Lasioderma serricorne
Necrobia rufipes
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphilus niger
Ptinus fur
Ptinus latro
Rhyzopertha dominica
Tachyporus hypnorum

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Trogoderma variabile
Xestobium rufovillosum

Austria (120)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Atomaria lewisi
Attagenus pantherinus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bostrychoplites cornutus
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus japonicus
Dinoderus minutus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lyctus linearis
Mezium affine
Mezium americanum
Monopis laevigella
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Oryzaephilus surinamensis
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum
Stelidota geminata
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thes bergrothi
Tinea pallescentella
Tribolium confusum
Tribolium madens
Trigonogenius globosus
Trogoderma angustum
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

Azebgaijan (30)
Acanthoscelides obtectus
Anobium punctatum
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus brachialis
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Carpophilus hemipterus
Corticaria elongata
Corticaria serrata
Cortinicara gibbosa
Cryptolestes spartii
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus setulosus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dienerella filiformis
Gibbium aequinoctiale
Gibbium psylloides
Korynetes caeruleus
Lasioderma serricorne
Lyctus linearis
Necrobia rufipes
Necrobia violacea
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Oryzaephilus surinamensis
Ptinus fur
Ptinus latro
Ptinus villiger
Silvanus unidentatus
Stegobium paniceum
Tachyporus hypnorum
Uloma culinaris

Azores (55)
Acanthoscelides obtectus
Alphitobius diaperinus
Alphitobius laevigatus
Anthrenus verbasci
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchus brachialis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Carcinops pumilio

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus marginellus
Carpophilus mutilatus
Cartodere nodifer
Corticaria elongata
Corticaria serrata
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus saginatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dinoderus brevis
Epuraea luteolus
Holoparamecus caularum
Lasioderma serricorne
Liposcelis corrodens
Lyctus linearis
Mezium affine
Mezium americanum
Migneauxia lederi
Mimosestes mimosae
Monotoma picipes
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Niptus hololeucus
Omonadus formicarius
Omosita colon
Ptinus fur
Ptinus latro
Rhyzopertha dominica
Silvanus unidentatus
Stegobium paniceum
Stelidota geminata
Tenebroides mauritanicus

Bahamas (6)
Acanthoscelides obtectus
Cadra cautella
Carpophilus dimidiatus
Coccotrypes dactyliperda
Cylas formicarius
Necrobia rufipes

Bahrain (5)
Alphitobius diaperinus
Alphitobius laevigatus
Oryzaephilus surinamensis
Sitophilus oryzae
Tribolium castaneum

Bangladesh (20)
Ahasverus advena
Attagenus unicolor
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cylas formicarius
Dinoderus brevis
Lasioderma serricorne
Latheticus oryzae
Oryzaephilus mercator
Oryzaephilus surinamensis
Rhyzopertha dominica
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum
Tribolium castaneum
Tribolium confusum
Trogoderma granarium

Belarus (67)
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps mortisaga
Bruchus atomarius
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes pusillus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella filiformis
Dienerella filum
Enicmus histrio
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Lathridius minutus
Lyctus linearis
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Stephostethus lardarius
Tenebroides mauritanicus
Thes bergrothi
Tribolium destructor
Uloma culinaris
Xestobium rufovillosum

Belgium (109)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Caryedon serratus
Corticaria elongata
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus minutus
Dinoderus ocellaris
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus maxillosus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Lyctus linearis
Mezium affine
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphilus niger
Oryzaephilus mercator
Oryzaephilus surinamensis
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Stegobium paniceum
Stelidota geminata
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thes bergrothi
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trigonogenius globosus
Trogoderma granarium
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

Belize (15)
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus mutilatus
Cathartus quadricollis
Cryptolestes pusillus
Cylas formicarius
Epuraea luteolus
Monanus concinnulus
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Sitophilus oryzae
Sitophilus zeamais
Tribolium castaneum

Benin (8)
Dinoderus bifoveolatus
Etiella zinckenella
Oryzaephilus mercator
Prostephanus truncatus
Sitophilus oryzae
Tenebroides mauritanicus
Tribolium castaneum
Trogoderma granarium

Bermuda (3)
Carpophilus dimidiatus
Cryptolestes pusillus
Cylas formicarius

Bhutan (19)
Alphitobius diaperinus
Alphitobius laevigatus
Atomaria lewisi
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes pusillus
Gibbium aequinoctiale
Lasioderma serricorne
Migneauxia lederi
Omonadus floralis
Omonadus formicarius
Oryzaephilus surinamensis
Ptinus fur
Ptinus latro
Rhyzopertha dominica
Tribolium castaneum

Bolivia (10)
Dermestes haemorrhoidalis
Dermestes peruvianus
Etiella zinckenella
Lophocateres pusillus
Necrobia rufipes
Orphinus fulvipes
Pagiocerus frontalis
Sitophilus oryzae
Tribolium castaneum
Tribolium confusum

Bonin Is. (3)
Anthrenus fuscus
Coccotrypes dactyliperda
Hypothenemus eruditus

Borneo (11)
Alphitobius diaperinus
Alphitobius laevigatus
Araecerus fasciculatus
Cadra cautella
Carpophilus dimidiatus
Carpophilus mutilatus
Carpophilus obsoletus
Cathartus quadricollis
Cryptolestes pusillus
Dinoderus brevis
Sitophilus oryzae

Bosnia Herzegovina (53)
Ahasverus advena
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchidius lividimanus
Bruchus brachialis
Bruchus rufimanus
Bruchus rufipes
Carpophilus hemipterus
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Dinoderus ocellaris
Enicmus histrio
Epuraea luteolus
Gibbium psylloides
Hadrobregmus pertinax
Holoparamecus caularum
Lyctus linearis
Mezium affine
Necrobia ruficollis
Necrobia violacea

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Silvanus unidentatus
Tachyporus hypnorum
Uloma culinaris
Xestobium rufovillosum

Botswana (13)
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Corcyra cephalonica
Dermestes maculatus
Etiella zinckenella
Lasioderma serricorne
Oryzaephilus surinamensis
Rhyzopertha dominica
Sitotroga cerealella
Stegobium paniceum
Tribolium castaneum
Trogoderma granarium

Brunei (18)
Cadra cautella
Lophocateres pusillus
Murmidius ovalis
Orphinus fulvipes
Oryzaephilus surinamensis
Tribolium castaneum

Bulgaria (77)
Acanthoscelides obtectus
Anobium punctatum
Anthrenus coloratus
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Atomaria lewisi
Attagenus bifasciatus
Attagenus lobatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus marginellus
Cartodere nodifer
Corcyra cephalonica
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Lyctus linearis
Necrobia violacea
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Oryzaephilus surinamensis
Phthorimaea operculella
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Rhyzopertha dominica
Sitophilus oryzae
Sitotroga cerealella
Tachyporus hypnorum
Tribolium castaneum
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

Burkina Faso (8)
Bruchidius atrolineatus
Callosobruchus chinensis
Callosobruchus maculatus
Etiella zinckenella
Gibbium aequinoctiale
Prostephanus truncatus
Tribolium castaneum
Trogoderma granarium

Burundi (18)
Acanthoscelides obtectus
Ahasverus advena
Araecerus fasciculatus
Bostrychoplites cornutus
Cryptolestes pusilloides
Cryptolestes pusillus
Dinoderus minutus
Etiella zinckenella
Lasioderma serricorne
Lyctus africanus
Lyctus brunneus
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Prostephanus truncatus
Ptinus raptor
Rhyzopertha dominica
Tribolium castaneum

Cambodia (6)
Alphitobius diaperinus
Cylas formicarius
Necrobia rufipes
Sitophilus oryzae
Sitophilus zeamais
Tribolium castaneum

Cameroon (12)
Aglossa pinguinalis
Ahasverus advena
Bruchidius atrolineatus
Coccotrypes dactyliperda
Cylas formicarius
Etiella zinckenella
Hypothenemus eruditus
Hypothenemus hampei
Necrobia rufipes
Oryzaephilus mercator
Sitophilus oryzae
Tribolium castaneum

Campbell Is. (1)
Liposcelis corrodens

Canada (136)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Alphitophagus bifasciatus
Anobium punctatum
Anthrenus flavipes
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Araecerus fasciculatus
Attagenus pellio

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Attagenus unicolor
Bruchus brachialis
Bruchus pisorum
Bruchus rufimanus
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus pallipennis
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Cydia pomonella
Cynaeus angustus
Dermestes ater
Dermestes caninus
Dermestes carnivorus
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes marmoratus
Dermestes undulatus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus minutus
Endrosis sarcitrella
Epauloecus unicolor
Ephestia elutella
Ephestia kuehniella
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Glischrochilus quadrisignatus
Gnatocerus cornutus
Hofmannophila pseudospretella
Hypothenemus eruditus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Litargus balteatus
Lyctus brunneus
Lyctus linearis
Mezium affine
Mezium americanum
Migneauxia lederi
Monotoma picipes
Murmidius ovalis
Mycetophagus quadriguttatus
Nacerdes melanura
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phthorimaea operculella
Prostephanus truncatus
Pseudeurostus hilleri
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Pyralis farinalis
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sphaericus gibboides
Stegobium paniceum
Stephostethus lardarius
Tenebrio molitor
Tenebrio obscurus
Tenebroides mauritanicus
Thes bergrothi
Thylodrias contractus
Tineola bisselliella
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Tribolium madens
Trigonogenius globosus
Trogoderma glabrum
Trogoderma inclusum
Trogoderma ornatum
Trogoderma simplex
Trogoderma sternale
Trogoderma variabile
Typhaea stercorea

Canal Zone (1)
Omonadus formicarius

Canary Is. (74)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus coloratus
Anthrenus verbasci
Attagenus pellio
Blaps lethifera
Bruchidius lividimanus
Bruchus ervi
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus marginellus
Carpophilus mutilatus
Cartodere nodifer
Coccotrypes dactyliperda
Corticaria pubescens
Corticaria serrata
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes spartii
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus saginatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium aequinoctiale
Gnatocerus maxillosus
Gonocephalum prolixum
Holoparamecus caularum
Hypothenemus eruditus
Hypothenemus hampei
Lachesilla pedicularia
Lasioderma serricorne
Lophocateres pusillus
Lyctus linearis
Mezium affine
Mezium americanum
Migneauxia lederi
Mimosestes mimosae

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Monotoma picipes
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Omonadus floralis
Palorus subdepressus
Plodia interpunctella
Ptinus fur
Ptinus latro
Rhyzopertha dominica
Silvanus unidentatus
Sitophilus oryzae
Stegobium paniceum
Tenebroides mauritanicus
Tribolium destructor
Trichophaga tapetzella
Trogoderma inclusum

Cape Verde Is. (2)
Palorus subdepressus
Sitophilus oryzae

Caroline Is. (1)
Cylas formicarius

Cayman Is. (1)
Cylas formicarius

Celebes (3)
Cadra cautella
Cryptophilus integer
Dinoderus ocellaris

Central African Republic (6)
Etiella zinckenella
Hypothenemus hampei
Oryzaephilus mercator
Sitophilus oryzae
Tenebrio guineensis
Tribolium castaneum

Chad (4)
Corcyra cephalonica
Cylas formicarius
Hypothenemus hampei
Tribolium castaneum

Chile (61)
Acanthoscelides obtectus
Ahasverus advena
Alphitophagus bifasciatus
Anthrenus scrophulariae
Anthrenus verbasci
Araecerus fasciculatus
Attagenus unicolor
Bruchus ervi
Bruchus pisorum
Cadra cautella
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Cartodere constricta
Coccotrypes dactyliperda
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes peruvianus
Endrosis sarcitrella
Ephestia kuehniella
Etiella zinckenella
Galleria mellonella
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Mezium americanum
Necrobia ruficollis
Necrobia rufipes
Nemapogon granella
Omonadus floralis
Oryzaephilus surinamensis
Pagiocerus frontalis
Palorus subdepressus
Plodia interpunctella
Ptinus tectus
Pyralis farinalis
Reesa vespulae
Rhyzopertha dominica
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Sphaericus gibboides
Stegobium paniceum
Tenebrio molitor
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Trichophaga tapetzella
Trigonogenius globosus
Trogoderma variabile
Typhaea stercorea
Zabrotes subfasciatus

Colombia (27)
Ahasverus advena
Araecerus fasciculatus
Attagenus fasciatus
Cadra cautella
Cadra figulilella
Caryedon serratus
Cathartus quadricollis
Coccotrypes dactyliperda
Corcyra cephalonica
Ephestia elutella
Etiella zinckenella
Gibbium aequinoctiale
Gnatocerus maxillosus
Hypothenemus hampei
Lasioderma serricorne
Migneauxia lederi
Monanus concinnulus
Necrobia rufipes
Oryzaephilus surinamensis
Pagiocerus frontalis
Prostephanus truncatus
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum
Tribolium castaneum
Trigonogenius globosus
Zabrotes subfasciatus

Comoro Is. (3)
Bostrychoplites cornutus
Cylas formicarius
Etiella zinckenella

Congo (54)
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Araecerus fasciculatus
Attagenus smirnovi
Bostrychoplites cornutus
Bruchidius atrolineatus
Cadra cautella
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus mutilatus
Carpophilus obsoletus
Cartodere constricta
Caryedon pallidus
Cathartus quadricollis
Cryptolestes ferrugineus
Cryptolestes pusillus
Cylas formicarius
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus minutus
Dinoderus ocellaris
Epuraea luteolus
Etiella zinckenella
Gibbium aequinoctiale
Gnatocerus cornutus
Gnatocerus maxillosus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Latheticus oryzae
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Nausibius clavicornis
Necrobia rufipes
Omonadus floralis
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus depressus
Palorus subdepressus
Phthorimaea operculella
Prostephanus truncatus
Rhyzopertha dominica
Sitophilus oryzae

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Sitophilus zeamais
Stegobium paniceum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum

Cook Is. (6)
Carpophilus dimidiatus
Carpophilus humeralis
Cylas formicarius
Hypothenemus eruditus
Necrobia rufipes
Tribolium castaneum

Corsica (7)
Cadra cautella
Cadra figulilella
Creophilus maxillosus
Ephestia elutella
Hypothenemus eruditus
Plodia interpunctella
Tachyporus hypnorum

Costa Rica (16)
Cadra cautella
Carpophilus dimidiatus
Dermestes carnivorus
Dermestes maculatus
Etiella zinckenella
Hypothenemus eruditus
Mimosestes mimosae
Nacerdes melanura
Orphinus fulvipes
Pagiocerus frontalis
Prostephanus truncatus
Sennius morosus
Sitophilus oryzae
Sitophilus zeamais
Tenebrio molitor
Tribolium castaneum

Crete (10)
Bruchidius lividimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Coccotrypes dactyliperda
Ephestia elutella
Ephestia kuehniella
Melyris oblonga
Plodia interpunctella
Tachyporus hypnorum

Croatia (85)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus bifasciatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra cautella
Callosobruchus chinensis
Carcinops pumilio
Carpophilus hemipterus
Carpophilus obsoletus
Cartodere nodifer
Cathartus quadricollis
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Dienerella filiformis
Dinoderus bifoveolatus
Enicmus histrio
Ephestia elutella
Epuraea luteolus
Gibbium psylloides
Glischrochilus quadrisignatus
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Lathridius minutus
Liposcelis corrodens
Lyctus linearis
Mezium affine
Migneauxia lederi
Monotoma picipes
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Omosita colon
Oryzaephilus mercator
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitotroga cerealella
Stegobium paniceum
Tachyporus hypnorum
Tenebroides mauritanicus
Tribolium confusum
Trogoderma granarium
Trogoderma versicolor
Uloma culinaris
Xestobium rufovillosum

Cuba (31)
Ahasverus advena
Bruchus pisorum
Bruchus rufimanus
Cadra cautella
Carpophilus dimidiatus
Cathartus quadricollis
Coccotrypes dactyliperda
Creophilus maxillosus
Cylas formicarius
Dermestes caninus
Dermestes marmoratus
Dinoderus minutus
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus maxillosus
Hypothenemus eruditus
Lasioderma serricorne
Latheticus oryzae
Leichenum canaliculatum
Mimosestes mimosae
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Orphinus fulvipes
Pagiocerus frontalis
Rhyzopertha dominica
Sitophilus oryzae
Thaneroclerus buqueti
Tribolium castaneum
Zabrotes subfasciatus

Curacao (2)
Caryedon serratus
Mimosestes mimosae

Cyprus (66)
Alphitobius diaperinus
Anobium punctatum
Attagenus pellio
Attagenus unicolor
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Cadra cautella

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Cadra figulilella
Callosobruchus analis
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Carpophilus obsoletus
Corcyra cephalonica
Corticaria elongata
Corticaria serrata
Creophilus maxillosus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dinoderus minutus
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium psylloides
Gonocephalum prolixum
Lachesilla pedicularia
Lasioderma serricorne
Lathridius minutus
Liposcelis corrodens
Litargus balteatus
Lyctus brunneus
Lyctus linearis
Melyris oblonga
Mezium affine
Monotoma picipes
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus tectus
Pyralis farinalis
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Sphaericus gibboides
Stegobium paniceum
Tachyporus hypnorum
Tenebrio obscurus
Tenebroides mauritanicus
Tribolium castaneum
Trogoderma granarium
Trogoderma versicolor

Czech Republic (124)

Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus flavipes
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pantherinus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dienerella arga
Dienerella filiformis
Dinoderus bifoveolatus
Dinoderus minutus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Litargus balteatus
Lyctus brunneus
Lyctus linearis
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omosita colon
Orphilus niger
Oryzaephilus surinamensis
Palorus subdepressus
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebrio molitor
Tenebroides mauritanicus
Thes bergrothi
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Tribolium madens
Trigonogenius globosus
Trogoderma angustum
Trogoderma glabrum
Trogoderma granarium
Trogoderma variabile
Trogoderma versicolor
Typhaea haagi
Typhaea stercorea
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

Denmark (110)

Acanthoscelides obtectus
Ahasverus advena

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Alphitobius diaperinus
Anobium punctatum
Anthrenus flavipes
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus fasciatus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Bruchus rufimanus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus minutus
Enicmus histrio
Ephestia elutella
Gibbium psylloides
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lyctus brunneus
Lyctus linearis
Mezium affine
Migneauxia lederi
Mimosestes mimosae
Monotoma picipes
Nacerdes melanura
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Oryzaephilus surinamensis
Phradonoma tricolor
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus tectus
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebrio molitor
Tenebroides mauritanicus
Thes bergrothi
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trigonogenius globosus
Trogoderma angustum
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum

Djibouti (3)
Etiella zinckenella
Gibbium aequinoctiale
Tribolium castaneum

Dominica (3)
Alphitobius diaperinus
Orphinus fulvipes
Ptinus tectus

Dominican Republic (12)
Ahasverus advena
Cadra cautella
Carpophilus mutilatus
Caryedon serratus
Cylas formicarius
Dermestes caninus
Etiella zinckenella
Gibbium aequinoctiale
Mimosestes mimosae
Nausibius clavicornis
Sitotroga cerealella
Tribolium castaneum

Easter Is. (1)
Sitophilus oryzae

Ecuador (30)
Ahasverus advena
Alphitobius laevigatus
Anthrenus coloratus
Anthrenus verbasci
Cadra cautella
Carpophilus dimidiatus
Carpophilus obsoletus
Cathartus quadricollis
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusillus
Dermestes lardarius
Dermestes maculatus
Dinoderus minutus
Etiella zinckenella
Hypothenemus hampei
Latheticus oryzae
Lophocateres pusillus
Pagiocerus frontalis
Palorus subdepressus
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebroides mauritanicus
Tribolium castaneum
Trigonogenius globosus
Zabrotes subfasciatus

El Salvador (7)
Etiella zinckenella
Oryzaephilus surinamensis
Pagiocerus frontalis
Prostephanus truncatus
Sitophilus oryzae
Tribolium castaneum
Trogoderma simplex

Equatorial Guinea (3)
Coccotrypes dactyliperda
Etiella zinckenella
Hypothenemus hampei

Eritrea (4)
Anthrenus coloratus
Attagenus smirnovi
Etiella zinckenella
Phradonoma nobile

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Estonia (56)
Acanthoscelides obtectus
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Bruchus rufimanus
Carcinops pumilio
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes maculatus
Dienerella filiformis
Enicmus histrio
Ephestia elutella
Hadrobregmus pertinax
Lathridius minutus
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Silvanus bidentatus
Silvanus unidentatus
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thes bergrothi
Uloma culinaris

Ethiopia (46)
Acanthoscelides obtectus
Ahasverus advena
Anthrenus coloratus
Attagenus fasciatus
Attagenus smirnovi
Bruchus lentis
Bruchus pisorum
Cadra cautella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus humeralis
Cartodere constricta
Caryedon pallidus
Coccotrypes dactyliperda
Cryptolestes ferrugineus
Cryptolestes pusillus
Ephestia kuehniella
Etiella zinckenella
Gnatocerus cornutus
Lasioderma serricorne
Latheticus oryzae
Lyctus africanus
Lyctus brunneus
Migneauxia lederi
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phthorimaea operculella
Plodia interpunctella
Pseudeurostus hilleri
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trogoderma granarium
Typhaea stercorea
Zabrotes subfasciatus

Faroe Is. (5)
Anobium punctatum
Creophilus maxillosus
Epauloecus unicolor
Ptinus fur
Ptinus tectus

Falklands (1)
Ptinus tectus

Fernando Po (1)
Hypothenemus hampei

Fiji (31)
Alphitobius diaperinus
Alphitobius laevigatus
Araecerus fasciculatus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Caryedon serratus
Corcyra cephalonica
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dermestes frischii
Ephestia elutella
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Plochionus pallens
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Tenebroides mauritanicus
Tribolium castaneum

Finland (105)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus flavipes
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Atomaria lewisi
Attagenus fasciatus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bostrychoplites cornutus
Bruchidius lividimanus
Bruchus atomarius
Bruchus lentis
Bruchus rufimanus
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes peruvianus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus minutus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium psylloides
Hadrobregmus pertinax
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lyctus brunneus
Lyctus linearis
Mezium affine
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thes bergrothi
Tribolium destructor
Trigonogenius globosus
Trogoderma angustum
Trogoderma glabrum
Trogoderma variabile
Trogoderma versicolor
Typhaea haagi
Xestobium rufovillosum

France (153)

Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus coloratus
Anthrenus flavipes
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pantherinus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Cartodere constricta
Cartodere nodifer
Caryedon pallidus
Caryedon serratus
Cathartus quadricollis
Coccotrypes dactyliperda
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Cydia pomonella
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus minutus
Dinoderus ocellaris
Enicmus histrio
Epauloecus unicolor
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus maxillosus
Hadrobregmus pertinax
Holoparamecus caularum
Hypothenemus eruditus
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Lyctus linearis
Mezium affine
Mezium americanum
Mimosestes mimosae
Monanus concinnulus
Monotoma picipes
Nacerdes melanura
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon granella
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Orphinus fulvipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Plochionus pallens
Plodia interpunctella

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Prostephanus truncatus
Ptinus fur
Ptinus japonicus
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Sphaericus gibboides
Stegobium paniceum
Stelidota geminata
Stephostethus lardarius
Tachyporus hypnorum
Tenebrio molitor
Tenebrio obscurus
Tenebroides mauritanicus
Thaneroclerus buqueti
Thes bergrothi
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Tribolium madens
Trigonogenius globosus
Trogoderma angustum
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

French Guiana (5)
Carpophilus dimidiatus
Oryzaephilus surinamensis
Sitophilus oryzae
Sitophilus zeamais
Tribolium castaneum

French Polynesia (5)
Carpophilus dimidiatus
Carpophilus humeralis
Hypothenemus hampei
Palorus subdepressus
Tribolium castaneum

Gabon (5)
Etiella zinckenella
Hypothenemus eruditus
Hypothenemus hampei
Rhyzopertha dominica
Tribolium castaneum

Galapagos (2)
Creophilus maxillosus
Etiella zinckenella

Gambia (9)
Cadra figulilella
Caryedon pallidus
Caryedon serratus
Etiella zinckenella
Oryzaephilus mercator
Sitophilus oryzae
Sitotroga cerealella
Tribolium castaneum
Trogoderma granarium

Georgia (51)
Acanthoscelides obtectus
Anobium punctatum
Bruchus atomarius
Bruchus brachialis
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Leichenum canaliculatum
Omonadus floralis
Omonadus formicarius
Corticaria elongata
Cortinicara gibbosa
Dermestes ater
Lyctus linearis
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Carcinops pumilio
Cartodere constricta
Corticaria pubescens
Corticaria serrata
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophilus integer
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Gibbium psylloides
Hadrobregmus pertinax
Lasioderma serricorne
Lathridius minutus
Mezium affine
Monotoma picipes
Niptus hololeucus
Ptinus fur
Ptinus latro
Ptinus villiger
Stegobium paniceum
Tachyporus hypnorum
Typhaea haagi
Uloma culinaris

Germany (157)
Acanthoscelides obtectus
Achroia grisella
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus coloratus
Anthrenus flavipes
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Atomaria lewisi
Attagenus fasciatus
Attagenus pantherinus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bostrychoplites cornutus
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Caryedon serratus
Cathartus quadricollis
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Cryptophilus integer
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dermestes undulatus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus japonicus
Dinoderus minutus
Dinoderus ocellaris
Enicmus histrio
Epauloecus unicolor
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Lyctus linearis
Mezium affine
Mezium americanum
Migneauxia lederi
Mimosestes mimosae
Monanus concinnulus
Monotoma picipes
Nacerdes melanura
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon cloacella
Nemapogon granella
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Orphinus fulvipes
Oryzaephilus surinamensis
Pharaxonotha kirschii
Plodia interpunctella
Prostephanus truncatus
Pseudeurostus hilleri
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Pyralis farinalis
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sphaericus gibboides
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebrio molitor
Tenebroides mauritanicus
Thaneroclerus buqueti
Thes bergrothi
Tinea pallescentella
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trigonogenius globosus
Trogoderma angustum
Trogoderma granarium
Trogoderma versicolor
Typhaea haagi
Typhaea stercorea
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

Ghana (42)
Acanthoscelides obtectus
Ahasverus advena
Anthrenus flavipes
Araecerus fasciculatus
Bruchidius atrolineatus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus marginellus
Carpophilus obsoletus
Caryedon serratus
Cathartus quadricollis
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dermestes frischii
Dinoderus bifoveolatus
Dinoderus minutus
Etiella zinckenella
Gnatocerus maxillosus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Latheticus oryzae
Lophocateres pusillus
Monanus concinnulus
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Prostephanus truncatus
Ptinus tectus
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Typhaea stercorea
Zabrotes subfasciatus

Gibraltar (5)
Bruchus rufimanus
Cadra calidella
Nacerdes melanura
Palorus subdepressus
Tribolium castaneum

Grand Cayman (1)
Cadra cautella

Greece (128)
Acanthoscelides obtectus
Aglossa pinguinalis
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Alphitophagus bifasciatus
Anthrenus coloratus
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Attagenus lobatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Cartodere constricta
Cartodere nodifer
Caryedon pallidus
Coccotrypes dactyliperda
Corcyra cephalonica
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Dinoderus minutus
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Hadrobregmus pertinax
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Leichenum canaliculatum
Liposcelis corrodens
Litargus balteatus
Lyctus brunneus
Lyctus linearis
Melyris oblonga
Mezium affine
Monotoma picipes
Necrobia rufipes
Nemapogon granella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphilus niger
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phradonoma nobile
Phthorimaea operculella
Plochionus pallens
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus tectus
Ptinus villiger
Pyralis farinalis
Rhyzopertha dominica
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tachyporus hypnorum
Tenebrio molitor
Tenebrio obscurus
Tenebroides mauritanicus
Tinea pellionella
Tineola bisselliella
Tribolium castaneum
Tribolium confusum
Tribolium madens
Trigonogenius globosus
Trogoderma glabrum
Trogoderma inclusum
Trogoderma variabile
Trogoderma versicolor
Typhaea stercorea
Uloma culinaris
Xestobium rufovillosum

Greenland (6)
Anthrenus pimpinellae
Cryptophagus acutangulus
Endrosis sarcitrella
Hofmannophila pseudospretella
Oryzaephilus surinamensis
Thes bergrothi

Grenada (23)
Ahasverus advena
Araecerus fasciculatus
Cadra cautella
Carpophilus dimidiatus
Cathartus quadricollis
Corcyra cephalonica
Cryptolestes pusillus
Dermestes lardarius
Ephestia elutella
Epuraea luteolus
Etiella zinckenella
Gnatocerus maxillosus
Lasioderma serricorne
Monanus concinnulus
Monotoma picipes
Necrobia rufipes
Omonadus floralis
Oryzaephilus mercator
Oryzaephilus surinamensis
Plochionus pallens
Stegobium paniceum
Tenebroides mauritanicus
Tribolium castaneum

Grenadines (1)
Monanus concinnulus

Guadeloupe (14)
Carpophilus dimidiatus
Creophilus maxillosus
Dinoderus minutus
Epuraea luteolus
Hypothenemus eruditus
Lasioderma serricorne
Monanus concinnulus
Monotoma picipes
Nausibius clavicornis
Omonadus floralis
Oryzaephilus surinamensis
Pagiocerus frontalis
Sitophilus oryzae
Thorictodes heydeni

Guatemala (24)
Acanthoscelides obtectus
Carpophilus dimidiatus
Carpophilus mutilatus
Cartodere constricta
Cathartus quadricollis
Creophilus maxillosus
Cylas formicarius
Epuraea luteolus
Etiella zinckenella
Gibbium aequinoctiale
Gnatocerus cornutus
Gnatocerus maxillosus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Lophocateres pusillus
Mimosestes mimosae
Nausibius clavicornis
Necrobia rufipes
Pagiocerus frontalis
Prostephanus truncatus
Ptinus latro
Sitophilus oryzae
Zabrotes subfasciatus

Guernsey (2)
Achroia grisella
Ephestia elutella

Guinea (9)
Anthrenus coloratus
Callosobruchus maculatus
Etiella zinckenella
Hypothenemus eruditus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Hypothenemus hampei
Prostephanus truncatus
Rhyzopertha dominica
Tribolium castaneum
Trogoderma granarium

Guinea-Bissau (4)
Caryedon serratus
Etiella zinckenella
Gibbium psylloides
Tribolium castaneum

Guyana (14)
Alphitobius diaperinus
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Ephestia kuehniella
Lasioderma serricorne
Mimosestes mimosae
Oryzaephilus surinamensis
Sitophilus zeamais
Sitotroga cerealella
Tenebrio obscurus

Haiti (5)
Carpophilus mutilatus
Caryedon serratus
Cylas formicarius
Mimosestes mimosae
Monanus concinnulus

Honduras (28)
Acanthoscelides obtectus
Ahasverus advena
Cadra cautella
Carpophilus dimidiatus
Carpophilus mutilatus
Cathartus quadricollis
Corcyra cephalonica
Cryptolestes pusillus
Etiella zinckenella
Gnatocerus maxillosus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Mimosestes mimosae
Necrobia rufipes
Oryzaephilus surinamensis
Pagiocerus frontalis
Pharaxonotha kirschii
Plodia interpunctella
Prostephanus truncatus
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebroides mauritanicus
Tribolium castaneum
Typhaea stercorea
Zabrotes subfasciatus

Hong Kong (23)
Achroia grisella
Anthrenus flavipes
Callosobruchus analis
Carpophilus dimidiatus
Carpophilus marginellus
Carpophilus obsoletus
Cortinicara gibbosa
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Dermestes carnivorus
Dinoderus bifoveolatus
Dinoderus ocellaris
Gibbium aequinoctiale
Lasioderma serricorne
Lophocateres pusillus
Murmidius ovalis
Niptus hololeucus
Rhyzopertha dominica
Stegobium paniceum
Trogoderma granarium
Xestobium rufovillosum

Hungary (110)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pantherinus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus hemipterus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Dienerella filiformis
Dienerella filum
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lyctus linearis
Migneauxia lederi
Mimosestes mimosae
Monanus concinnulus
Necrobia ruficollis
Necrobia rufipes
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Plochionus pallens
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thes bergrothi
Tribolium destructor
Tribolium madens
Trogoderma angustum
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

Iceland (26)
Anobium punctatum
Attagenus pellio
Attagenus unicolor
Blaps mortisaga
Carpophilus hemipterus
Corticaria elongata
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dienerella filum
Lathridius minutus
Lyctus brunneus
Lyctus linearis
Niptus hololeucus
Ptinus fur
Ptinus tectus
Reesa vespulae
Tenebroides mauritanicus
Thes bergrothi
Tribolium destructor

India (117)
Acanthoscelides obtectus
Achroia grisella
Aglossa pinguinalis
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Alphitophagus bifasciatus
Anthrenus coloratus
Anthrenus flavipes
Araecerus fasciculatus
Atomaria lewisi
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchidius sahlbergi
Bruchus lentis
Bruchus pisorum
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Cartodere constricta
Caryedon pallidus
Caryedon serratus
Coccotrypes dactyliperda
Corcyra cephalonica
Corticaria elongata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptophagus cellaris
Cryptophilus integer
Cylas formicarius
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes tessellatocollis
Dermestes undulatus
Dermestes vorax
Dienerella arga
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus minutus
Dinoderus ocellaris
Enicmus histrio
Ephestia elutella
Epuraea luteolus
Etiella zinckenella
Galleria mellonella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus maxillosus
Holoparamecus caularum
Hypothenemus eruditus
Hypothenemus hampei
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Leichenum canaliculatum
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Migneauxia lederi
Monanus concinnulus
Murmidius ovalis
Nacerdes melanura
Necrobia ruficollis
Necrobia rufipes
Niditinea fuscella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphinus fulvipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Phradonoma tricolor
Phthorimaea operculella
Plodia interpunctella
Prostephanus truncatus
Ptinus fur
Ptinus japonicus
Ptinus latro
Ptinus tectus
Rhyzopertha dominica
Silvanus bidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tachyporus hypnorum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trigonogenius globosus
Trogoderma glabrum
Trogoderma granarium
Trogoderma inclusum
Trogoderma versicolor
Zabrotes subfasciatus

Indonesia (38)
Ahasverus advena
Alphitobius diaperinus
Cadra cautella
Callosobruchus analis
Callosobruchus phaseoli
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dermestes maculatus
Dermestes peruvianus
Dinoderus brevis
Etiella zinckenella
Hypothenemus hampei
Lasioderma serricorne
Lophocateres pusillus
Monanus concinnulus
Monotoma picipes
Necrobia rufipes
Oryzaephilus surinamensis

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Palorus subdepressus
Phthorimaea operculella
Plochionus pallens
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Trogoderma granarium
Typhaea stercorea

Iran (98)
Acanthoscelides obtectus
Aglossa pinguinalis
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus flavipes
Anthrenus pimpinellae
Anthrenus scrophulariae
Araecerus fasciculatus
Atomaria lewisi
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Attagenus unicolor
Blaps mortisaga
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Carpophilus obsoletus
Corticaria serrata
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Ephestia elutella
Ephestia kuehniella
Gibbium aequinoctiale
Gibbium psylloides
Gonocephalum prolixum
Hypothenemus eruditus
Hypothenemus hampei
Idaea inquinata
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lyctus africanus
Necrobia rufipes
Necrobia violacea
Niditinea fuscella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus tectus
Pyralis farinalis
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Stegobium paniceum
Tachyporus hypnorum
Tenebrio molitor
Tenebrio obscurus
Tenebroides mauritanicus
Tinea pellionella
Tineola bisselliella
Tribolium castaneum
Tribolium confusum
Trichophaga tapetzella
Trogoderma glabrum
Trogoderma granarium
Trogoderma inclusum
Trogoderma variabile
Trogoderma versicolor
Typhaea stercorea
Uloma culinaris
Zabrotes subfasciatus

Iraq (55)
Aglossa pinguinalis
Alphitobius diaperinus
Alphitobius laevigatus
Anthrenus coloratus
Anthrenus flavipes
Anthrenus pimpinellae
Attagenus bifasciatus
Attagenus lobatus
Attagenus pellio
Blaps mortisaga
Bruchus ervi
Bruchus lentis
Bruchus rufimanus
Cadra calidella
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon serratus
Coccotrypes dactyliperda
Cryptolestes pusillus
Cryptophagus cellaris
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Ephestia elutella
Epuraea luteolus
Gibbium psylloides
Hypsopygia costalis
Latheticus oryzae
Leichenum canaliculatum
Melyris oblonga
Migneauxia lederi
Niditinea fuscella
Niptus hololeucus
Omonadus formicarius
Oryzaephilus surinamensis
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Prostephanus truncatus
Ptinus fur
Ptinus latro
Pyralis farinalis
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Tribolium castaneum
Tribolium confusum
Trogoderma granarium
Trogoderma inclusum
Trogoderma variabile

Ireland (83)
Acanthoscelides obtectus
Achroia grisella
Alphitobius diaperinus
Anobium punctatum
Anthrenus flavipes
Anthrenus verbasci
Atomaria lewisi
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Bruchus atomarius
Cadra calidella
Cadra cautella

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TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Cadra figulilella
Carcinops pumilio
Carpophilus hemipterus
Carpophilus humeralis
Cartodere nodifer
Corticaria elongata
Corticaria serrata
Cortinicara gibbosa
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dienerella filiformis
Dienerella filum
Enicmus histrio
Epauloecus unicolor
Ephestia elutella
Ephestia kuehniella
Gibbium psylloides
Gnatocerus cornutus
Lachesilla pedicularia
Lasioderma serricorne
Lathridius minutus
Liposcelis corrodens
Lyctus brunneus
Lyctus linearis
Mezium affine
Monotoma picipes
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Oryzaephilus surinamensis
Plodia interpunctella
Pseudeurostus hilleri
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus tectus
Rhyzopertha dominica
Silvanus bidentatus
Sitophilus granarius
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Thes bergrothi
Trigonogenius globosus
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Xestobium rufovillosum

Isle of Scilly (1)
Achroia grisella

Israel (101)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Alphitophagus bifasciatus
Anobium punctatum
Anthrenus coloratus
Anthrenus flavipes
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Attagenus bifasciatus
Attagenus fasciatus
Attagenus pellio
Attagenus unicolor
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchidius sahlbergi
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon serratus
Cathartus quadricollis
Coccotrypes dactyliperda
Corticaria serrata
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptophagus cellaris
Cryptophagus pilosus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes undulatus
Dienerella arga
Dinoderus minutus
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium psylloides
Gnatocerus cornutus
Hypothenemus eruditus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Nacerdes melanura
Necrobia ruficollis
Necrobia rufipes
Niditinea fuscella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Prostephanus truncatus
Ptinus fur
Ptinus latro
Ptinus tectus
Pyralis farinalis
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebrio obscurus
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tinea pellionella
Tribolium castaneum
Tribolium confusum
Trigonogenius globosus
Trogoderma glabrum
Trogoderma granarium
Trogoderma inclusum
Trogoderma versicolor
Typhaea stercorea
Zabrotes subfasciatus

Ivory Coast (20)
Alphitobius diaperinus
Araecerus fasciculatus
Carpophilus dimidiatus
Carpophilus obsoletus
Cathartus quadricollis
Corcyra cephalonica
Etiella zinckenella
Hypothenemus eruditus
Hypothenemus hampei
Lophocateres pusillus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Necrobia rufipes
Oryzaephilus mercator
Palorus subdepressus
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Tenebrio guineensis
Tenebroides mauritanicus
Tribolium castaneum
Trogoderma granarium

Jamaica (47)
Achroia grisella
Ahasverus advena
Alphitobius diaperinus
Anthrenus flavipes
Attagenus fasciatus
Cadra cautella
Carpophilus dimidiatus
Carpophilus obsoletus
Caryedon serratus
Cathartus quadricollis
Coccotrypes dactyliperda
Corcyra cephalonica
Creophilus maxillosus
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dermestes caninus
Dermestes lardarius
Dinoderus brevis
Dinoderus minutus
Ephestia kuehniella
Gnatocerus cornutus
Gnatocerus maxillosus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Lophocateres pusillus
Lyctus brunneus
Mimosestes mimosae
Monanus concinnulus
Nausibius clavicornis
Necrobia rufipes
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Oryzaephilus surinamensis
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Thaneroclerus buqueti
Thorictodes heydeni
Tribolium castaneum
Trigonogenius globosus
Trogoderma granarium
Trogoderma sternale
Zabrotes subfasciatus

Japan (144)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Alphitophagus bifasciatus
Anthrenus flavipes
Anthrenus fuscus
Anthrenus nipponensis
Anthrenus pimpinellae
Anthrenus verbasci
Araecerus fasciculatus
Atomaria lewisi
Attagenus fasciatus
Attagenus pellio
Attagenus unicolor
Blaps japonensis
Bruchus pisorum
Bruchus rufimanus
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Cartodere constricta
Cartodere nodifer
Cephimallota colonella
Coccotrypes dactyliperda
Corcyra cephalonica
Corticaria elongata
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophilus integer
Cydia pomonella
Cylas formicarius
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes tessellatocollis
Dermestes undulatus
Dermestes vorax
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus japonicus
Dinoderus minutus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Etiella zinckenella
Galleria mellonella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Gnatocerus maxillosus
Hadrobregmus pertinax
Holoparamecus signatus
Hypothenemus eruditus
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Leichenum canaliculatum
Liposcelis corrodens
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Lyctus linearis
Migneauxia lederi
Monanus concinnulus
Monotoma picipes
Murmidius ovalis
Nacerdes melanura
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon granella
Niditinea fuscella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Omosita colon
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phthorimaea operculella
Plodia interpunctella
Pseudeurostus hilleri
Ptinus fur
Ptinus japonicus
Ptinus latro
Ptinus tectus
Pyralis farinalis
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tachyporus hypnorum
Tenebrio molitor

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Tenebrio obscurus
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tineola bisselliella
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Tribolium madens
Trichophaga tapetzella
Trigonogenius globosus
Trinodes rufescens
Trogoderma granarium
Trogoderma inclusum
Trogoderma ornatum
Trogoderma variabile
Trogoderma versicolor
Typhaea haagi
Typhaea stercorea
Zabrotes subfasciatus

Java (26)
Anthrenus pimpinellae
Anthrenus verbasci
Araecerus fasciculatus
Attagenus fasciatus
Cadra cautella
Callosobruchus analis
Caryedon serratus
Corcyra cephalonica
Dermestes ater
Dinoderus bifoveolatus
Dinoderus minutus
Ephestia elutella
Hypothenemus hampei
Lasioderma serricorne
Lophocateres pusillus
Nausibius clavicornis
Necrobia rufipes
Orphinus fulvipes
Plochionus pallens
Plodia interpunctella
Rhyzopertha dominica
Sitotroga cerealella
Stegobium paniceum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni

Jersey (3)
Achroia grisella
Ephestia elutella
Plodia interpunctella

Jordan (34)
Attagenus pellio
Blaps lethifera
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Caryedon serratus
Coccotrypes dactyliperda
Cryptophagus cellaris
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Ephestia elutella
Ephestia kuehniella
Migneauxia lederi
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Ptinus fur
Ptinus latro
Stegobium paniceum

Kazakhstan (43)
Alphitobius diaperinus
Anthrenus coloratus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Atomaria lewisi
Attagenus fasciatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchus atomarius
Bruchus pisorum
Cartodere constricta
Corticaria serrata
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus setulosus
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Enicmus histrio
Ephestia elutella
Glischrochilus quadrisignatus
Latheticus oryzae
Lyctus linearis
Monotoma picipes
Niptus hololeucus
Omosita colon
Orphilus niger
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Stegobium paniceum
Trogoderma glabrum
Trogoderma granarium
Trogoderma variabile
Trogoderma versicolor

Kenya (44)
Acanthoscelides obtectus
Alphitobius diaperinus
Attagenus smirnovi
Attagenus unicolor
Bruchidius atrolineatus
Bruchus lentis
Bruchus rufimanus
Cadra calidella
Cadra cautella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carpophilus dimidiatus
Carpophilus humeralis
Caryedon serratus
Coccotrypes dactyliperda
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptophilus integer
Cylas formicarius
Dinoderus minutus
Ephestia kuehniella
Etiella zinckenella
Hypothenemus hampei
Litargus balteatus
Lophocateres pusillus
Migneauxia lederi
Necrobia rufipes
Oryzaephilus mercator
Phthorimaea operculella
Prostephanus truncatus
Ptinus tectus
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Tribolium destructor
Trigonogenius globosus
Trogoderma granarium
Zabrotes subfasciatus

Kiribati (1)
Cylas formicarius

Korea (77)
Alphitobius diaperinus
Alphitobius laevigatus
Alphitophagus bifasciatus
Anthrenus flavipes
Anthrenus nipponensis
Anthrenus verbasci

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Araecerus fasciculatus
Atomaria lewisi
Attagenus fasciatus
Attagenus pellio
Attagenus unicolor
Blaps japonensis
Bruchus atomarius
Bruchus pisorum
Bruchus rufimanus
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus marginellus
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophilus integer
Cylas formicarius
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes tessellatocollis
Dermestes vorax
Enicmus histrio
Ephestia elutella
Epuraea luteolus
Galleria mellonella
Gibbium aequinoctiale
Gibbium psylloides
Hadrobregmus pertinax
Lasioderma serricorne
Latheticus oryzae
Lyctus brunneus
Monotoma picipes
Nacerdes melanura
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon granella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Omosita colon
Oryzaephilus surinamensis
Plodia interpunctella
Ptinus fur
Ptinus japonicus
Ptinus latro
Ptinus tectus
Pyralis farinalis
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebrio molitor
Tenebrio obscurus
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trichophaga tapetzella
Trogoderma granarium

Kurile Is. (2)
Creophilus maxillosus
Dermestes vorax

Kuwait (14)
Alphitobius diaperinus
Anthrenus flavipes
Callosobruchus chinensis
Callosobruchus maculatus
Dermestes frischii
Lasioderma serricorne
Necrobia rufipes
Niptus hololeucus
Oryzaephilus surinamensis
Sitophilus oryzae
Stegobium paniceum
Tribolium castaneum
Tribolium confusum
Tribolium destructor

Kyrgyzstan (24)
Anthrenus coloratus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Bruchus atomarius
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Niptus hololeucus
Ptinus fur
Ptinus latro
Stegobium paniceum
Trogoderma granarium
Trogoderma versicolor

Laos (4)
Cylas formicarius
Oryzaephilus surinamensis
Sitophilus oryzae
Tribolium castaneum

Lapland (1)
Creophilus maxillosus

Latvia (71)
Acanthoscelides obtectus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps mortisaga
Bruchus atomarius
Bruchus rufimanus
Carcinops pumilio
Carpophilus hemipterus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes spartii
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella filiformis
Dienerella filum
Ephestia elutella
Hadrobregmus pertinax
Korynetes caeruleus
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lyctus linearis
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thes bergrothi

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Trogoderma angustum
Trogoderma glabrum
Trogoderma variabile
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum

Lebanon (51)
Acanthoscelides obtectus
Anthrenus scrophulariae
Attagenus bifasciatus
Attagenus pellio
Bruchidius lividimanus
Bruchus atomarius
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Carpophilus hemipterus
Carpophilus mutilatus
Carpophilus obsoletus
Corticaria serrata
Creophilus maxillosus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Ephestia elutella
Ephestia kuehniella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Necrobia violacea
Nemapogon granella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Phthorimaea operculella
Plodia interpunctella
Ptinus fur
Ptinus latro
Pyralis farinalis
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Tachyporus hypnorum
Tenebrio obscurus
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Trogoderma granarium
Zabrotes subfasciatus

Leeward Is. (1)
Orphinus fulvipes

Lesotho (12)
Acanthoscelides obtectus
Ahasverus advena
Cadra cautella
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptophilus integer
Etiella zinckenella
Gnatocerus cornutus
Oryzaephilus surinamensis
Plodia interpunctella
Sitophilus oryzae
Tribolium castaneum

Liberia (7)
Ahasverus advena
Carpophilus dimidiatus
Cylas formicarius
Etiella zinckenella
Hypothenemus hampei
Sitophilus oryzae
Tribolium castaneum

Libya (64)
Acanthoscelides obtectus
Achroia grisella
Aglossa pinguinalis
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anthrenus verbasci
Attagenus bifasciatus
Attagenus fasciatus
Attagenus pellio
Bruchidius lividimanus
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Corcyra cephalonica
Creophilus maxillosus
Cryptolestes pusillus
Cryptophagus dentatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Ephestia elutella
Ephestia kuehniella
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Gonocephalum prolixum
Hypsopygia costalis
Lasioderma serricorne
Latheticus oryzae
Lyctus brunneus
Mezium affine
Necrobia rufipes
Nemapogon granella
Niptus hololeucus
Omonadus floralis
Oryzaephilus surinamensis
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Ptinus fur
Ptinus latro
Pyralis farinalis
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum
Tenebrio molitor
Tenebroides mauritanicus
Tinea pellionella
Tribolium castaneum
Tribolium confusum
Trogoderma granarium

Leichtenstein (26)
Ahasverus advena
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Blaps lethifera
Blaps mortisaga
Cartodere nodifer
Corticaria serrata
Cortinicara gibbosa
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus scutellatus
Dienerella arga
Dienerella filiformis
Lathridius minutus
Lyctus linearis
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Omonadus floralis
Omonadus formicarius
Ptinus fur
Ptinus latro
Ptinus pusillus
Silvanus unidentatus
Uloma culinaris

Lithuania (57)
Acanthoscelides obtectus
Ahasverus advena
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Atomaria lewisi
Attagenus pellio
Attagenus unicolor
Blaps mortisaga
Bruchus rufimanus
Carcinops pumilio
Cartodere constricta
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cryptolestes ferrugineus
Cryptophagus acutangulus
Cryptophagus dentatus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Enicmus histrio
Ephestia elutella
Hadrobregmus pertinax
Lathridius minutus
Lyctus linearis
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Silvanus bidentatus
Silvanus unidentatus
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thes bergrothi
Tribolium destructor
Uloma culinaris
Xestobium rufovillosum

Luxembourg (28)
Alphitobius diaperinus
Alphitobius laevigatus
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus pellio
Attagenus unicolor
Bruchus atomarius
Cadra calidella
Cadra cautella
Cadra figulilella
Creophilus maxillosus
Dermestes ater
Dermestes frischii
Dermestes maculatus
Ephestia elutella
Ephestia kuehniella
Gnatocerus maxillosus
Lachesilla pedicularia
Latheticus oryzae
Liposcelis corrodens
Lyctus linearis
Niptus hololeucus
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Tribolium destructor
Trogoderma granarium

Macedonia (31)
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus rufimanus
Bruchus rufipes
Creophilus maxillosus
Cryptophagus pilosus
Cryptophagus saginatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Epuraea luteolus
Gibbium psylloides
Korynetes caeruleus
Lyctus linearis
Mezium affine
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphilus niger
Ptinus fur
Ptinus latro
Ptinus tectus
Sitophilus oryzae
Stegobium paniceum
Tachyporus hypnorum

Madagascar (29)
Alphitobius diaperinus
Bostrychoplites cornutus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon pallidus
Caryedon serratus
Coccotrypes dactyliperda
Cryptolestes ferrugineus
Cylas formicarius
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes marmoratus
Ephestia elutella
Etiella zinckenella
Gibbium aequinoctiale
Hypothenemus eruditus
Leichenum canaliculatum
Lophocateres pusillus
Lyctus africanus
Orphinus fulvipes
Ptinus latro
Sitophilus oryzae
Sitophilus zeamais
Tribolium castaneum
Trogoderma granarium
Zabrotes subfasciatus

Madeira (56)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus verbasci
Attagenus pellio
Blaps lethifera
Bruchidius lividimanus
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra cautella
Cadra figulilella
Carcinops pumilio
Carpophilus hemipterus
Cartodere constricta
Coccotrypes dactyliperda
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes spartii
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dienerella arga
Dinoderus bifoveolatus
Enicmus histrio
Ephestia elutella
Epuraea luteolus
Gibbium psylloides

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Gnatocerus maxillosus
Lachesilla pedicularia
Lasioderma serricorne
Lyctus brunneus
Mezium affine
Mezium americanum
Monotoma picipes
Nausibius clavicornis
Omonadus floralis
Omosita colon
Plodia interpunctella
Ptinus fur
Ptinus latro
Rhyzopertha dominica
Sitophilus oryzae
Stegobium paniceum

Malawi (40)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Attagenus fasciatus
Bostrychoplites cornutus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Dermestes maculatus
Dinoderus minutus
Etiella zinckenella
Gnatocerus cornutus
Gnatocerus maxillosus
Lasioderma serricorne
Litargus balteatus
Lyctus brunneus
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Phthorimaea operculella
Plodia interpunctella
Prostephanus truncatus
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebroides mauritanicus
Tribolium castaneum
Typhaea stercorea
Zabrotes subfasciatus

Malaysia (54)
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Alphitophagus bifasciatus
Araecerus fasciculatus
Cadra cautella
Callosobruchus analis
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon serratus
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophagus cellaris
Cylas formicarius
Dermestes ater
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus minutus
Ephestia elutella
Gibbium aequinoctiale
Hypothenemus eruditus
Hypothenemus hampei
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lophocateres pusillus
Lyctus brunneus
Monanus concinnulus
Orphinus fulvipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phthorimaea operculella
Plochionus pallens
Plodia interpunctella
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebrio obscurus
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trogoderma granarium
Typhaea stercorea

Mali (16)
Alphitobius diaperinus
Bruchidius atrolineatus
Cadra cautella
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusillus
Etiella zinckenella
Latheticus oryzae
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Rhyzopertha dominica
Sitophilus zeamais
Tenebroides mauritanicus
Tribolium castaneum
Trogoderma granarium

Malta (37)
Acanthoscelides obtectus
Alphitobius diaperinus
Alphitobius laevigatus
Attagenus pellio
Attagenus unicolor
Bruchidius atrolineatus
Bruchus ervi
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra cautella
Callosobruchus chinensis
Carcinops pumilio
Carpophilus hemipterus
Carpophilus mutilatus
Carpophilus obsoletus
Cryptophagus cellaris
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Ephestia elutella
Epuraea luteolus
Gibbium psylloides
Holoparamecus caularum
Lathridius minutus
Mezium affine
Mezium americanum
Monotoma picipes
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Phthorimaea operculella
Ptinus fur
Ptinus latro
Stegobium paniceum

Mariana Is. (2)
Cylas formicarius
Plochionus pallens

Marquesas Is. (2)
Cylas formicarius
Hypothenemus eruditus

Martinique (1)
Bruchus ervi

Mascarene Is. (2)
Bostrychoplites cornutus
Carpophilus mutilatus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Mauritania (3)
Etiella zinckenella
Tribolium castaneum
Trogoderma granarium

Mauritius (14)
Alphitobius diaperinus
Bostrychoplites cornutus
Cadra cautella
Callosobruchus analis
Carpophilus humeralis
Cylas formicarius
Dinoderus minutus
Gibbium aequinoctiale
Phthorimaea operculella
Sitophilus oryzae
Stegobium paniceum
Thaneroclerus buqueti
Trogoderma granarium
Zabrotes subfasciatus

Mexico (84)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitophagus bifasciatus
Araecerus fasciculatus
Bruchus pisorum
Bruchus rufimanus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus mutilatus
Carpophilus obsoletus
Carpophilus pallipennis
Caryedon serratus
Cathartus quadricollis
Coccotrypes dactyliperda
Corcyra cephalonica
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptophagus acutangulus
Cryptophagus subfumatus
Cylas formicarius
Cynaeus angustus
Dermestes caninus
Dermestes maculatus
Dermestes marmoratus
Dermestes peruvianus
Dienerella filum
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Gnatocerus maxillosus
Hypothenemus eruditus
Hypothenemus hampei
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Migneauxia lederi
Mimosestes mimosae
Monanus concinnulus
Murmidius ovalis
Nausibius clavicornis
Necrobia rufipes
Nemapogon granella
Omonadus floralis
Omonadus formicarius
Orphinus fulvipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Pagiocerus frontalis
Palorus subdepressus
Pharaxonotha kirschii
Phthorimaea operculella
Plochionus pallens
Plodia interpunctella
Prostephanus truncatus
Rhyzopertha dominica
Sennius morosus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trogoderma glabrum
Trogoderma granarium
Trogoderma grassmani
Trogoderma inclusum
Trogoderma ornatum
Trogoderma simplex
Trogoderma sternale
Trogoderma variabile
Typhaea stercorea
Zabrotes subfasciatus

Micronesia (22)
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Dermestes ater
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum

Moldavia (24)
Atomaria lewisi
Carpophilus hemipterus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Gibbium psylloides
Glischrochilus quadrisignatus
Lyctus linearis
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Omosita colon
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Xestobium rufovillosum

Moluccas (1)
Sitophilus zeamais

Monaco (1)
Lachesilla pedicularia

Mongolia (39)
Alphitobius diaperinus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Attagenus unicolor
Bruchus atomarius
Cartodere constricta
Cortinicara gibbosa
Creophilus maxillosus
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes tessellatocollis
Enicmus histrio
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Lathridius minutus
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omosita colon
Ptinus fur
Ptinus latro
Ptinus raptor
Silvanus bidentatus
Silvanus unidentatus
Stegobium paniceum
Tribolium destructor
Trogoderma glabrum
Trogoderma variabile
Trogoderma versicolor

Montserrat (1)
Orphinus fulvipes

Morocco (111)
Acanthoscelides obtectus
Aglossa pinguinalis
Ahasverus advena
Alphitobius diaperinus
Alphitophagus bifasciatus
Anobium punctatum
Anthrenus coloratus
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Bostrychoplites cornutus
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus mutilatus
Carpophilus obsoletus
Cartodere constricta
Coccotrypes dactyliperda
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus scutellatus
Cryptophagus setulosus
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dienerella arga
Dinoderus minutus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Etiella zinckenella
Gibbium psylloides
Gonocephalum prolixum
Holoparamecus caularum
Hypothenemus eruditus
Idaea inquinata
Lachesilla pedicularia
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lyctus africanus
Lyctus brunneus
Lyctus linearis
Mezium affine
Mezium americanum
Migneauxia lederi
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphilus niger
Oryzaephilus surinamensis
Palorus depressus
Palorus subdepressus
Phradonoma nobile
Phthorimaea operculella
Plochionus pallens
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus tectus
Reesa vespulae
Rhyzopertha dominica
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Stegobium paniceum
Tachyporus hypnorum
Tenebrio obscurus
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Trigonogenius globosus
Trogoderma glabrum
Trogoderma granarium
Trogoderma inclusum
Trogoderma variabile
Trogoderma versicolor

Mozambique (21)
Ahasverus advena
Bruchidius atrolineatus
Cadra cautella
Carpophilus dimidiatus
Coccotrypes dactyliperda
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dinoderus brevis
Etiella zinckenella
Gnatocerus maxillosus
Mezium americanum
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebroides mauritanicus
Tribolium castaneum
Trogoderma granarium

Mustique (1)
Monanus concinnulus

Myanmar (31)
Aglossa dimidiata
Alphitobius diaperinus
Cadra cautella
Callosobruchus analis
Carpophilus dimidiatus
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon serratus
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dermestes carnivorus
Dinoderus brevis
Dinoderus minutus
Hypothenemus eruditus
Lasioderma serricorne
Latheticus oryzae
Lophocateres pusillus
Migneauxia lederi
Murmidius ovalis
Nausibius clavicornis
Oryzaephilus mercator
Oryzaephilus surinamensis
Phthorimaea operculella

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Sitophilus oryzae
Thorictodes heydeni
Tribolium castaneum
Trogoderma granarium
Zabrotes subfasciatus

Namibia (5)
Anthrenus coloratus
Etiella zinckenella
Phradonoma nobile
Prostephanus truncatus
Tribolium castaneum

Natal (2)
Callosobruchus analis
Sitophilus zeamais

Nei Mongol Zizhiqu (1)
Pseudeurostus hilleri

Nepal (43)
Alphitobius diaperinus
Atomaria lewisi
Attagenus fasciatus
Attagenus pellio
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus marginellus
Cartodere constricta
Corcyra cephalonica
Corticaria elongata
Cortinicara gibbosa
Creophilus maxillosus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes tessellatocollis
Dinoderus bifoveolatus
Enicmus histrio
Ephestia elutella
Epuraea luteolus
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Lachesilla pedicularia
Lasioderma serricorne
Leichenum canaliculatum
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus surinamensis
Phthorimaea operculella
Ptinus fur
Ptinus latro
Ptinus tectus
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tribolium castaneum

Netherlands (114)
Acanthoscelides obtectus
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus flavipes
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus bifasciatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus marginellus
Carpophilus mutilatus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus japonicus
Dinoderus minutus
Dinoderus ocellaris
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium psylloides
Glischrochilus quadrisignatus
Gnatocerus maxillosus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lophocateres pusillus
Lyctus brunneus
Lyctus linearis
Mezium affine
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon cloacella
Nemapogon granella
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Oryzaephilus surinamensis
Phradonoma tricolor
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitotroga cerealella
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebrio molitor
Tenebroides mauritanicus
Thaneroclerus buqueti
Thes bergrothi
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trogoderma angustum
Trogoderma glabrum
Trogoderma granarium
Trogoderma variabile
Trogoderma versicolor
Xestobium rufovillosum

New Caledonia (31)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Araecerus fasciculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Cryptolestes pusilloides
Cryptolestes pusillus
Dermestes ater
Dermestes carnivorus
Dermestes maculatus
Etiella zinckenella
Gibbium aequinoctiale
Gnatocerus cornutus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Necrobia ruficollis
Necrobia rufipes
Oryzaephilus surinamensis
Palorus subdepressus
Ptinus latro
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Stegobium paniceum
Tenebrio molitor
Tenebroides mauritanicus
Tribolium castaneum

New Zealand (69)
Acanthoscelides obtectus
Achroia grisella
Aglossa dimidiata
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus verbasci
Attagenus unicolor
Cadra cautella
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Coccotrypes dactyliperda
Corticaria elongata
Corticaria serrata
Cryptolestes ferrugineus
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dermestes carnivorus
Dermestes maculatus
Endrosis sarcitrella
Ephestia elutella
Ephestia kuehniella
Etiella zinckenella
Gnatocerus cornutus
Hofmannophila pseudospretella
Lasioderma serricorne
Liposcelis corrodens
Mezium affine
Mezium americanum
Nacerdes melanura
Necrobia ruficollis
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phthorimaea operculella
Ptinus fur
Ptinus latro
Ptinus tectus
Pyralis farinalis
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Sphaericus gibboides
Stegobium paniceum
Tenebrio molitor
Tenebrio obscurus
Tenebroides mauritanicus
Tinea pellionella
Tineola bisselliella
Tribolium castaneum
Tribolium confusum
Trichophaga tapetzella
Trigonogenius globosus
Trogoderma granarium
Trogoderma grassmani
Trogoderma inclusum
Trogoderma ornatum
Trogoderma variabile

Nicaragua (26)
Acanthoscelides obtectus
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus humeralis
Carpophilus mutilatus
Carpophilus obsoletus
Cathartus quadricollis
Cryptolestes ferrugineus
Cryptolestes pusillus
Dinoderus minutus
Epuraea luteolus
Etiella zinckenella
Gnatocerus maxillosus
Hypothenemus hampei
Mimosestes mimosae
Monanus concinnulus
Nausibius clavicornis
Oryzaephilus surinamensis
Plodia interpunctella
Prostephanus truncatus
Rhyzopertha dominica
Sitophilus oryzae
Tribolium castaneum
Typhaea stercorea
Zabrotes subfasciatus

Niger (6)
Bruchidius atrolineatus
Etiella zinckenella
Gnatocerus maxillosus
Prostephanus truncatus
Tribolium castaneum
Trogoderma granarium

Niue (8)
Alphitobius laevigatus
Anthrenus verbasci
Araecerus fasciculatus
Carpophilus dimidiatus
Hypothenemus eruditus
Necrobia rufipes
Oryzaephilus mercator
Tribolium castaneum

Norway (78)
Acanthoscelides obtectus
Anobium punctatum
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Cadra cautella
Cadra figulilella
Carpophilus marginellus
Cartodere constricta
Corticaria elongata
Corticaria pubescens
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella filiformis
Dienerella filum
Dinoderus minutus
Enicmus histrio

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Ephestia elutella
Ephestia kuehniella
Hadrobregmus pertinax
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Lathridius minutus
Lyctus brunneus
Lyctus linearis
Nausibius clavicornis
Necrobia ruficollis
Necrobia violacea
Nemapogon cloacella
Niditinea fuscella
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Plodia interpunctella
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thes bergrothi
Tinea pallescentella
Tribolium destructor
Trichophaga tapetzella
Trogoderma angustum
Uloma culinaris
Xestobium rufovillosum

Oman (12)
Anthrenus coloratus
Attagenus fasciatus
Attagenus pellio
Attagenus smirnovi
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Omonadus floralis
Omonadus formicarius
Phradonoma tricolor
Trogoderma glabrum

Orkney Is. (2)
Creophilus maxillosus
Tachyporus hypnorum

Pakistan (68)
Aglossa pinguinalis
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Araecerus fasciculatus
Attagenus pellio
Attagenus unicolor
Bruchus pisorum
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus obsoletus
Cartodere constricta
Caryedon serratus
Corcyra cephalonica
Corticaria elongata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dinoderus bifoveolatus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium aequinoctiale
Gibbium psylloides
Lasioderma serricorne
Latheticus oryzae
Lophocateres pusillus
Murmidius ovalis
Necrobia rufipes
Niditinea fuscella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Ptinus fur
Ptinus latro
Pyralis farinalis
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Tachyporus hypnorum
Tenebrio molitor
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trigonogenius globosus
Trogoderma granarium
Typhaea stercorea

Panama (22)
Ahasverus advena
Alphitobius diaperinus
Araecerus fasciculatus
Cadra cautella
Carpophilus dimidiatus
Cartodere constricta
Cathartus quadricollis
Coccotrypes dactyliperda
Ephestia elutella
Etiella zinckenella
Hypothenemus eruditus
Lasioderma serricorne
Mimosestes mimosae
Monanus concinnulus
Nausibius clavicornis
Necrobia rufipes
Orphinus fulvipes
Pagiocerus frontalis
Prostephanus truncatus
Tribolium castaneum
Trogoderma glabrum
Zabrotes subfasciatus

Papua New Guinea (34)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Araecerus fasciculatus
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus mutilatus
Caryedon serratus
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dinoderus ocellaris
Etiella zinckenella
Gibbium psylloides
Lasioderma serricorne
Latheticus oryzae
Monanus concinnulus
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Plochionus pallens
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Tenebroides mauritanicus
Tribolium castaneum

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Paraguay (10)
Ahasverus advena
Alphitobius diaperinus
Cadra cautella
Etiella zinckenella
Lasioderma serricorne
Oryzaephilus surinamensis
Sitophilus oryzae
Sitotroga cerealella
Tribolium castaneum
Trigonogenius globosus

Peru (50)
Acanthoscelides obtectus
Alphitobius laevigatus
Araecerus fasciculatus
Bruchus pisorum
Bruchus rufimanus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Carpophilus obsoletus
Coccotrypes dactyliperda
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes turcicus
Cylas formicarius
Dermestes ater
Dermestes haemorrhoidalis
Dermestes maculatus
Dermestes peruvianus
Dinoderus bifoveolatus
Ephestia elutella
Ephestia kuehniella
Etiella zinckenella
Gnatocerus cornutus
Hypothenemus hampei
Lasioderma serricorne
Lophocateres pusillus
Mezium americanum
Monanus concinnulus
Necrobia rufipes
Nemapogon granella
Oryzaephilus mercator
Oryzaephilus surinamensis
Pagiocerus frontalis
Plodia interpunctella
Prostephanus truncatus
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Trigonogenius globosus
Trogoderma inclusum
Zabrotes subfasciatus

Philippines (45)
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Araecerus fasciculatus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus humeralis
Carpophilus mutilatus
Carpophilus obsoletus
Cathartus quadricollis
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusillus
Cylas formicarius
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus minutus
Dinoderus ocellaris
Ephestia elutella
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Latheticus oryzae
Lyctus africanus
Monanus concinnulus
Nausibius clavicornis
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Prostephanus truncatus
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Trogoderma granarium

Poland (124)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pantherinus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carcinops pumilio
Carpophilus hemipterus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus minutus
Dinoderus ocellaris
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium aequinoctiale
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Liposcelis corrodens
Lophocateres pusillus
Lyctus africanus
Lyctus linearis
Mimosestes mimosae
Nausibius clavicornis
Necrobia rufipes
Nemapogon granella
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Oryzaephilus mercator
Oryzaephilus surinamensis
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thes bergrothi
Tinea pallescentella
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Tribolium madens
Trigonogenius globosus
Trogoderma angustum
Trogoderma glabrum
Trogoderma granarium
Trogoderma inclusum
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

Portugal (94)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus verbasci
Attagenus bifasciatus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Bruchidius atrolineatus
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Carpophilus obsoletus
Cartodere constricta
Cartodere nodifer
Coccotrypes dactyliperda
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes turcicus
Cryptophagus cellaris
Cryptophagus saginatus
Cryptophagus scutellatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Endrosis sarcitrella
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium psylloides
Gnatocerus cornutus
Lachesilla pedicularia
Lasioderma serricorne
Lathridius minutus
Litargus balteatus
Lophocateres pusillus
Lyctus brunneus
Lyctus linearis
Mezium affine
Migneauxia lederi
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niditinea fuscella
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Orphilus niger
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Pyralis farinalis
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Sphaericus gibboides
Stegobium paniceum
Tachyporus hypnorum
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Tribolium madens
Trogoderma granarium
Trogoderma versicolor
Typhaea stercorea
Xestobium rufovillosum

Puerto Rico (31)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Bruchus pisorum
Bruchus rufimanus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus humeralis
Cathartus quadricollis
Coccotrypes dactyliperda
Cryptolestes pusillus
Cylas formicarius
Dinoderus minutus
Epuraea luteolus
Etiella zinckenella
Gnatocerus cornutus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Mimosestes mimosae
Monanus concinnulus
Nausibius clavicornis
Omonadus floralis
Orphinus fulvipes
Rhyzopertha dominica
Sitophilus oryzae
Tenebrio molitor
Tenebrio obscurus
Tribolium castaneum
Zabrotes subfasciatus

Qatar (9)
Anthrenus coloratus
Anthrenus flavipes
Attagenus fasciatus
Dermestes frischii
Dermestes maculatus
Omonadus formicarius
Phradonoma nobile
Tribolium castaneum
Trogoderma granarium

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Respublika Krym (1)
Bruchus lentis

Reunion Is. (7)
Bostrychoplites cornutus
Bruchus ervi
Cylas formicarius
Gibbium aequinoctiale
Nausibius clavicornis
Phthorimaea operculella
Trogoderma granarium

Rodrigues Is. (3)
Caryedon serratus
Cylas formicarius
Sitophilus oryzae

Romania (78)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus lobatus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Bruchus brachialis
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Carcinops pumilio
Cartodere constricta
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Dienerella filiformis
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Korynetes caeruleus
Lachesilla pedicularia
Lathridius minutus
Lyctus linearis
Necrobia rufipes
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Oryzaephilus surinamensis
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus villiger
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Trogoderma glabrum
Trogoderma versicolor
Uloma culinaris
Xestobium rufovillosum

Russia (129)
Acanthoscelides obtectus
Aglossa pinguinalis
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus coloratus
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Atomaria lewisi
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pantherinus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes undulatus
Dermestes vorax
Dienerella filiformis
Dienerella filum
Endrosis sarcitrella
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium aequinoctiale
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lyctus linearis
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon granella
Niptus hololeucus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Plodia interpunctella
Ptinus fur
Ptinus japonicus
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thes bergrothi
Thorictodes heydeni
Thylodrias contractus
Tineola bisselliella
Tribolium confusum
Tribolium destructor
Tribolium madens
Trichophaga tapetzella
Trigonogenius globosus
Trogoderma angustum
Trogoderma glabrum
Trogoderma granarium
Trogoderma inclusum
Trogoderma variabile
Trogoderma versicolor
Typhaea haagi
Typhaea stercorea
Uloma culinaris
Xestobium rufovillosum

Rwanda (20)
Acanthoscelides obtectus
Ahasverus advena
Araecerus fasciculatus
Bostrychoplites cornutus
Cryptolestes pusilloides
Cryptolestes pusillus
Dinoderus minutus
Etiella zinckenella
Gibbium aequinoctiale
Lasioderma serricorne
Lyctus africanus
Lyctus brunneus
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Prostephanus truncatus
Ptinus raptor
Rhyzopertha dominica
Sitophilus oryzae
Tribolium castaneum

S. Mariana Is. (1)
Thorictodes heydeni

Sabah (2)
Lophocateres pusillus
Murmidius ovalis

Sakhalin Is. (1)
Dermestes vorax

Samoa (22)
Ahasverus advena
Alphitobius diaperinus
Araecerus fasciculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Corcyra cephalonica
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Etiella zinckenella
Hypothenemus hampei
Lasioderma serricorne
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Tenebroides mauritanicus
Tribolium castaneum

Sao Tome Is. (2)
Gibbium aequinoctiale
Hypothenemus hampei

Sarawak (17)
Alphitobius diaperinus
Alphitobius laevigatus
Araecerus fasciculatus
Cadra cautella
Carpophilus dimidiatus
Carpophilus humeralis
Carpophilus mutilatus
Carpophilus obsoletus
Corticaria pubescens
Cryptolestes turcicus
Dinoderus bifoveolatus
Lophocateres pusillus
Monanus concinnulus
Murmidius ovalis
Orphinus fulvipes
Plochionus pallens
Sitophilus zeamais

Sardina (8)
Bruchidius lividimanus
Cadra cautella
Cadra figulilella
Creophilus maxillosus
Ephestia elutella
Ephestia kuehniella
Plodia interpunctella
Tachyporus hypnorum

Saudi Arabia (53)
Acanthoscelides obtectus
Alphitobius diaperinus
Alphitobius laevigatus
Anthrenus coloratus
Anthrenus flavipes
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Attagenus smirnovi
Bostrychoplites cornutus
Bruchidius sahlbergi
Cadra cautella
Callosobruchus analis
Callosobruchus maculatus
Callosobruchus phaseoli
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon pallidus
Coccotrypes dactyliperda
Corticaria elongata
Cryptolestes ferrugineus
Cryptophagus cellaris
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dinoderus bifoveolatus
Ephestia elutella
Epuraea luteolus
Gibbium psylloides
Gonocephalum prolixum
Lasioderma serricorne
Latheticus oryzae
Migneauxia lederi
Necrobia rufipes
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Phradonoma tricolor
Plodia interpunctella
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Thaneroclerus buqueti
Tribolium castaneum
Trogoderma granarium
Trogoderma variabile
Trogoderma versicolor

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Scotland (11)
Achroia grisella
Anthrenus scrophulariae
Anthrenus verbasci
Attagenus pellio
Attagenus unicolor
Creophilus maxillosus
Ephestia kuehniella
Pseudeurostus hilleri
Reesa vespulae
Silvanus unidentatus
Tachyporus hypnorum

Senegal (26)
Attagenus pellio
Bruchidius atrolineatus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Caryedon pallidus
Caryedon serratus
Coccotrypes dactyliperda
Cryptolestes turcicus
Cylas formicarius
Dermestes ater
Etiella zinckenella
Gibbium aequinoctiale
Gnatocerus maxillosus
Gonocephalum prolixum
Necrobia rufipes
Oryzaephilus mercator
Phthorimaea operculella
Rhyzopertha dominica
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum
Tenebrio guineensis
Thorictodes heydeni
Tribolium castaneum
Trogoderma granarium

Serbia and Montenegro (54)
Anthrenus coloratus
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus bifasciatus
Attagenus pellio
Attagenus unicolor
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra cautella
Callosobruchus chinensis
Carcinops pumilio
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus dentatus
Cryptophagus saginatus
Cryptophagus scanicus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella filum
Epuraea luteolus
Gibbium psylloides
Glischrochilus quadrisignatus
Holoparamecus caularum
Lyctus linearis
Mezium affine
Monotoma picipes
Necrobia violacea
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Ptinus fur
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Tachyporus hypnorum
Tenebroides mauritanicus
Tribolium castaneum
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Uloma culinaris
Xestobium rufovillosum

Seychelles (12)
Carpophilus humeralis
Caryedon serratus
Corcyra cephalonica
Cylas formicarius
Dermestes ater
Etiella zinckenella
Hypothenemus eruditus
Orphinus fulvipes
Phthorimaea operculella
Sitophilus oryzae
Sitophilus zeamais
Tribolium castaneum

Shetland Is. (2)
Cartodere constricta
Creophilus maxillosus

Siberia (57)
Acanthoscelides obtectus
Ahasverus advena
Anthrenus flavipes
Anthrenus nipponensis
Anthrenus verbasci
Atomaria lewisi
Attagenus fasciatus
Attagenus pellio
Blaps lethifera
Bruchus atomarius
Bruchus ervi
Bruchus lentis
Bruchus rufimanus
Cadra cautella
Cartodere constricta
Cephimallota colonella
Corticaria elongata
Corticaria pubescens
Cortinicara gibbosa
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus setulosus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes tessellatocollis
Dermestes vorax
Enicmus histrio
Lasioderma serricorne
Lathridius minutus
Lyctus linearis
Monotoma picipes
Nacerdes melanura
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omosita colon
Ptinus fur
Ptinus japonicus
Ptinus latro
Ptinus raptor
Ptinus tectus
Ptinus villiger
Silvanus bidentatus
Silvanus unidentatus
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Trogoderma glabrum
Trogoderma versicolor
Uloma culinaris
Xestobium rufovillosum

Sicily (14)
Attagenus bifasciatus
Bruchidius lividimanus
Bruchus ervi
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Carpophilus dimidiatus
Creophilus maxillosus
Ephestia elutella
Ephestia kuehniella

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Etiella zinckenella
Plodia interpunctella
Tachyporus hypnorum

Sierra Leone (29)
Araecerus fasciculatus
Bostrychoplites cornutus
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus mutilatus
Carpophilus obsoletus
Coccotrypes dactyliperda
Corcyra cephalonica
Corticaria serrata
Cryptolestes ferrugineus
Cryptolestes pusillus
Dinoderus bifoveolatus
Etiella zinckenella
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Lophocateres pusillus
Orphinus fulvipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Plochionus pallens
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Tenebroides mauritanicus
Tribolium castaneum
Trogoderma granarium
Typhaea stercorea

Singapore (25)
Ahasverus advena
Alphitobius diaperinus
Araecerus fasciculatus
Cadra cautella
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus obsoletus
Coccotrypes dactyliperda
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Cylas formicarius
Lasioderma serricorne
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Tribolium castaneum
Tribolium confusum
Trogoderma granarium
Typhaea stercorea

Slovakia (95)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus pantherinus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Dinoderus minutus
Enicmus histrio
Ephestia elutella
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lyctus brunneus
Lyctus linearis
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Orphilus niger
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thes bergrothi
Tribolium destructor
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum

Slovenia (52)
Ahasverus advena
Alphitobius diaperinus
Anobium punctatum
Atomaria lewisi
Attagenus bifasciatus
Attagenus pellio
Attagenus unicolor
Blaps mortisaga
Bruchus brachialis
Bruchus rufimanus
Bruchus rufipes
Callosobruchus chinensis
Cartodere nodifer
Creophilus maxillosus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes lardarius

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Dermestes maculatus
Dermestes murinus
Dienerella arga
Epuraea luteolus
Gibbium psylloides
Glischrochilus quadrisignatus
Mezium affine
Monotoma picipes
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omosita colon
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Sitophilus granarius
Stelidota geminata
Tachyporus hypnorum
Tenebroides mauritanicus
Uloma culinaris
Xestobium rufovillosum

Society Is. (1)
Cylas formicarius

Solomon Is. (15)
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Carpophilus dimidiatus
Carpophilus obsoletus
Coccotrypes dactyliperda
Corcyra cephalonica
Cylas formicarius
Dermestes ater
Etiella zinckenella
Necrobia rufipes
Oryzaephilus mercator
Sitophilus oryzae
Tenebroides mauritanicus
Tribolium castaneum

Somalia (18)
Bruchus lentis
Cadra cautella
Carpophilus dimidiatus
Corcyra cephalonica
Cryptolestes ferrugineus
Cylas formicarius
Etiella zinckenella
Gibbium aequinoctiale
Lasioderma serricorne
Oryzaephilus mercator
Oryzaephilus surinamensis
Plodia interpunctella
Rhyzopertha dominica
Sitophilus oryzae
Sitotroga cerealella
Tenebroides mauritanicus
Tribolium castaneum
Trogoderma granarium

South Africa (66)
Achroia grisella
Ahasverus advena
Alphitobius diaperinus
Anthrenus verbasci
Atomaria lewisi
Attagenus fasciatus
Bruchidius sahlbergi
Cadra cautella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus mutilatus
Caryedon serratus
Coccotrypes dactyliperda
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophilus integer
Cylas formicarius
Dermestes carnivorus
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dinoderus minutus
Ephestia kuehniella
Etiella zinckenella
Gnatocerus cornutus
Gnatocerus maxillosus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Latheticus oryzae
Litargus balteatus
Lyctus brunneus
Mezium americanum
Nacerdes melanura
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Prostephanus truncatus
Ptinus fur
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebrio molitor
Tenebroides mauritanicus
Tineola bisselliella
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trigonogenius globosus
Trogoderma granarium
Trogoderma inclusum
Trogoderma variabile
Typhaea stercorea
Zabrotes subfasciatus

Spain (139)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus coloratus
Anthrenus flavipes
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pantherinus
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bostrychoplites cornutus
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Cartodere constricta
Cartodere nodifer
Caryedon pallidus
Coccotrypes dactyliperda
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusilloides

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophilus integer
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Gnatocerus maxillosus
Gonocephalum prolixum
Hadrobregmus pertinax
Holoparamecus caularum
Hypothenemus eruditus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Lyctus linearis
Melyris oblonga
Mezium affine
Mezium americanum
Migneauxia lederi
Monotoma picipes
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon granella
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Plochionus pallens
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus tectus
Pyralis farinalis
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebrio obscurus
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trigonogenius globosus
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Uloma culinaris
Zabrotes subfasciatus

Sri Lanka (53)
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Cadra cautella
Cadra figulilella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon pallidus
Caryedon serratus
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dinoderus minutus
Dinoderus ocellaris
Ephestia elutella
Gibbium aequinoctiale
Gibbium psylloides
Hypothenemus hampei
Lasioderma serricorne
Latheticus oryzae
Monanus concinnulus
Murmidius ovalis
Nausibius clavicornis
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phthorimaea operculella
Plochionus pallens
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trichophaga tapetzella
Trogoderma granarium

St. Bartholomew (1)
Zabrotes subfasciatus

St. Croix (3)
Caryedon serratus
Omonadus floralis
Orphinus fulvipes

St. Eustatius (1)
Cylas formicarius

St. Helena (3)
Anthrenus fuscus
Cryptolestes ferrugineus
Dermestes marmoratus

St. Kitts-Nevis (2)
Cylas formicarius
Orphinus fulvipes

St. Lucia (8)
Ahasverus advena
Carpophilus hemipterus
Corcyra cephalonica
Dermestes lardarius
Dermestes maculatus
Oryzaephilus mercator
Oryzaephilus surinamensis
Tribolium castaneum

St. Vincent (5)
Epuraea luteolus
Gibbium aequinoctiale
Monanus concinnulus
Monotoma picipes
Nausibius clavicornis

Sudan (34)
Anthrenus coloratus
Bruchidius atrolineatus
Cadra cautella
Callosobruchus analis
Carpophilus dimidiatus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Carpophilus mutilatus
Carpophilus obsoletus
Caryedon pallidus
Caryedon serratus
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes ferrugineus
Cylas formicarius
Ephestia elutella
Etiella zinckenella
Gonocephalum prolixum
Hypothenemus hampei
Latheticus oryzae
Lathridius minutus
Lyctus africanus
Necrobia rufipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Ptinus latro
Rhyzopertha dominica
Sitophilus oryzae
Sitotroga cerealella
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trogoderma granarium
Typhaea stercorea

Sumatra (4)
Dinoderus bifoveolatus
Dinoderus minutus
Hypothenemus hampei
Plochionus pallens

Sunda Is. (2)
Dinoderus brevis
Dinoderus ocellaris

Suriname (10)
Ahasverus advena
Carpophilus mutilatus
Caryedon serratus
Dermestes ater
Dermestes maculatus
Hypothenemus hampei
Lophocateres pusillus
Oryzaephilus surinamensis
Sitophilus oryzae
Tribolium castaneum

Svalbard (1)
Atomaria lewisi

Swaziland (37)
Acanthoscelides obtectus
Bostrychoplites cornutus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Corcyra cephalonica
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dermestes ater
Dermestes maculatus
Dinoderus minutus
Ephestia kuehniella
Etiella zinckenella
Gnatocerus cornutus
Gnatocerus maxillosus
Lasioderma serricorne
Lyctus brunneus
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Plodia interpunctella
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum

Sweden (111)
Aglossa pinguinalis
Ahasverus advena
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus fasciatus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bostrychoplites cornutus
Bruchus atomarius
Bruchus rufimanus
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Cartodere constricta
Cartodere nodifer
Caryedon serratus
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus subfumatus
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dienerella filiformis
Dienerella filum
Dinoderus brevis
Dinoderus japonicus
Dinoderus minutus
Dinoderus ocellaris
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium psylloides
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lyctus brunneus
Lyctus linearis
Mezium affine
Migneauxia lederi
Monotoma picipes
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Niptus hololeucus
Nitidula bipunctata
Omonadus floralis
Omonadus formicarius
Omosita colon
Oryzaephilus surinamensis
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Reesa vespulae
Rhyzopertha dominica

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Silvanus bidentatus
Silvanus unidentatus
Sitophilus granarius
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Thes bergrothi
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trigonogenius globosus
Trogoderma angustum
Trogoderma granarium
Trogoderma variabile
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum

Switzerland (111)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius laevigatus
Anobium punctatum
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus pantherinus
Attagenus pellio
Attagenus smirnovi
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bostrychoplites cornutus
Bruchus atomarius
Bruchus brachialis
Bruchus ervi
Bruchus lentis
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus hemipterus
Cartodere constricta
Cartodere nodifer
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Dienerella filiformis
Dienerella filum
Dinoderus bifoveolatus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Holoparamecus caularum
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Liposcelis corrodens
Lyctus africanus
Lyctus brunneus
Lyctus linearis
Migneauxia lederi
Monotoma picipes
Nausibius clavicornis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon cloacella
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Orphilus niger
Oryzaephilus surinamensis
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Reesa vespulae
Rhyzopertha dominica
Silvanus bidentatus
Silvanus unidentatus
Sitophilus oryzae
Sitotroga cerealella
Stegobium paniceum
Stelidota geminata
Stephostethus lardarius
Tachyporus hypnorum
Thes bergrothi
Tribolium destructor
Trichophaga tapetzella
Trigonogenius globosus
Trogoderma glabrum
Trogoderma granarium
Trogoderma versicolor
Uloma culinaris
Xestobium rufovillosum
Zabrotes subfasciatus

Syria (61)
Acanthoscelides obtectus
Anthrenus coloratus
Attagenus bifasciatus
Attagenus fasciatus
Attagenus pellio
Bruchidius lividimanus
Bruchus atomarius
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus analis
Carpophilus dimidiatus
Carpophilus humeralis
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon pallidus
Creophilus maxillosus
Cryptophagus cellaris
Cryptophilus integer
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dinoderus minutus
Ephestia elutella
Ephestia kuehniella
Gibbium aequinoctiale
Gibbium psylloides
Gonocephalum prolixum
Holoparamecus caularum
Lasioderma serricorne
Lyctus africanus
Lyctus linearis
Melyris oblonga
Mezium affine
Nacerdes melanura
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Phradonoma nobile
Phthorimaea operculella
Plodia interpunctella
Ptinus fur
Ptinus latro

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Ptinus tectus
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Tachyporus hypnorum
Tribolium castaneum
Trogoderma granarium
Trogoderma versicolor

Tahiti (7)
Cadra cautella
Caryedon serratus
Cryptolestes pusillus
Dinoderus minutus
Hypothenemus hampei
Oryzaephilus mercator
Tribolium castaneum

Taiwan (69)
Ahasverus advena
Alphitobius diaperinus
Araecerus fasciculatus
Atomaria lewisi
Attagenus unicolor
Blaps japonensis
Bruchus lentis
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus hemipterus
Carpophilus marginellus
Carpophilus mutilatus
Carpophilus obsoletus
Corcyra cephalonica
Cortinicara gibbosa
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophilus integer
Cylas formicarius
Dermestes carnivorus
Dermestes peruvianus
Dinoderus minutus
Ephestia elutella
Ephestia kuehniella
Epuraea luteolus
Etiella zinckenella
Gibbium psylloides
Gnatocerus cornutus
Gnatocerus maxillosus
Holoparamecus signatus
Korynetes caeruleus
Lachesilla pedicularia
Lasioderma serricorne
Latheticus oryzae
Leichenum canaliculatum
Lophocateres pusillus
Lyctus brunneus
Monanus concinnulus
Monotoma picipes
Murmidius ovalis
Necrobia ruficollis
Necrobia rufipes
Necrobia violacea
Nemapogon granella
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Plochionus pallens
Plodia interpunctella
Ptinus fur
Pyralis farinalis
Rhyzopertha dominica
Silvanus bidentatus
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebrio molitor
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Trichophaga tapetzella
Trogoderma granarium
Typhaea stercorea

Tajikistan (32)
Anthrenus coloratus
Anthrenus flavipes
Anthrenus pimpinellae
Anthrenus scrophulariae
Atomaria lewisi
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Bruchus lentis
Bruchus pisorum
Callosobruchus maculatus
Creophilus maxillosus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella arga
Monotoma picipes
Necrobia rufipes
Niptus hololeucus
Orphilus niger
Phradonoma nobile
Ptinus fur
Ptinus latro
Tribolium castaneum
Trogoderma granarium
Trogoderma variabile
Trogoderma versicolor

Tanzania (41)
Acanthoscelides obtectus
Alphitobius laevigatus
Bostrychoplites cornutus
Bruchidius atrolineatus
Bruchus lentis
Cadra calidella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus humeralis
Coccotrypes dactyliperda
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dermestes maculatus
Dinoderus bifoveolatus
Dinoderus brevis
Dinoderus minutus
Etiella zinckenella
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Lophocateres pusillus
Necrobia rufipes
Orphinus fulvipes
Oryzaephilus mercator
Phradonoma nobile
Plodia interpunctella
Prostephanus truncatus
Ptinus japonicus
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Trogoderma granarium
Zabrotes subfasciatus

Tasmania (13)
Aglossa pinguinalis
Anthrenus scrophulariae
Bruchus rufimanus
Dermestes lardarius
Ephestia kuehniella
Nacerdes melanura
Niptus hololeucus
Ptinus tectus
Sitophilus oryzae
Tineola bisselliella
Trichophaga tapetzella
Trigonogenius globosus
Trogoderma inclusum

Thailand (74)
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Anthrenus flavipes
Anthrenus pimpinellae
Araecerus fasciculatus
Attagenus fasciatus

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Bruchidius lividimanus
Bruchus pisorum
Cadra cautella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carcinops pumilio
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus mutilatus
Carpophilus obsoletus
Caryedon serratus
Cathartus quadricollis
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Cryptophilus integer
Cylas formicarius
Cynaeus angustus
Dermestes ater
Dermestes carnivorus
Dermestes maculatus
Dermestes peruvianus
Dienerella filiformis
Dinoderus brevis
Dinoderus minutus
Dinoderus ocellaris
Ephestia elutella
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Latheticus oryzae
Lophocateres pusillus
Lyctus brunneus
Migneauxia lederi
Monanus concinnulus
Necrobia ruficollis
Necrobia rufipes
Niptus hololeucus
Orphinus fulvipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Prostephanus truncatus
Rhyzopertha dominica
Silvanus bidentatus
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Stegobium paniceum
Tenebrio molitor
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tineola bisselliella
Tribolium castaneum
Tribolium confusum
Trogoderma granarium
Trogoderma inclusum
Typhaea stercorea
Zabrotes subfasciatus

Tibet (2)
Dermestes tessellatocollis
Sitophilus zeamais

Togo (11)
Bruchidius atrolineatus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Cathartus quadricollis
Etiella zinckenella
Hypothenemus eruditus
Hypothenemus hampei
Oryzaephilus surinamensis
Prostephanus truncatus
Tribolium castaneum

Tonga (14)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Araecerus fasciculatus
Cadra cautella
Carpophilus dimidiatus
Cylas formicarius
Dinoderus minutus
Gnatocerus cornutus
Necrobia rufipes
Sitophilus oryzae
Sitophilus zeamais
Tenebroides mauritanicus
Tribolium castaneum

Trinidad and Tobago (21)
Ahasverus advena
Alphitobius laevigatus
Cadra cautella
Cadra figulilella
Carpophilus dimidiatus
Corcyra cephalonica
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Hypothenemus eruditus
Lasioderma serricorne
Lophocateres pusillus
Mimosestes mimosae
Nausibius clavicornis
Orphinus fulvipes
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Sitophilus oryzae
Tenebroides mauritanicus
Tribolium castaneum

Tristan da Cunha (1)
Sitophilus oryzae

Tunisia (88)
Acanthoscelides obtectus
Alphitobius diaperinus
Alphitobius laevigatus
Anobium punctatum
Anthrenus coloratus
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Bruchidius atrolineatus
Bruchidius lividimanus
Bruchus ervi
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Carcinops pumilio
Carpophilus hemipterus
Carpophilus obsoletus
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Creophilus maxillosus
Cryptolestes ferrugineus
Cryptolestes pusillus
Cryptolestes spartii
Cryptolestes turcicus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophilus integer
Dermestes ater
Dermestes carnivorus
Dermestes frischii
Dermestes haemorrhoidalis
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dermestes peruvianus
Dienerella arga
Ephestia elutella
Ephestia kuehniella
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Gonocephalum prolixum
Holoparamecus caularum
Idaea inquinata
Lasioderma serricorne
Latheticus oryzae
Lyctus brunneus
Lyctus linearis
Melyris oblonga

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Mezium affine
Migneauxia lederi
Necrobia ruficollis
Necrobia rufipes
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Oryzaephilus surinamensis
Palorus subdepressus
Phradonoma nobile
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus tectus
Pyralis farinalis
Reesa vespulae
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Tachyporus hypnorum
Tenebrio molitor
Tenebroides mauritanicus
Tribolium castaneum
Tribolium confusum
Trogoderma glabrum
Trogoderma granarium
Trogoderma inclusum
Trogoderma versicolor

Tungaru (2)
Corcyra cephalonica
Palorus subdepressus

Turkmenistan (44)
Aglossa pinguinalis
Alphitobius diaperinus
Anthrenus coloratus
Attagenus bifasciatus
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Blaps lethifera
Blaps mortisaga
Cadra cautella
Carpophilus hemipterus
Cephimallota colonella
Creophilus maxillosus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Ephestia elutella
Gibbium aequinoctiale
Latheticus oryzae
Leichenum canaliculatum
Lyctus linearis
Monotoma picipes
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Phradonoma nobile
Plodia interpunctella
Ptinus fur
Ptinus latro
Ptinus villiger
Stegobium paniceum
Tachyporus hypnorum
Tribolium castaneum
Tribolium destructor
Trogoderma variabile
Trogoderma versicolor
Xestobium rufovillosum

Uganda (62)
Acanthoscelides obtectus
Ahasverus advena
Alphitobius diaperinus
Alphitobius laevigatus
Araecerus fasciculatus
Attagenus fasciatus
Bostrychoplites cornutus
Bruchidius atrolineatus
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carpophilus dimidiatus
Carpophilus hemipterus
Carpophilus humeralis
Carpophilus obsoletus
Caryedon serratus
Cathartus quadricollis
Coccotrypes dactyliperda
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Cylas formicarius
Dermestes ater
Dermestes maculatus
Dinoderus minutus
Epuraea luteolus
Etiella zinckenella
Gibbium aequinoctiale
Gibbium psylloides
Gnatocerus cornutus
Gnatocerus maxillosus
Hypothenemus eruditus
Hypothenemus hampei
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Litargus balteatus
Lophocateres pusillus
Lyctus africanus
Lyctus brunneus
Nausibius clavicornis
Necrobia rufipes
Omonadus floralis
Oryzaephilus mercator
Oryzaephilus surinamensis
Palorus subdepressus
Prostephanus truncatus
Ptinus japonicus
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Tenebroides mauritanicus
Thaneroclerus buqueti
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Typhaea stercorea
Zabrotes subfasciatus

Ukraine (72)
Acanthoscelides obtectus
Alphitobius laevigatus
Anthrenus fuscus
Anthrenus pimpinellae
Anthrenus scrophulariae
Anthrenus verbasci
Attagenus pellio
Attagenus unicolor
Blaps lethifera
Blaps mortisaga
Bruchus brachialis
Bruchus lentis
Bruchus pisorum
Bruchus rufimanus
Bruchus rufipes
Carcinops pumilio
Cartodere constricta
Corticaria elongata
Corticaria pubescens
Corticaria serrata
Cortinicara gibbosa
Creophilus maxillosus
Cryptolestes spartii
Cryptophagus acutangulus
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus saginatus
Cryptophagus scanicus
Cryptophagus scutellatus
Cryptophagus setulosus
Cryptophagus subfumatus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes undulatus
Dienerella arga
Dienerella filiformis
Dienerella filum

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Enicmus histrio
Epuraea luteolus
Gibbium psylloides
Glischrochilus quadrisignatus
Hadrobregmus pertinax
Lasioderma serricorne
Latheticus oryzae
Lathridius minutus
Lyctus linearis
Monotoma picipes
Niptus hololeucus
Omonadus floralis
Omonadus formicarius
Omosita colon
Orphilus niger
Ptinus fur
Ptinus latro
Ptinus pusillus
Ptinus raptor
Ptinus tectus
Ptinus villiger
Sitotroga cerealella
Stegobium paniceum
Stephostethus lardarius
Tachyporus hypnorum
Tenebroides mauritanicus
Tribolium destructor
Trigonogenius globosus
Trogoderma versicolor
Typhaea haagi
Uloma culinaris
Xestobium rufovillosum

Uruguay (14)
Bruchus pisorum
Bruchus rufimanus
Coccotrypes dactyliperda
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cryptolestes turcicus
Dermestes maculatus
Etiella zinckenella
Necrobia ruficollis
Oryzaephilus surinamensis
Sitophilus oryzae
Tribolium castaneum
Trogoderma granarium

Uzbekistan (35)
Atomaria lewisi
Attagenus fasciatus
Attagenus lobatus
Attagenus pellio
Bruchus lentis
Bruchus pisorum
Carcinops pumilio
Cryptophagus cellaris
Cryptophagus dentatus
Cryptophagus pilosus
Cryptophagus subfumatus
Cryptophilus integer
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dermestes murinus
Dienerella filiformis
Ephestia elutella
Gibbium aequinoctiale
Lyctus brunneus
Lyctus linearis
Monotoma picipes
Niptus hololeucus
Omonadus formicarius
Orphilus niger
Phradonoma nobile
Ptinus latro
Rhyzopertha dominica
Sitophilus oryzae
Tachyporus hypnorum
Tribolium confusum
Trogoderma granarium
Trogoderma variabile
Trogoderma versicolor

Vanuatu (4)
Cylas formicarius
Plochionus pallens
Rhyzopertha dominica
Tribolium castaneum

Venezuela (35)
Acanthoscelides obtectus
Attagenus fasciatus
Cadra cautella
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus dimidiatus
Carpophilus mutilatus
Caryedon serratus
Coccotrypes dactyliperda
Corcyra cephalonica
Cryptolestes pusillus
Cylas formicarius
Dermestes maculatus
Etiella zinckenella
Gibbium aequinoctiale
Gnatocerus maxillosus
Lasioderma serricorne
Lophocateres pusillus
Lyctus brunneus
Mimosestes mimosae
Monanus concinnulus
Oryzaephilus mercator
Oryzaephilus surinamensis
Pagiocerus frontalis
Palorus subdepressus
Rhyzopertha dominica
Sitophilus oryzae
Sitophilus zeamais
Stegobium paniceum
Tribolium castaneum
Trogoderma granarium
Trogoderma ornatum
Trogoderma sternale
Typhaea stercorea
Zabrotes subfasciatus

Vietnam (29)
Ahasverus advena
Cadra cautella
Carpophilus dimidiatus
Carpophilus hemipterus
Corcyra cephalonica
Cryptolestes ferrugineus
Cryptolestes pusillus
Cylas formicarius
Dermestes peruvianus
Dinoderus minutus
Dinoderus ocellaris
Ephestia elutella
Hypothenemus eruditus
Monanus concinnulus
Necrobia rufipes
Oryzaephilus surinamensis
Phthorimaea operculella
Plodia interpunctella
Pyralis farinalis
Rhyzopertha dominica
Sitophilus oryzae
Sitotroga cerealella
Tenebroides mauritanicus
Tinea pellionella
Tineola bisselliella
Tribolium castaneum
Tribolium confusum
Trichophaga tapetzella
Trogoderma variabile

Virgin Is. (2)
Cylas formicarius
Monanus concinnulus

Wales (4)
Achroia grisella
Anthrenus verbasci
Attagenus pellio
Dermestes lardarius

Wallis Is. (1)
Cylas formicarius

West Indies (14)
Callosobruchus analis
Carpophilus hemipterus
Carpophilus mutilatus
Corticaria pubescens
Cryptolestes ferrugineus
Dermestes ater
Etiella zinckenella
Gibbium psylloides
Lophocateres pusillus
Phthorimaea operculella

(*continued on next page*)

TABLE 2.5 Insect species reported in countries other than those in Table 2.4 (*continued from previous page*)

Plochionus pallens
Sitophilus oryzae
Sitophilus zeamais
Trogoderma glabrum

Yemen (46)
Acanthoscelides obtectus
Aglossa pinguinalis
Alphitobius diaperinus
Alphitobius laevigatus
Anthrenus coloratus
Attagenus fasciatus
Attagenus pellio
Bostrychoplites cornutus
Bruchidius atrolineatus
Cadra calidella
Cadra cautella
Cadra figulilella
Callosobruchus chinensis
Callosobruchus maculatus
Callosobruchus phaseoli
Carpophilus obsoletus
Cartodere constricta
Cryptolestes ferrugineus
Cryptolestes pusillus
Dermestes ater
Dermestes frischii
Dermestes lardarius
Dermestes maculatus
Dinoderus bifoveolatus
Enicmus histrio
Ephestia elutella
Ephestia kuehniella
Gibbium aequinoctiale
Lasioderma serricorne
Latheticus oryzae
Leichenum canaliculatum
Migneauxia lederi
Omonadus formicarius
Oryzaephilus surinamensis
Palorus subdepressus
Phradonoma tricolor
Plodia interpunctella
Pseudeurostus hilleri
Rhyzopertha dominica
Sitophilus granarius
Sitophilus oryzae
Sitotroga cerealella
Tenebroides mauritanicus
Thorictodes heydeni
Tribolium castaneum
Tribolium confusum
Tribolium destructor
Trogoderma granarium
Zabrotes subfasciatus

Yugoslavia (22)
Alphitophagus bifasciatus
Attagenus pantherinus
Bruchidius lividimanus
Bruchus rufimanus
Bruchus rufipes
Cadra calidella
Cadra cautella
Cadra figulilella
Carpophilus mutilatus
Ephestia elutella
Ephestia kuehniella
Lachesilla pedicularia
Liposcelis corrodens
Mycetophagus quadriguttatus
Oryzaephilus mercator
Oryzaephilus surinamensis
Plodia interpunctella
Rhyzopertha dominica
Sitophilus oryzae
Tribolium castaneum
Tribolium madens
Trichophaga tapetzella

Zambia (19)
Acanthoscelides obtectus
Bostrychoplites cornutus
Bruchidius atrolineatus
Cadra cautella
Callosobruchus analis
Callosobruchus chinensis
Callosobruchus maculatus
Carpophilus mutilatus
Dermestes ater
Dermestes maculatus
Etiella zinckenella
Oryzaephilus mercator
Oryzaephilus surinamensis
Prostephanus truncatus
Sitophilus oryzae
Sitophilus zeamais
Sitotroga cerealella
Tribolium castaneum
Trogoderma granarium

Zimbabwe (20)
Callosobruchus analis
Carpophilus dimidiatus
Cryptolestes ferrugineus
Cryptolestes pusilloides
Cryptolestes pusillus
Cylas formicarius
Dienerella arga
Ephestia elutella
Etiella zinckenella
Lasioderma serricorne
Nausibius clavicornis
Oryzaephilus mercator
Oryzaephilus surinamensis
Phradonoma nobile
Phthorimaea operculella
Sitophilus oryzae
Sitotroga cerealella
Tineola bisselliella
Tribolium castaneum
Trogoderma granarium

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CHAPTER 3

CLASSIFICATION AND CROSS INFESTATION OF COMMODITIES

The commodities reported to be infested by stored-product insects can be classified in 28 categories. Overall, the percentage of commodities in each category ranged from 0.3% (dried fruit products, dfp) to 15.1% (vegetable material, v) (Table 3.1). The commodities included in each category are listed in Table 3.2 and Table 3.3 gives the scientific names of plant species included in Table 3.2. A total of 1010 commodities have been reported to be infested by the 235 insect species pictured in this Atlas. Twelve insect species were associated with more than 75% or 21 of the commodity categories suggesting broad host ranges (Table 3.4). These insect species infest 79 to 232 commodities and are some of the most common and economically important.

Because of overlap, the categories listed in Tables 3.1 and 3.2 can be combined in different ways to identify a more general category of commodities most frequently infested by an insect species. For example, grain, nut, oilseed, pulse and seed are all seeds. Processed commodities of several plant parts might be combined to show that processed commodities are more suitable for a species than unprocessed commodities. The large number of records for North American *Trogoderma* spp. in the seed category is a result of extensive surveys designed to detect the khapra beetle (Strong and Okumura 1958, Strong et al. 1959, Okumura and Strong 1965). For some insect species, too few records are available to have a representative sample.

Cross infestation of commodities, the movement of insects from one commodity to another, may be a major problem when using commodity-sampling and pest-interception records to determine which commodities are suitable for insect development, reproduction and population growth. Laboratory studies on the suitability of commodities are reviewed in Chapter 4. Adults of many species are very mobile. Many of the commodity sampling and pest-interception records may be a result of insects finding shelter in commodities that are unsuitable for their development, reproduction and population growth. In addition to adults, *Dermestes* spp. wander as mature larvae and often damage commodities which are unsuitable for larval development (Hinton 1945). *Tenebrio* spp. have been found to wander as mature larvae and have commonly been found in commodities on which they cannot develop (Cotton 1963). Some larvae of *Cryptolestes ferrugugineus* (Smith 1972), nitidulids (Campbell 1989), pyralid moths (Cole and Cox 1981, Hagstrum and Sharp, Richards and Waloff 1946, Tsuji 1996), *Tribolium castaneum* (Hagstrum and Gilbert, Toews et al. 2005) and *Trogoderma granarium* (Burges 1959, Nutting and Gerhardt 1964) leave feeding sites to find a pupation sites and some of these wandering larvae could contaminate commodities that are unsuitable for their development. The number of stored-product insect species with these wandering larvae is likely to be much larger than indicated by this list. Hagstrum and Subramanyam (2010) reported that mature larvae of 361 insect species in 59 families and 5 orders wander in search of a pupation site.

Conversely, although *Sitophilus* spp. are commonly considered a grain pest, Delobel and Grenier (1993) found that *Sitophilus* spp. can develop on a number of non-cereal grain commodities. Therefore, some of the records for *Sitophilus* species on non-cereal grain foods may not be a result of cross infestation but rather the result of insect reproducing on these commodities. The incidence of cross infestation is evident with the bruchids that generally can only develop on seeds of specific legumes. However, Kingslover (1979) reported the non-legume lotus seed as a host for *Callosobruchus chinensis*. Cross infestation levels for bruchids on non-legume commodities may be as high as 35%, although the average is 9.6% (Table 3.5). In some cases, a small amount of legume seed contaminating other commodities may explain the presence of bruchids. Cross infestation for other stored-product insect species may be more likely for infrequently infested commodities than frequently infested commodities.

TABLE 3.1 Overall percentages of the 1010 commodities in each of 28 categories.

Commodity category	Percentage
animal, invertebrate (aninv)	2.1
animal, vertebrate (anv)	6.4
beverage crops (bc)	0.9
bake goods (bg)	1.3
dried fruit (df)	2.3
dried fruit product (dfp)	0.3
fresh fruit or vegetable (ffv)	5.3
grain (g)	2.4
grain product (gp)	6.7
grain spoiled (gs)	1.5
medicine (me)	4.4
nut (n)	2.2
nut product (np)	1.2
other commodities (oc)	8.0
oilseed (os)	1.5
oilseed product (osp)	3.7
pulse (p)	4.6
pulse product (pp)	2.1
root (r)	3.8
residual commodities (res)	1.8
root product (rp)	2.1
other seed (se)	10.3
seasoning (sea)	4.7
spoiled other commodities (sp)	2.7
textile (t)	1.1
vegetable material (v)	15.1
wood (w)	0.9
wood product (wp)	0.6

TABLE 3.2 Commodities in each of 28 categories.

aninv = invertebrate animal (21)	
aninv	beebread
aninv	beehive
aninv	beewax
aninv	cowrie
aninv	crab meat
aninv	cuttle fish, dried
aninv	honeycomb (bee, wasp)
aninv	insect, dried
aninv	lac resin
aninv	mollusc, dried
aninv	mussel, dried
aninv	phane (edible caterpillar)
aninv	seafood, dried
aninv	shrimp paste
aninv	shrimp, dried
aninv	silk
aninv	silk fabric
aninv	silk, soiled
aninv	silkworm cocoon
aninv	sponge
aninv	squid, dried
anv = vertebrate animal (65)	
anv	animal product
anv	animal specimen
anv	animal specimen, bird skin
anv	animal specimen, dried snake
anv	animal specimen, hunting trophy
anv	animal specimen, imperfectly cleaned skeleton
anv	animal specimen, lizard dried
anv	animal specimen, mammal
anv	animal specimen, whale
anv	bacon, smoked
anv	beef bullion cube
anv	blood meal
anv	blood, dried
anv	bone
anv	bone grist
anv	bone meal
anv	bone skeleton
anv	bone, whale
anv	bristle
anv	bristle, brush
anv	butter
anv	buttermilk, dried
anv	casein, dried
anv	cheese
anv	dairy product
anv	egg albumen
anv	egg, dried
anv	feather
anv	feather pillow
anv	feather, down
anv	feathermeal
anv	fish, dried
anv	fish, preserved
anv	fishmeal
anv	fur
anv	hair, unspecified
anv	ham
anv	hide drum head
anv	hide, pelt or skin
anv	hoof
anv	hoof meal
anv	horn
anv	horsehair
anv	junket
anv	lactose pellet
anv	lard
anv	leather
anv	liver meal, dried
anv	meat extract, dried
anv	meat meal
anv	meat product
anv	meat scrap
anv	meat, cured, dried or smoked
anv	meat, processed
anv	milk, dried
anv	mohair
anv	pork sauce
anv	pork, smoked
anv	sausage
anv	shark fin, dried
anv	tallow
anv	tortoise shell
anv	turtle shell
anv	whey, dried
anv	wool
bc = beverage crops (9)	
bc	chocolate
bc	chocolate powder

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

bc	cocoa
bc	cocoa bean
bc	cocoa cake
bc	cocoa powder
bc	coffee
bc	coffee bean
bc	tea leaf
bg = baked goods (13)	
bg	biscuit
bg	biscuit meal
bg	bread
bg	bread stick
bg	bread, rye
bg	cake
bg	cinnamon roll
bg	cookie
bg	cracker
bg	dog biscuit
bg	graham cracker
bg	ice cream cone
bg	pastry
df = dried fruit (23)	
df	apple, dried
df	apricot, dried
df	banana, dried
df	bilberry, dried
df	blueberry
df	carob (locust)
df	cherry, dried
df	currant
df	date
df	dried fruit, unspecified
df	fig, dried
df	jujube
df	kava
df	loganberry, dried
df	mango, dried
df	nectarine, dried
df	olive, dried
df	peach, dried
df	pear, dried
df	persimmon, dried
df	prune
df	raisin
df	sultana, dried
dfp = dried fruit product (3)	
dfp	apple skin, dried
dfp	carob meal
dfp	citrus pulp, dried
ffv = fresh fruit/vegetable (54)	
ffv	apple
ffv	apricot
ffv	avocado
ffv	banana
ffv	bean
ffv	beet, field and sugar
ffv	blackberry
ffv	cactus fruit
ffv	cherimoya
ffv	chickasaw plum
ffv	citrus fruit
ffv	corn
ffv	egg plant
ffv	fenugreek
ffv	fig
ffv	fruit, unspecified
ffv	garden egg
ffv	gourd (squash)
ffv	grape
ffv	grapefruit
ffv	guava
ffv	kava
ffv	kiwi
ffv	lemon
ffv	lettuce
ffv	lime
ffv	mango
ffv	melon, bitter
ffv	melon, Persian
ffv	melon, unspecified
ffv	muskmelon
ffv	nectarine
ffv	okra
ffv	olive fruit
ffv	onion
ffv	orange
ffv	papaw fruit
ffv	papaya
ffv	pea
ffv	peach
ffv	pear

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

ffv	pepper, bell or green
ffv	persimmon
ffv	pineapple
ffv	plum
ffv	pomegranate
ffv	quince fruit
ffv	rhubarb
ffv	rhubarb, Chinese dried
ffv	swede
ffv	squash
ffv	tomato
ffv	watermelon
ffv	wild brinjal (eggplant)
g = cereal grain (26)	
g	barley
g	buckwheat
g	buckwheat, tartary
g	grain, cereal
g	grain, old
g	hungry rice (fonio)
g	kaffir seed
g	maize
g	maize ear
g	millet, finger (ragi)
g	millet, foxtail (tenai)
g	millet, pearl
g	millet, unspecified
g	millet and rice
g	oat
g	paddy rice
g	popcorn
g	rice
g	rice, wild
g	rye
g	sorghum (broomcorn)
g	teff
g	triticale
g	wheat
gp = grain product (69)	
gp	barley flour
gp	barley malt
gp	barley meal
gp	barley, rolled
gp	buckwheat flour
gp	cereal (cereal product)
gp	grain product
gp	hominy grit
gp	macaroni paste
gp	maize bran
gp	maize cob
gp	maize flake
gp	maize germ meal
gp	maize gluten
gp	maize husk
gp	maize meal
gp	maize product
gp	maize screening
gp	maize stalk
gp	maize starch
gp	maize, cracked
gp	maize, split
gp	malt
gp	malt culm
gp	millet meal
gp	noodle
gp	oat flake
gp	oat flour
gp	oat, rolled
gp	oatmeal
gp	pancake flour
gp	rice bran
gp	rice cake
gp	rice cone
gp	rice flour
gp	rice hull
gp	rice meal
gp	rice product
gp	rice sheet
gp	rice sprout
gp	rice stick
gp	rice, broken
gp	rice, flaked
gp	rice, puffed
gp	rye bran
gp	rye flour
gp	rye flour paste
gp	rye meal
gp	sorghum flour
gp	sorghum meal
gp	sorghum, rolled
gp	tortilla, dry cooked
gp	wheat bran (pollard)
gp	wheat chaff
gp	wheat dust

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

gp	wheat farina
gp	wheat flour
gp	wheat flour mix
gp	wheat flour stick
gp	wheat germ
gp	wheat germ meal
gp	wheat gluten
gp	wheat meal
gp	wheat product
gp	wheat semolina
gp	wheat, bulgar
gp	wheat, cracked
gp	wheat, shredded

gs = grain spoiled (15)

gs	cereal product, spoiled
gs	grain, insect damaged
gs	grain, moldy
gs	maize meal, moldy
gs	maize, decaying
gs	maize, moldy
gs	rice, decaying
gs	sorghum, moldy
gs	soybean meal, moldy
gs	soybean, moldy
gs	wheat bran, wet
gs	wheat flour, damp moldy
gs	wheat flour, decaying
gs	wheat flour, spoiled
gs	wheat, damp moldy

me = medicine (45)

me	medicine, aconite
me	medicine, aconitum root
me	medicine, angelica root
me	medicine, apple peel tea
me	medicine, belladonna
me	medicine, belladonna leaf
me	medicine, belladonna root
me	medicine, borage
me	medicine, buckthron berry
me	medicine, chamomile tea
me	medicine, Chinese angelica
me	medicine, Chinese traditional (many)
me	medicine, dandelion
me	medicine, dandelion root
me	medicine, dried anemone root
me	medicine, unspecified drug
me	medicine, hawthorn berry
me	medicine, hawthorn fruit
me	medicine, henbane
me	medicine, henbane leaf
me	medicine, unspecified herbal
me	medicine, hibiscus flower
me	medicine, Himalayan rhubarb
me	medicine, Indian belladonna
me	medicine, Indian colchicum
me	medicine, Indian madder
me	medicine, jaborandi leaf powder
me	medicine, jimson weed
me	medicine, juniper berry
me	medicine, kava kava root
me	medicine, lime blossom tea
me	medicine, liverwort
me	medicine, milkweed
me	medicine, orange peel
me	medicine, passion flower
me	medicine, peppermint leaf
me	medicine, poison hemlock
me	medicine, quaking aspen
me	medicine, rhubarb root
me	medicine, scotch broom flower
me	medicine, senna
me	medicine, senna leaf
me	medicine, senna leaf powder
me	medicine, senna pod
me	medicine, slippery elm

n = nut (22)

n	acorn, unspecified
n	almond
n	almond, blanched
n	betel nut (areca nut)
n	Brazil nut (para nut)
n	butternut
n	cashew
n	chestnut
n	chirauli nut (charoli)
n	filbert
n	hazel nut
n	hickory nut
n	kola nut
n	litchi nut (lychee)
n	macadamia nut
n	marking nut
n	nut, unspecified

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

n	pecan
n	pistachio nut
n	sheanut
n	Tahitian chestnut
n	walnut
np = nut product (12)	
np	almond hull
np	almond hull meal
np	almond meal
np	almond meat
np	chestnut flour
np	nut bar
np	nut meal
np	nut meat
np	nut product
np	pecan husk
np	pecan meat
np	walnut meat
oc = other commodities (81)	
oc	albumin with drugs
oc	ammonium nitrate
oc	animal feed, unspecified
oc	apple pomace
oc	asbestos
oc	baby food
oc	baking powder
oc	baking soda
oc	BBQ sauce
oc	bead curtain
oc	bean paste, chili
oc	bean sauce, black bean
oc	bean sauce, chili
oc	bean sauce, hot
oc	bean sauce, yellow
oc	bonbon
oc	book
oc	boot
oc	cake mix
oc	candied fruit
oc	candy
oc	cat food
oc	chocolate bonbon
oc	chocolate covered almond
oc	chocolate covered candy
oc	chocolate mint
oc	chocolate nut candy
oc	confectionery
oc	custard powder
oc	dextrine
oc	dog food
oc	egg noodle
oc	fertilizer
oc	fish food
oc	fudge mix
oc	furniture
oc	furniture, upholstered
oc	gelatin capsule
oc	ginger candy
oc	hair brush
oc	horse collar with straw stuffing
oc	insulation, house
oc	jelly
oc	koji
oc	lime pickle in oil
oc	lozenge
oc	malted milk
oc	museum collection
oc	museum collection, mummy
oc	museum collection, mummy skull
oc	nougat
oc	olive
oc	painting
oc	paste
oc	pastry dough
oc	pastry wrapper
oc	peanut candy
oc	pepper, chili sauce
oc	pepper, chili with black bean
oc	piano felt
oc	pictures
oc	porridge
oc	potash
oc	rat poison
oc	rubber
oc	saddle
oc	salt
oc	sausage rusk
oc	sesame sweet
oc	soap, desiccated
oc	soapstone
oc	soda ash
oc	sodium bicarbonate
oc	sodium sulfate
oc	soup mix, dried

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

oc	sponge, bath
oc	sponge, rubber
oc	strychnine
oc	tanning extract
oc	tartar, cream of (argol)
oc	yarn, synthetic

os = oilseed (14)

os	African mango seed
os	coconut
os	cottonseed
os	flax seed (linseed)
os	illipenut
os	mango seed
os	melon seed, bitter
os	oilseed, unspecified
os	palm kernel
os	peanut
os	rapeseed (canola)
os	safflower
os	sesame seed
os	sunflower seed

osp = oilseed product (38)

osp	coconut cake
osp	coconut fiber
osp	coconut husk
osp	coconut shell
osp	copra
osp	copra chip
osp	copra meal
osp	copra oilcake
osp	cottonseed hull
osp	cottonseed meal
osp	cottonseed meal cake
osp	cottonseed meal pellet
osp	cottonseed oilcake
osp	cottonseed product
osp	linseed flake
osp	linseed meal
osp	linseed oilcake
osp	oilcake
osp	oilseed cake
osp	oilseed meal
osp	oilseed product
osp	palm kernel meal
osp	palm kernel oilcake
osp	peanut flake
osp	peanut flour
osp	peanut meal
osp	peanut oilcake
osp	peanut product
osp	peanut sauce
osp	peanut, shelled
osp	rape oilcake
osp	rapeseed meal
osp	safflower meal
osp	safflower meal cake
osp	sesame seed meal
osp	sesame seed oilcake
osp	sunflower seed meal
osp	sunflower seed oilcake

p = pulse (47)

p	adzuki bean
p	algarroba pod
p	bambara groundnut
p	bean, unspecified
p	bean, dried black
p	bean, white
p	black gram (mash, urd)
p	broad bean (fava bean, horsebean)
p	catjag
p	chickling vetch
p	chickpea (Bengal gram, garbanzo)
p	clusterbean (guar)
p	cowpea
p	divi-divi
p	futna seed
p	gram
p	grass pea
p	hoba bean
p	horsebean (jackbean, overlook)
p	horsegram
p	haricort
p	hyaciath bean
p	kidney bean
p	kudzu bean
p	lentil (masur)
p	lima bean
p	lotus
p	maple pea
p	monkey pod
p	moth bean
p	mung bean
p	myrabolan

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

p	pea
p	pigeonpea (arhar, red gram)
p	pinto bean
p	pulse, unspecified
p	rice bean
p	scarlet runner bean
p	sesbania seed
p	soybean
p	sword bean
p	tepary bean
p	tonka bean
p	vetch seed
p	winged bean
p	yard long bean
p	yellow pea
pp = pulse product (21)	
pp	bari (sundried pulse cake)
pp	bean cake
pp	bean curd
pp	bean flour
pp	bean meal
pp	bean noodle
pp	bean paste
pp	bean thread
pp	bean, salted
pp	bean, split
pp	chickpea, split
pp	clusterbean meal (guar meal)
pp	mung bean thread
pp	pea meal
pp	pulse product, unspecified
pp	soy grit
pp	soybean bran
pp	soybean flour
pp	soybean meal
pp	soybean paste
pp	soybean product
r = root (39)	
r	arrowroot
r	bulb, daffodil
r	bulb, garlic
r	bulb, gladiolus
r	bulb, hyacinth
r	bulb, hyacinth
r	bulb, Indian tulip
r	bulb, Indian turnip
r	bulb, iris
r	bulb, lily
r	bulb, tulip
r	bulb, unspecified
r	carrot
r	potato
r	potato, dried
r	root, unspecified (tuber)
r	root, derris (rotenone)
r	root, dried (rhizome)
r	root, dried (tuber)
r	root, dried cassava (manioc)
r	root, dried chicory
r	root, dried lotus
r	root, dried pomegranate
r	root, ginger
r	root, ginseng
r	root, licorice
r	root, lonchocarpus (rotenone)
r	root, moghat
r	root, musk
r	root, orris
r	root, sarsaparilla
r	root, valerian
r	sugar beet
r	sweet potato
r	sweet potato, dried
r	tapioca
r	tapioca root
r	taro
r	yam
res = residue (18)	
res	barley residue
res	barley screening
res	bean spillage
res	carob residue
res	cotton gin trash
res	grain debris
res	grain residue
res	hay residue
res	maize residue
res	medicine residue, Chinese traditional
res	oilcake residue
res	paddy residue
res	pepper and ginger spillage
res	residue
res	rice screening

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

res	wheat flour residue
res	wheat residue
res	wheat screening
rp = root product (21)	
rp	arrowroot flour
rp	beet pulp
rp	beet pulp, sugar
rp	beet, sliced
rp	cassava root chip
rp	cassava root meal
rp	cassava root starch
rp	licorice
rp	licorice apricot
rp	potato chip
rp	potato flake
rp	potato flour
rp	potato starch
rp	rotenone powder
rp	sweet potato flour
rp	tapioca chip
rp	tapioca flour
rp	tapioca shred
rp	yam chip
rp	yam flour
rp	yam meal
se = other seed (103)	
se	alfalfa seed (lucerne)
se	alta fescue grass seed
se	annatto seed
se	apricot seed
se	avocado seed
se	bagaruwa seed (Gambia pod)
se	beet seed
se	bentgrass seed
se	Bermuda grass seed
se	bird feed
se	bluegrass seed
se	borassus seed
se	broccoli seed
se	brome grass seed
se	brome grass seed, praire
se	burnet seed
se	burr clover seed
se	cabbage seed
se	cactus seed
se	canary grass seed
se	cantaloupe seed (casaba)
se	caraway seed
se	carrot seed
se	cassia seed
se	castor bean
se	cauliflower seed
se	celery seed
se	chamomile seed
se	clover seed
se	cocksfood seed
se	coriander seed
se	crotolaria seed
se	cucumber seed
se	cumin seed
se	dallisgrass seed
se	dandelion seed
se	date seed
se	dill seed
se	egg plant seed
se	fennel seed
se	fenugreek seed
se	fescue seed
se	flower seed
se	gourd seed
se	grass seed
se	guava seed
se	hemp seed
se	henbane seed
se	juniper seed
se	kapok seed
se	kohlrabi seed
se	lettuce seed
se	lotus seed
se	lupine seed
se	mango seed
se	melon seed
se	muskmelon seed
se	mustard seed
se	mustard seed, black
se	nasturtium seed
se	nigerseed
se	nutmeg seed
se	okra seed (lady's finger)
se	onion seed
se	orchard grass seed
se	ornamental plant seed, unspecified
se	pepper seed
se	pine seed

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

se	plantago seed
se	poppy seed
se	pumpkin seed
se	quinoa
se	radish seed
se	Rhode Island bent grass seed
se	ryegrass seed
se	sago seed
se	seed, unspecified
se	sesbania seed
se	snapdragon seed
se	spinach seed
se	spruce seed
se	squash seed
se	stock flower seed
se	Sudan grass seed
se	sugar beet seed
se	sweet clover seed
se	Swiss chard seed
se	tamarind seed
se	tapioca seed
se	timothy grass seed
se	tobacco seed
se	tomato seed
se	tree seed, unspecified
se	trefoil seed
se	turnip seed
se	vegetable seed
se	veldt grass seed
se	velvet grass seed
se	vetch seed
se	watermelon seed
se	wattle seed
se	weed seed
se	wheatgrass seed

sea = seasoning (48)

sea	achuete spice
sea	allspice
sea	aniseed (anise spice)
sea	basil leaf
sea	bay leaf
sea	caraway
sea	cardamom
sea	chicory
sea	cinnamon
sea	cinnamon bark
sea	clove
sea	coriander
sea	cumin
sea	curcumin
sea	curry powder
sea	fennel
sea	garlic
sea	ginger
sea	ginger cake
sea	kitchen sage
sea	lemon balm
sea	marjoram
sea	mustard
sea	mustard, black
sea	nutmeg (mace)
sea	oregano
sea	parsley
sea	pepper
sea	pepper, black
sea	pepper, cayenne
sea	pepper, chili
sea	pepper, chili paste
sea	pepper, dried
sea	pepper, ground chili
sea	pepper, paprika
sea	pepper, pod dried chili
sea	pepper, red
sea	pepper, white
sea	peppermint
sea	pimento
sea	saffron
sea	spearmint
sea	spice, unspecified
sea	sweet basil leaf
sea	tarragon
sea	thyme
sea	turmeric
sea	vanilla

sp = spoiled other commodities (27)

sp	almond hull and meal, wet
sp	apple, cull
sp	bread roll, moldy
sp	bread, fermenting, moldy
sp	cheese, moldy
sp	cherry, mummified
sp	citrus fruit (rotting)

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

sp	cloth, rotten
sp	coffee, moldy
sp	copra, moldy
sp	esparto grass, moldy
sp	food, decaying
sp	fruit, cull
sp	lemon, decaying
sp	lemon, mummified
sp	meat, decaying
sp	melon, rotting
sp	nut, rotting
sp	orange (decaying)
sp	peach, cull
sp	pig bladder, moldy
sp	pineapple plant, decaying
sp	plant debris, damp moldy
sp	radish, moldy
sp	tobacco, fermenting
sp	vegetable material, decaying
sp	vegetable matter, moldy
t = textile (11)	
t	bedding (blanket, spread)
t	carpet
t	cloth
t	cloth towel, bathmat
t	cloth, cotton
t	cloth, felt
t	cloth, linen
t	cloth, velvet
t	cotton
t	tapestry
t	yarn
v = vegetable material (153)	
v	alfalfa hay
v	alfalfa meal
v	alfalfa pellet
v	Amorphophallus konac flour
v	asparagus berry
v	asparagus, dried
v	Avens
v	baldo
v	bamboo
v	bamboo basket
v	bamboo carving
v	bamboo, dried leaf or shoot
v	banana baked with honey
v	banana product
v	barberry
v	basketware, wicker
v	bean curd with rice
v	bean with ginger
v	berseem (Egyptian clover)
v	breadfruit (bread nut)
v	brown sugar
v	cabbage, dried
v	cactus, unspecified
v	cactus, dried
v	cactus, Opuntia
v	calamus
v	calamus for basket
v	calumba powder
v	candy bar with peanut
v	cane
v	caneware
v	carob pod
v	cassia
v	cassia fruit
v	cassia husk
v	cat's paw
v	chamomile
v	chamomile flower
v	cholam
v	cigar (cheroot, stogie)
v	cigarette
v	clover
v	cole, dried
v	comfrey
v	cornflower
v	cotton boll
v	date pollen
v	dog rose
v	elderberry
v	elecampagne
v	fenugreek
v	flax
v	flower, cactus
v	flower, chrysanthemum dried (pyrethrum)
v	flower, dried
v	flower, hibiscus dried
v	flower, lily dried
v	flower, yucca

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

v	fungus, dried	v	pollen
v	gallnut	v	poplar
v	garlic head	v	poppy
v	gentian	v	poppy head
v	grass skirt	v	poppy petal dried
v	gum arabic	v	pudding mix
v	gum dammar	v	quassia
v	hay	v	rattan
v	hemp (marijuana)	v	rhubarb, dried
v	herb	v	rose
v	herbarium specimen	v	rose petal, dried
v	hop	v	rosebud, dried
v	horse radish	v	roselle (sorrel)
v	iris powder	v	rubber seed cake
v	jute	v	rye, perennial
v	leaf, cherry laurel	v	sago
v	leaf, dried	v	sago flour
v	lily, Hong Kong	v	seaweed, dried
v	linden	v	sesbania
v	lotus	v	shallot, fried
v	lovage	v	sisal
v	lupine	v	snuff
v	mallow flower	v	starch
v	mango juice, dried	v	straw
v	marzipan	v	sugar
v	meadow knotweed	v	sugarcane
v	melon rind	v	sunnhemp
v	milk thistle	v	syrup
v	mint leaf, flower	v	tamarind
v	mistletoe leaf	v	tamarind product
v	molasses meal	v	toadflax
v	mushroom, dried	v	tobacco leaf
v	mustard leaf, black	v	tomato, dried
v	nettle leaf	v	tree cucumber
v	oat straw	v	vegetable ivory
v	onion, dried	v	vegetable material, dried
v	opium cake	v	vegetable refuse
v	orange peel	v	vegetable, preserved
v	orange pomace	v	verbascum
v	palm fruit	v	water chestnut
v	palm leaf basket	v	water chestnut powder
v	palm leaf mat	v	white bryony
v	pine nut	v	white horehound
v	plantain	v	white nettle
v	plant debris	v	wintergreen
v	plant, dried	v	wormwood
v	plum, preserved	v	yeast

(*continued on next page*)

TABLE 3.2 Commodities in each of 28 categories (*continued from previous page*)

w = wood (9)		**wp = wood product (6)**	
w	Eucalyptus	wp	cardboard
w	wood, unspecified	wp	cork
w	wood furniture	wp	paper
w	wood mask	wp	paper, tissue
w	wood ornament	wp	wall paper
w	wood shaving	wp	wooden basket
w	wood souvenir carving and drum		
w	wood toy		
w	wood, soft		

TABLE 3.3 Scientific names of plants.

achuete	*Bixa orellana*
aconitum	*Aconitum* spp.
adzuki bean	*Vigna angularis*
African mango	*Irvingia gabonensis*
alfalfa	*Medicago sativa*
algarroba	*Prosopis pallida*
allspice	*Pimenta dioica*
almond	*Prunus dulcis*
alta fescue grass	*Schedonorus phoenix*
anemone	*Anemone* spp.
angelica	*Angelica* spp.
aniseed (anise)	*Pimpinella anisum*
annatto	*Bixa orellana*
apple	*Malus domestica*
apricot	*Prunus armeniaca*
arrowroot	*Maranta arundinacea*
asparagus	*Asparagus officinalis*
Aspen, quaking	*Populus tremuloides*
avens	*Geum* spp.
avocado	*Persea americana*
bagaruwa	*Acacia nilotica*
bambara groundnut	*Voandzeia subterranea*
bamboo	*Bambusa* spp.
banana	*Musa acuminata*
barberry	*Berberis* spp.
barley	*Hordeum vulgare*
basil	*Ocimum basilicum*
bay	*Laurus nobilis*
beet	*Beta vulgaris*
bell pepper	*Capsicum annuum*
belladonna	*Atropa bella-donna*
Bengal gram (chickpea)	*Cicer arietinum*
bentgrass	*Agrotis* spp.
Bermuda grass	*Cynodon dactylon*
berseem	*Trifolium alexandrinum*
betel nut	*Areca catechu*
bilberry	*Vaccinium myrtillus*
bitter melon	*Citrullus lanatus*
blackeyed pea (cowpea)	*Vigna unguiculata*
blackberry	*Rubus* spp.
black gram	*Vigna mungo*
black pepper	*Piper nigrum*
blueberry	*Vaccinium* spp.
bluegrass	*Poa* spp.
boldo	*Peumus boldus*
borage	*Borago officinalis*
borassus	*Borassus* spp.
Brazil nut	*Bertholletia excelsa*
breadfruit (breadnut)	*Artocarpus altilis*
broad bean (fava)	*Vicia faba*
broccoli	*Brassica olearacea*
brome grass	*Bromus* spp.
buckthorn	*Rhamnus* spp.
buckwheat	*Fagopyrum esculentum*
Buckwheat, Tartary	*Fagopyroum tataricum*
burnet	*Sanguisorba minor*
burrclover	*Medicago* spp.
butternut	*Juglans cinerea*
cabbage	*Brassica olearacea*
cactus	*Opuntia* spp. (or others)
calamus	*Acorus calamus*
calumba	*Jateorhiza columba*
canary grass	*Phalaris* spp.
cane	*Arundinaria* spp.
cantaloupe melon (casaba)	*Cucumis melo*
caraway	*Carum carvi*
cardamom	*Amomum compactum*
cardamom	*Elettaria cardamomum*
carob (locust)	*Ceratonia siliqua*
carrot	*Daucus carota*
cashew	*Anacardium occidentale*
cassava	*Manihot esculenta*
cassia	*Cinnamomium aromaticum*
castor bean	*Ricinus communis*
catjang	*Vigna unguiculata*
cats paw	*Anigozanthos* spp.
cauliflower	*Brassica olearacea*
cayenne pepper	*Capsicum baccatum*
cayenne pepper	*Capsicum frutescnes*
celery	*Apium graveolens*
chamomile	*Chamaemelum nobile*
cherimoya	*Annona cherimolia*
cherry	*Prunus* spp.
cherry laurel	*Prunus laurocerasus*
chestnut	*Castanea* spp.
chickling vetch	*Lathyrus sativus*
chickpea	*Cicer arietinum*
chicory	*Cichorium intybus*
chili pepper	*Capsicum frutescnes*
chili pepper	*Capsicum annuum*
Chinese angelica	*Angelica sinensis*
chirauli nut (charoli)	*Buchanania latifolia*
chocolate	*Theobroma cacao*
cholam	*Sorghum* spp.

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TABLE 3.3 Scientific names of plants (*continued from previous page*)

chrysanthemum (pyrethrum)	*Chrysanthemum cinerariaefolium*
cinnamon	*Cinnamomium verum*
citrus	*Citrus* spp.
clove	*Syzygium aromaticum*
clover	*Trifolium* spp.
cluster bean (guar)	*Cyamopsis tetragonoloba*
cocksfood	*Dactylis glomerata*
cocoa	*Theobroma cacao*
coconut	*Cocos nucifera*
coffee	*Coffea arabica*
colchicum	*Colchicum luteum*
cole	*Brassica* spp.
comfrey	*Symphytum officinale*
copra	*Cocos nucifera*
coriander	*Coriandrum sativum*
cork	*Quercus suber*
cornflower	*Centaurea cyanus*
cotton	*Gossypium hirsutum*
cowpea	*Vigna unguiculata*
crotolaria	*Crotolaria juncea*
cucumber	*Cucumis sativus*
cumin	*Cuminum cyminum*
currant	*Ribes* spp.
daffodil	*Narcissus pseudonarcissus*
dallisgrass	*Paspalum dilatatum*
dandelion	*Taraxacum officinale*
date	*Phoenix dactylifera*
derris (rotenone)	*Derris elliptica*
derris (rotenone)	*Derris ferruginea*
dill seed	*Anethum graveolens*
divi-divi	*Caesalpinia coriaria*
dog rose	*Rosa canina*
egg plant	*Solanum melongena*
elderberry	*Sambucus* spp.
elecampane	*Inula* spp.
elm, slippery	*Ulmus fulva*
esparto grass	*Stipa tenacissima*
Eucalyptus wood	*Eucalyptus* spp.
fava bean	*Vicia faba*
fennel	*Foeniculum vulgare*
fenugreek	*Trigonella foenum-graecum*
fescue seed	*Festuca* spp.
fig	*Ficus carica*
filbert	*Corylus avellana*
finger millet (ragi)	*Eleusine coracana*
flax	*Linum usitatissimum*
foxtail millet (tenai)	*Setaria italica*
futna seed (ornamental tree)	*Acacia farnesiana*
garden egg	*Solanum incanum*
garlic	*Allium sativum*
gentian	*Gentiana* spp.
ginger	*Zingiber officinale*
ginseng	*Panax pseudoginseng*
gladiolus	*Gladiolus* spp.
gourd	*Curcurbita* spp.
gram	*Vigna radiata*
grape	*Vitis* spp.
grapefruit	*Citrus x paradisi*
grass pea	*Lathyrus sativus*
guava	*Cyamopsis psoraloides*
gum arabic tree	*Acacia senegal*
gum dammar	*Agathis dammara*
haricot (green bean)	*Phaseolus vulgaris*
hawthorn	*Crataegus* spp.
hazel nut	*Corylus avellana*
hemlock	*Conium maculatum*
hemp	*Cannabis sativa*
henbane	*Hyoscyamus muticus*
hibiscus	*Hibiscus* spp.
hickory	*Carya ovata*
Himalayan rhubarb	*Rheum australe*
Hong Kong lily	*Lilium brownii*
hop	*Humulus lupulus*
horsebean	*Canavalia ensiformis*
horsebean	*Vicia faba*
horsegram	*Dolichos uniflorus*
horsegram	*Macrotyloma uniflorum*
horseradish	*Aromoracia rusticana*
hungry rice (fonio)	*Digitaria exilis*
hyacinth	*Hyacinthus orientalis*
hyaciath bean	*Lablab purpureus*
illipenut	*Shorea macrophylla*
Indian belladonna	*Atropa acuminata*
Indian colchicum	*Colchicum luteum*
Indian madder	*Rubia tinctorum*
Indian tulip	*Thespesia populnea*
Indian turnip	*Arum triphyllum*
iris	*Iris* spp.
jaborandi	*Pilocarpus jaborandi*
jimson weed	*Datura stramonium*
jujube (Chinese date)	*Ziziphus jujuba*
juniper	*Juniperus* spp.
jute	*Hibiscus cannabinus*
kaffir	*Sorghum vulgare*

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TABLE 3.3 Scientific names of plants (*continued from previous page*)

kapok	*Ceiba pentandra*
kava	*Piper methysticum*
kidney bean	*Phaseolus vulgaris*
kitchen sage	*Salvia officinalis*
kiwi	*Actinidia chinensis*
kohlrabi	*Brassica olearacea*
kola nut	*Garcinia kola*
kola nut	*Cola acuminata*
kudzu bean	*Pueraria montana*
laurel	*Laurus nobilis*
lemon	*Citrus x limon*
lentil (masur)	*Lens culinaris*
lettuce	*Lactuca sativa*
licorice	*Glycyrrhiza glabra*
lily	*Lilium* spp.
lima bean	*Phaseolus lunatus*
lime	*Citrus* spp.
lime flower	*Tilia* spp.
linden	*Tilia* spp.
linseed	*Linum usitatissimum*
litchi nut (lychee)	*Litchi chinensis*
liverwort	*Marchantia* spp.
locust	*Ceratonia siliqua*
loganberry	*Rubus loganobaccus*
lonchocarpus (rotenone)	*Lonchocarpus nicou*
lotus	*Nelumbo nucifera*
lovage	*Levisticum officinale*
lupine	*Lupinus* spp.
macadamia nut	*Macadamia integrifolia*
madder	*Rubia cordifolia*
maize	*Zea mays*
mallow flower	*Hibiscus* spp.
mango	*Mangifera indica*
mango, African	*Irvingia* spp.
marjoram	*Origanum majorana*
marking nut	*Semecarpus anacardium*
meadows knotweed	*Polygonum* spp.
melon	*Cucumis melo*
milk thistle	*Silybum* spp.
milkweed	*Asclepias* spp.
millet	*Panicum miliaceum*
mint	*Mentha arvensis*
mistletoe leaf	*Phoradendron* spp.
moghat	*Glossostemon bruguierri*
monkey pod	*Samanea saman*
moth bean	*Vigna aconitifolia*
mungbean	*Vigna radiata*
muskmelon	*Cucumis melo*
mustard	*Brassica* spp.
nasturtium	*Tropaeolum* spp.
nectarine	*Prunus persica*
nettle leaf	*Urtica* spp.
nigerseed	*Guizotia abyssinica*
nutmeg	*Myristica fragrans*
oat	*Avena sativa*
oil palm	*Elaeis guineensis*
okra (lady's finger)	*Abelmoschus esculentus*
olive	*Olea europaea*
onion	*Allium* spp.
orange	*Citrus* spp.
orchard grass	*Dactylis glomerata*
oregano	*Origanum vulgare*
orris	*Iris x germanica*
paddy (rice)	*Oryza sativa*
papaya (papaw)	*Carica papaya*
paprika	*Capsicum annuum*
parsley	*Petroselinum crispum*
passion flower	*Passiflora incarnata*
pea	*Pisum sativum*
peach	*Prunus persica*
peanut	*Arachis hypogaea*
pear	*Pyrus communis*
pearl millet	*Pennisetum americanum*
pecan	*Carya illinoensis*
pepper, bell or green	*Capsicum annuum*
peppermint	*Mentha x piperita*
Persian melon	*Cucumis melo*
persimmon	*Diospyros* spp.
pigeon pea	*Cajanus cajan*
pimeto	*Capsicum annuum*
pineapple	*Ananas comosus*
pine	*Pinus* spp.
pinto bean	*Phaseolus vulgaris*
pistachio nut	*Pistacia vera*
plantago	*Plantago* spp.
plantain	*Musa paradisiaca*
plum	*Prunus domesticus*
plum, Chickasaw	*Prunus angustifolia*
poison hemlock	*Conium maculatum*
pomegranate	*Punica granatum*
popcorn	*Zea mays*
poplar	*Poplus* spp.
poppy	*Papaver* spp.
potato	*Solanum tuberosum*
prune	*Prunus domesticus*
pumpkin seed	*Cucurbita pepo*

(*continued on next page*)

TABLE 3.3 Scientific names of plants (*continued from previous page*)

quaking aspen	*Populus tremuloides*
quassia	*Quassia amara*
quince	*Cydonia oblonga*
quinua (quinoa)	*Chenopodium quinoa*
radish	*Raphanus sativus*
ragi (finger millet)	*Eleusine coracana*
raisin	*Vitis vinifera*
rape (canola)	*Brassica napus*
rattan cane	*Calamus rotang*
Rhode Island bent grass	*Agrostis capillaris*
rhubarb	*Rheum rhabarbarum*
rice	*Oryza sativa*
rice bean	*Vigna umbellata*
rice, wild	*Zizania* spp.
rose	*Rosa spp.*
roselle (sorrel)	*Hibiscus sabdariffa*
rubber tree	*Hevea brasiliensis*
rye	*Secale cereale*
ryegrass, perennial	*Lollium* spp.
safflower	*Carthamus tinctorius*
saffron	*Crocus sativus*
sage	*Salvia* spp
sago palm (sago flour)	*Metroxylon sagu*
scarlet runner bean	*Phaseolus coccineus*
scotch broom	*Cytisus* spp.
senna	*Cassia* spp.
sesame (til)	*Sesamum indicum*
sesbania	*Sesbania sesban*
shallot	*Alium cepa*
sheanut	*Vitellaria paradoxa*
sisal	*Agave sisalana*
snapdragon	*Antrrhinum* spp.
sorghum	*Sorghum bicolor*
soybean	*Glycine max*
spangled fruit	*Flacourtia rukam*
spearmint	*Mentha spicata*
spinach	*Spinacia oleracea*
spruce	*Picea* spp.
squash	*Curcurbita* spp.
Sudan grass	*Sorghum x drummondii*
sugar beet	*Beta vulgaris*
sugarcane	*Saccharum officinarum*
sultana	*Vitis vinifera*
sunflower	*Helianthus annuus*
sunnhemp	*Crotolaria juncea*
swede (rutabaga)	*Brassica napus*
sweet basil	*Ocimum basilicum*
sweetclover	*Melilotus* spp.
sweet potato	*Ipomoea batatas*
Swiss chard	*Beta vulgaris*
sword bean	*Canavalia gladiata*
Tahitian chestnut	*Inocarpus fagiferus*
tamarind	*Tamarindus indica*
tapioca	*Manihot esculenta*
taro	*Colocasia esculenta*
tarragon	*Artemisia dracunculoides*
tea	*Camellia sinensis*
teff	*Eragrostis abyssinica*
tenai (foxtail millet)	*Setaria italica*
tepary bean	*Phaseolus acutifolius*
thyme	*Thymus* spp.
til (sesame)	*Sesamum indicum*
timothy grass	*Phleum pratense*
toadflax	*Linaria* spp.
tobacco	*Nicotiana tabacum*
tomato	*Lycopersicon lycopersicum*
tonka bean	*Dipteryx odorata*
tree cucumber	*Magnolia acuminata*
trefoil	*Lotus* spp.
triticale	*x Triticosecale*
tulip	*Tulipa* spp.
turmeric	*Curcuma longa*
turnip	*Brassica rapa*
valerian	*Valeriana officinalis*
vanilla	*Vanilla planifolia*
veldt grass	*Ehrharta* spp.
velvet grass	*Holcus* spp.
verbascum (mullein)	*Verbascum* spp.
vetch seed	*Vicia* spp.
walnut	*Juglans nigra*
water chestnut	*Trapa natans*
watermelon	*Citrullus lanatus*
wattle	*Acacia* spp.
wheat	*Triticum aestivum*
wheatgrass	*Agropyron* spp.
white bryony	*Bryonia alba*
white horehound	*Marrubium vulgare*
white nettle	*Lamium album*
wild brinjal (eggplant)	*Solanum melongena*
wintergreen	*Pyrola* spp.
wormwood herb	*Artemisia absinthium*
yam	*Dioscorea alata*
yard-long bean	*Vigna unguiculata*
yellow pea	*Lathyrus aphaca*

TABLE 3.4 Species associated with more than 75% of the commodity categories

Species	No. Categories	No. Commodities
Anthrenus verbasci	21	79
Carpophilus dimidiatus	21	128
Carpophilus hemipterus	26	122
Lasioderma serricorne	23	222
Oryzaephilus surinamensis	22	163
Plodia interpunctella	21	179
Ptinus tectus	21	115
Rhyzopertha dominica	22	115
Stegobium paniceum	23	177
Tenebroides mauritanicus	21	121
Tribolium castaneum	27	233
Tribolium confusum	23	138

TABLE 3.5 Percentage of the commodity infestation records for bruchids that are legume seed

Callosobruchus maculatus	64.8
Bruchus rufimanus	74.7
Bruchus pisorum	75.0
Callosobruchus chinensis	82.9
Bruchidius atrolineatus	88.3
Acanthoscelides obtectus	88.4
Callosobruchus phaseoli	92.9
Callosobruchus analis	94.4
Zabrotes subfasciatus	95.0
Bruchus atomarius	100.0
Bruchus brachialis	100.0
Bruchus ervi	100.0
Bruchus lentis	100.0
Bruchus rufipes	100.0
Bruchidius sahlbergi	100.0
Average	90.4

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CHAPTER 4

COMMODITY SUITABILITY

Commodities on which insects can develop in the laboratory are likely to be a suitable food for insect development, reproduction and population growth during storage. Suitabilities of 491 commodities as food for one or more of 67 stored-product insect species are summarized in Table 4.1. The 1327 published records of suitability reported in Table 4.1 and the 814 reported in the book Stored-Product Insect Resource are included in the text of Table 2.2. One hundred and eighty one and 54 of these records, respectively, were for the same species-commodity combination as were other records. Together these records cover the suitability of 537 commodities as food for one or more of 84 stored-product insect species. The number of commodities investigated per species varied from 139 for *Corcyra cephalonica* to only one for several species (Table 4.2). The suitabilities of large numbers of commodities as food for several species of *Trogoderma* were investigated when *Trogoderma granarium* was first discovered and eradicated in the United States.

Table 4.1 includes 323 commodities, 17 insect species and 1040 species-commodity combinations that were not included in Stored-Product Insect Resource. Of the 1149 species-commodity combinations summarized in Table 4.1, 661 (57.9%) were suitable, 115 (10.1%) were marginally suitable and 365 (32.0%) were unsuitable. Similar percentages for the 760 species-commodity combinations in Stored-Product Insect Resource were 54.5, 16.2 and 29.2, respectively. The percentages of the commodities summarized in Table 4.1 that were either suitable or unsuitable were larger than those for the commodities summarized in Stored-Product Insect Resource and the percentage that was marginally suitable was smaller. For the two summaries, the suitability of 41 and 15 species-commodity combinations, respectively, differed between studies.

Insects can sometimes develop on commercially stored commodities even though these commodities were unsuitable for development in the laboratory studies. This can be a result of the contamination of stored raw commodities by dead insects, insect damaged commodities, insect frass, weed seeds, other commodities or microorganisms on which insect pests feed. Flinn et al. (1992) summarized the effects of fine material on insect infestations. Dead insects, insect frass and the husk of wheat kernels previously fed upon by *Sitophilus granarius* were suitable as food for *Ptinus tectus* (Coombs and Woodroffe 1965, 1970). *Oryzaephilus surinamensis* populations grew more on peanuts when dead adults or eggs of *Plodia interpunctella* were present (LeCato 1973). *Tribolium castaneum* populations also grew more on maize, rice or wheat when dead adults or eggs of *Plodia interpunctella* were present (LeCato 1975). *Ephestia cautella* could develop on carob infested in the field by *Apomyelois ceratoniae* (Zeller) much better than on uninfested carob (Dobie 1978). Dead moths or fine material from insect infested maize increased the population growth of *Latheticus oryzae* more than that of *Tribolium castaneum* and *Cynaeus angustus* (Arbogast 1989). *Tribolium castaneum* and *Oryzaephilus surinamensis* populations grew more on maize previously infested by *Sitotroga cerealella* (Weston and Rattlingourd 2000). *Cadra cautella* infested saw palm berries in warehouses, but did not develop on this commodity in the laboratory (Arbogast et al. 2005).

In some cases, insects may be feeding on fungi growing on a commodity rather than feeding on the commodity. Thirteen species of stored-product insects either have been shown to develop and reproduce on fungi alone or the presence of molds can improve the quality of a commodity as food for the insect species (Table 4.3).

Many insect species can develop on several species of fungi.

Damaged kernels can be more susceptible to insect attack than undamaged kernels for *Cryptolestes ferrugineus* (White & Bell 1990), *Oryzaephilus surinamensis* (Fleming 1988), *Sitophilus oryzae* (Khare et al. 1979) and *Tribolium castaneum* (White 1982) infesting wheat. Damaged kernels are also more susceptible to *Cryptolestes ferrugineus* (Throne and Culik 1989) and *Cryptolestes. pusillus* (Cline 1991) infesting maize, and *Sitophilus oryzae* (Williams and Mills 1980) infesting sorghum. Harvesting can result in 20 to 50% wheat kernel damage (Tuff and Telford 1964, White 1982, White and Bell 1990), so the infestability may vary among lots of grain.

TABLE 4.1 Suitability of commodities as food for stored-product insect development (dev.), fecundity (fec.) and population growth (pop.). s = suitable, m = marginally suitable and u = unsuitable

Commodity	Insect Species	Studied	Ranking	Source
acorn	*Sitophilus granarius*	dev	s	Delobel and Grenier 1993
acorn	*Sitophilus granarius*	dev, fec	s	Kunike 1936
acorn	*Sitophilus oryzae*	dev	s	Delobel and Grenier 1993
acorn	*Sitophilus zeamais*	dev	s	Delobel and Grenier 1993
adzuki bean	*Bruchidius atrolineatus*	dev	s	Ofuya and Credland 1996
alfalfa seed	*Trogoderma granarium*	dev	u	Gołębiowska 1971
almond	*Oryzaephilus mercator*	dev	s	Rad et al. 1997
almond	*Plodia interpunctella*	dev, fec	s	Hoppe 1981
almond	*Plodia interpunctella*	dev	s	Savov 1973
almond	*Sitophilus granarius*	dev, fec	u	Kunike 1936
almond	*Corcyra cephalonica*	dev	s	Uberoi 1961
almond flour	*Idaea inquinata*	dev	u	Locatelli et al. 2005
almond meal	*Oryzaephilus mercator*	dev, fec	s	Joshi 1975
almond meat	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
almond, bitter	*Trogoderma angustum*	dev	s	Wohlgemuth1967
almond, ground	*Plodia interpunctella*	dev, fec	s	Hoppe 1981
almond, ground roasted	*Plodia interpunctella*	dev, fec	s	Hoppe 1981
almond, roasted	*Plodia interpunctella*	dev, fec	s	Hoppe 1981
almond, sweet	*Trogoderma angustum*	dev	s	Wohlgemuth1967
angelica root	*Idaea inquinata*	dev	s	Locatelli et al. 2005
angelica root	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
anise fruit, star	*Idaea inquinata*	dev	u	Locatelli et al. 2005
aniseed	*Lasioderma serricorne*	dev	s	Heinze 1983
aniseed	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
apple	*Glischrochilus quadrisignatus*	dev, fec	s	Peng and Williams 1991
apple, dried	*Rhyzopertha dominica*	dev, fec	m	Gołębiowska 1970
apple, dried	*Trogoderma angustum*	dev	u	Wohlgemuth1967
apricot	*Oryzaephilus mercator*	dev	u	Rad et al. 1997
apricot meal	*Oryzaephilus mercator*	dev, fec	s	Joshi 1975
apricot seed	*Trogoderma angustum*	dev	s	Wohlgemuth1967
apricot, dried	*Trogoderma angustum*	dev	u	Wohlgemuth1967
apricot, dried	*Trogoderma granarium*	dev	u	Gołębiowska 1971
avens root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
avocado fruit	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
avocado seed	*Pagiocerus frontalis*	dev	s	Eidt-Wendt and Schulz 1991
bambara groundnut	*Bruchidius atrolineatus*	dev	u	Ofuya and Credland 1996
bambara groundnut	*Callosobruchus maculatus*	dev	s	Howe and Currie 1964
bambara groundnut	*Callosobruchus maculatus*	dev	s	Lale and Vidal 2003

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
bambara groundnut	*Sitophilus zeamais*	pop	m	Babarinde et al. 2008
bamboo	*Dinoderus minutus*	dev	s	Garcia and Morrell 2009
barberry	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
barley	*Corcyra cephalonica*	dev	s	Uberoi 1961
barley	*Cryptolestes ferrugineus*	pop	m	Rilett 1949
barley	*Cynaeus angustus*	dev	s	Krall and Decker 1945
barley	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
barley	*Rhyzopertha dominica*	dev, fec	s	Gołębiowska 1970
barley	*Sitophilus granarius*	pop	s	Dobie 1978
barley	*Sitophilus granarius*	dev, fec	s	Kunike 1936
barley	*Sitophilus oryzae*	pop	s	Dobie 1978
barley	*Sitophilus zeamais*	pop	s	Dobie 1978
barley	*Trogoderma angustum*	dev	s	Wohlgemuth1967
barley	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
barley	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
barley	*Trogoderma granarium*	dev	s	Gołębiowska 1971
barley	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
barley cereal	*Trogoderma granarium*	dev, fec	m	Strong et al. 1959
barley cereal	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
barley flour	*Corcyra cephalonica*	dev	s	Uberoi 1961
barley flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
barley unhusked broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
barley, ground	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
barley, ground	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
barley, ground	*Tenebrio molitor*	dev	s	Gołębiowska 1957
barley, ground	*Tribolium castaneum*	dev, fec	s	Filipek 1971
barley, ground	*Tribolium confusum*	dev, fec	s	Filipek 1971
barley, ground	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
barley, ground	*Trogoderma granarium*	dev	s	Gołębiowska 1971
barley, hulled	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
barley, pearl	*Tenebrio molitor*	dev	s	Gołębiowska 1957
barley, pearl	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
barley, rolled	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
barley, rolled	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
barley, unhusked	*Rhyzopertha dominica*	dev	m	Kapoor 1964
bean	*Lasioderma serricorne*	dev	s	Heinze 1983
bean	*Sitophilus granarius*	dev, fec	u	Kunike 1936
bean	*Trogoderma granarium*	dev	u	Gołębiowska 1971
bean cracked	*Trogoderma granarium*	dev	m	Gołębiowska 1971

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
bean pod	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
bean flour, pole	*Latheticus oryzae*	dev	u	Pant et al. 1957
beef	*Ptinus tectus*	dev	u	Howe and Burges 1953a
beef blood	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
beef, desiccated	*Trogoderma angustum*	dev	s	Wohlgemuth1967
beet root	*Ptinus tectus*	dev	u	Howe and Burges 1953a
beet root, ground	*Ptinus tectus*	dev	u	Howe and Burges 1953a
beet root, sugar	*Lasioderma serricorne*	dev	m	Heinze 1983
betel nut flour	*Latheticus oryzae*	dev	u	Pant et al. 1957
biscuit	*Tribolium confusum*	dev	m	Filipek 1971
biscuit	*Tribolium confusum*	fec	s	Filipek 1971
biscuit	*Trogoderma angustum*	dev	u	Wohlgemuth1967
black gram	*Cadra cautella*	dev	u	Chaudhary and Bhattacharya 1976
black gram	*Callosobruchus analis*	dev	s	Rahman et al. 1943
black gram	*Callosobruchus chinensis*	dev	s	Arora and Paji 1959a
black gram	*Callosobruchus chinensis*	dev, fec	s	Rahman et al. 1943
black gram	*Callosobruchus chinensis*	dev	s	Singh 1962
black gram	*Callosobruchus chinensis*	dev	u	Yadav and Pant 1979
black gram	*Callosobruchus maculatus*	dev	s	Girish et al. 1974
black gram	*Callosobruchus maculatus*	dev	s	Howe and Currie 1964
black gram	*Callosobruchus maculatus*	dev	s	Yadav and Pant 1979
black gram	*Corcyra cephalonica*	dev	u	Uberoi 1961
black gram	*Rhyzopertha dominica*	dev	u	Kapoor 1964
black gram	*Trogoderma granarium*	dev	s	Bhattacharya and Pant 1969
black gram flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
black gram flour	*Corcyra cephalonica*	dev	s	Uberoi 1961
black gram flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
black gram, broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
black pepper	*Corcyra cephalonica*	dev	u	Uberoi 1961
black pepper powder	*Corcyra cephalonica*	dev	u	Uberoi 1961
blood meal	*Dermestes maculatus*	dev	s	Osuji 1978
blood serum	*Tineola bisselliella*	dev	s	Griswold 1944
blueberry, dried	*Trogoderma angustum*	dev	u	Wohlgemuth1967
boldo leaf	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
bone meal	*Dermestes maculatus*	dev	s	Osuji 1978
Brazil nut	*Trogoderma angustum*	dev	u	Wohlgemuth1967
broad bean	*Acanthoscelides obtectus*	dev, fec	s	Herford 1935
broad bean	*Acanthoscelides obtectus*	fec	u	Sinha and Muir 1977
broad bean	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
broad bean	*Callosobruchus maculatus*	fec	s	El Sawaf 1956
broad bean	*Callosobruchus maculatus*	dev	s	Howe and Currie 1964
broad bean	*Cryptolestes ferrugineus*	fec	u	Sinha and Muir 1977
broad bean	*Cryptolestes turcicus*	fec	u	Sinha and Muir 1977
broad bean	*Etiella zinckenella*	dev	u	Singh and Dhooria 1971
broad bean	*Oryzaephilus mercator*	fec	u	Sinha and Muir 1977
broad bean	*Oryzaephilus surinamensis*	fec	u	Sinha and Muir 1977
broad bean	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
broad bean	*Rhyzopertha dominica*	fec	u	Sinha and Muir 1977
broad bean	*Sitophilus granarius*	fec	u	Sinha and Muir 1977
broad bean	*Sitophilus oryzae*	fec	u	Sinha and Muir 1977
broad bean	*Sitophilus zeamais*	fec	u	Sinha and Muir 1977
broad bean	*Tribolium castaneum*	fec	u	Sinha and Muir 1977
broad bean	*Tribolium confusum*	fec	u	Sinha and Muir 1977
broad bean, crushed	*Acanthoscelides obtectus*	fec	u	Sinha and Muir 1977
broad bean, crushed	*Cryptolestes ferrugineus*	fec	s	Sinha and Muir 1977
broad bean, crushed	*Cryptolestes turcicus*	fec	u	Sinha and Muir 1977
broad bean, crushed	*Oryzaephilus mercator*	fec	u	Sinha and Muir 1977
broad bean, crushed	*Oryzaephilus surinamensis*	fec	s	Sinha and Muir 1977
broad bean, crushed	*Rhyzopertha dominica*	fec	u	Sinha and Muir 1977
broad bean, crushed	*Sitophilus granarius*	fec	u	Sinha and Muir 1977
broad bean, crushed	*Sitophilus oryzae*	fec	u	Sinha and Muir 1977
broad bean, crushed	*Sitophilus zeamais*	fec	u	Sinha and Muir 1977
broad bean, crushed	*Tribolium castaneum*	fec	s	Sinha and Muir 1977
broad bean, crushed	*Tribolium confusum*	fec	s	Sinha and Muir 1977
broad cloth	*Tineola bisselliella*	dev	m	Griswold 1944
buckthorn berry	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
buckwheat	*Corcyra cephalonica*	dev	s	Locatelli and Limonta 1998
buckwheat	*Ephestia kuehniella*	dev	s	Locatelli and Limonta 1998
buckwheat	*Plodia interpunctella*	dev	m	Locatelli and Limonta 1998
buckwheat	*Sitophilus granarius*	dev	s	Delobel and Grenier 1993
buckwheat	*Sitophilus granarius*	dev, fec	s	Kunike 1936
buckwheat	*Sitophilus oryzae*	dev	s	Delobel and Grenier 1993
buckwheat	*Sitophilus zeamais*	dev	s	Delobel and Grenier 1993
buckwheat flour	*Corcyra cephalonica*	dev	s	Locatelli and Limonta 1998
buckwheat flour	*Ephestia kuehniella*	dev	s	Locatelli and Limonta 1998
buckwheat flour	*Plodia interpunctella*	dev	s	Locatelli and Limonta 1998
buckwheat, ground	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
buckwheat, ground	*Rhyzopertha dominica*	dev	s	Gołębiowska 1970

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
buckwheat, ground	*Rhyzopertha dominica*	fec	m	Gołębiowska 1970
buckwheat, ground	*Tenebrio molitor*	dev	s	Gołębiowska 1957
buckwheat, ground	*Tribolium castaneum*	dev	s	Filipek 1971
buckwheat, ground	*Tribolium confusum*	dev, fec	s	Filipek 1971
buckwheat, ground	*Trogoderma granarium*	dev	s	Gołębiowska 1971
burnet root	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
cabbage	*Ptinus tectus*	dev	s	Howe and Burges 1953a
cabbage, ground	*Ptinus tectus*	dev	s	Howe and Burges 1953a
canola seed	*Cryptolestes ferrugineus*	dev	s	Loschiavo and Lamb 1985
canola seed	*Oryzaephilus mercator*	dev	s	Loschiavo and Lamb 1985
canola seed	*Oryzaephilus surinamensis*	dev	s	Loschiavo and Lamb 1985
canola seed	*Tribolium castaneum*	dev	s	Loschiavo and Lamb 1985
caraway	*Corcyra cephalonica*	dev	u	Uberoi 1961
caraway	*Trogoderma angustum*	dev	s	Wohlgemuth1967
carrot	*Lasioderma serricorne*	dev	m	Heinze 1983
carrot	*Ptinus tectus*	dev	s	Howe and Burges 1953a
carrot, ground	*Ptinus tectus*	dev	s	Howe and Burges 1953a
casein	*Ptinus tectus*	dev	s	Hickin 1942
casein	*Trogoderma angustum*	dev	u	Wohlgemuth1967
cashew	*Oryzaephilus mercator*	dev	s	Rad et al. 1997
cashew meal	*Oryzaephilus mercator*	dev, fec	s	Joshi 1975
cassava chip	*Sitophilus zeamais*	pop	s	Babarinde et al. 2008
cassava flour	*Tribolium castaneum*	dev	m	Ajayi and Rahman 2006
cassava meal	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
castor bean	*Corcyra cephalonica*	dev	u	Uberoi 1961
castor bean, crushed	*Corcyra cephalonica*	dev	u	Uberoi 1961
catjang	*Callosobruchus chinensis*	dev	u	Singh 1962
cats paw flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
chamomilla flower	*Idaea inquinata*	dev	s	Locatelli et al. 2005
chamomilla flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
cherimoya seed	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
chestnut	*Sitophilus granarius*	dev	s	Delobel and Grenier 1993
chestnut	*Sitophilus oryzae*	dev	s	Delobel and Grenier 1993
chestnut	*Sitophilus zeamais*	dev	s	Delobel and Grenier 1993
chickling vetch	*Acanthoscelides obtectus*	dev, fec	s	Herford 1935
chickling vetch	*Etiella zinckenella*	dev	s	Singh and Dhooria 1971
chickpea	*Acanthoscelides obtectus*	dev, fec	s	Herford 1935
chickpea	*Callosobruchus analis*	dev	s	Rahman et al. 1943
chickpea	*Callosobruchus chinensis*	dev	s	Arora and Paji 1959a

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
chickpea	*Callosobruchus chinensis*	dev, fec	s	Rahman et al. 1943
chickpea	*Callosobruchus chinensis*	dev	s	Singh 1962
chickpea	*Callosobruchus chinensis*	dev	s	Yadav and Pant 1979
chickpea	*Callosobruchus maculatus*	fec	s	El Sawaf 1956
chickpea	*Callosobruchus maculatus*	dev	s	Girish et al. 1974
chickpea	*Callosobruchus maculatus*	dev	s	Howe and Currie 1964
chickpea	*Callosobruchus maculatus*	dev	s	Yadav and Pant 1979
chickpea	*Corcyra cephalonica*	dev	s	Ayyar 1934
chickpea	*Corcyra cephalonica*	dev	m	Uberoi 1961
chickpea	*Etiella zinckenella*	dev	s	Singh and Dhooria 1971
chickpea	*Rhyzopertha dominica*	dev	u	Kapoor 1964
chickpea	*Trogoderma granarium*	dev	s	Bhattacharya and Pant 1969
chickpea	*Trogoderma granarium*	dev	s	Bhattacharya and Pant 1969
chickpea	*Bruchidius atrolineatus*	dev	s	Ofuya and Credland 1996
chickpea	*Cadra cautella*	dev	m	Chaudhary and Bhattacharya 1976
chickpea	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959
chickpea flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
chickpea flour	*Corcyra cephalonica*	dev	s	Uberoi 1961
chickpea flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
chickpea, broken	*Corcyra cephalonica*	dev	s	Uberoi 1961
chickpea, broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
chili pepper	*Plodia interpunctella*	dev	u	Okada et al. 2004
chili powder	*Corcyra cephalonica*	dev	s	Uberoi 1961
chocolate	*Trogoderma angustum*	dev	u	Wohlgemuth1967
chocolate	*Plodia interpunctella*	dev, fec	m	Hoppe 1981
chocolate with almond	*Plodia interpunctella*	dev, fec	s	Hoppe 1981
cholam, forage	*Corcyra cephalonica*	dev	s	Ayyar 1934
cinnamon corticle	*Idaea inquinata*	dev	u	Locatelli et al. 2005
cinnamon flour	*Latheticus oryzae*	dev	u	Pant et al. 1957
clove	*Trogoderma angustum*	dev	u	Wohlgemuth1967
clover seed	*Cryptolestes ferrugineus*	dev	s	Sinha 1972
clover seed	*Oryzaephilus mercator*	dev	u	Sinha 1972
clover seed	*Oryzaephilus surinamensis*	dev	u	Sinha 1972
clover seed	*Tribolium castaneum*	dev	m	Sinha 1972
clover seed	*Tribolium confusum*	dev	m	Sinha 1972
clover seed, ground	*Cryptolestes ferrugineus*	dev	m	Sinha 1972
clover seed, ground	*Cryptolestes ferrugineus*	fec	u	Sinha 1972
clover seed, ground	*Oryzaephilus mercator*	dev, fec	u	Sinha 1972
clover seed, ground	*Oryzaephilus surinamensis*	dev, fec	u	Sinha 1972

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
clover seed, ground	*Tribolium castaneum*	dev	s	Sinha 1972
clover seed, ground	*Tribolium castaneum*	fec	u	Sinha 1972
clover seed, ground	*Tribolium confusum*	dev	m	Sinha 1972
clover seed, ground	*Tribolium confusum*	fec	u	Sinha 1972
cluster bean (guara)	*Callosobruchus chinensis*	dev, fec	u	Rahman et al. 1943
cluster bean (guara)	*Callosobruchus chinensis*	dev	u	Singh 1962
cluster bean (guara)	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959
cocoa	*Ahasverus advena*	dev, fec	u	Woodroffe 1962
cocoa bean	*Corcyra cephalonica*	dev, fec	s	Bartels 2002
cocoa bean	*Plodia interpunctella*	dev, fec	m	Hoppe 1981
cocoa bean	*Prostephanus truncatus*	pop	u	Shires 1977
cocoa bean	*Sitophilus granarius*	dev, fec	u	Kunike 1936
cocoa bean powder	*Idaea inquinata*	dev	u	Locatelli et al. 2005
cocoa bean, ground	*Plodia interpunctella*	dev, fec	m	Hoppe 1981
cocoa bean, ground roasted	*Plodia interpunctella*	dev, fec	m	Hoppe 1981
cocoa bean. roasted	*Plodia interpunctella*	dev, fec	m	Hoppe 1981
cocoa cake	*Trogoderma angustum*	dev	u	Wohlgemuth1967
cocoa meal	*Trogoderma angustum*	dev	u	Wohlgemuth1967
cocoa oilcake	*Trogoderma angustum*	dev	s	Wohlgemuth1967
cocoa powder	*Lasioderma serricorne*	fec	s	Hori et al. 2011
cocoa powder	*Trogoderma angustum*	dev	u	Wohlgemuth1967
cocoa, coarse ground	*Ephestia elutella*	dev, fec	s	Waloff et al. 1948
coconut	*Oryzaephilus mercator*	dev	s	Rad et al. 1997
coconut meal	*Oryzaephilus mercator*	dev	s	Howe 1956a
coconut meal	*Oryzaephilus mercator*	dev, fec	s	Joshi 1975
coconut meal	*Oryzaephilus surinamensis*	dev	m	Howe 1956a
coconut, crushed	*Corcyra cephalonica*	dev	u	Uberoi 1961
coffee	*Trogoderma angustum*	dev	u	Wohlgemuth1967
coffee bean	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
coffee bean	*Prostephanus truncatus*	pop	u	Shires 1977
coffee bean	*Sitophilus granarius*	dev, fec	u	Kunike 1936
coffee bean	*Trogoderma granarium*	dev	u	Gołębiowska 1971
coffee bean, roasted	*Lasioderma serricorne*	fec	s	Hori et al. 2011
coffee cherry	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
comfrey root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
conduran bark	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
copra	*Ahasverus advena*	dev, fec	u	Woodroffe 1962
copra meal	*Ptinus tectus*	dev	s	Howe and Burges 1953a

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
copra meal	*Trogoderma angustum*	dev	u	Wohlgemuth1967
copra meal	*Trogoderma granarium*	dev, fec	u	Strong et al. 1959
copra meal	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
coriander	*Trogoderma angustum*	dev	s	Wohlgemuth1967
coriander flour	*Latheticus oryzae*	dev	u	Pant et al. 1957
coriander powder	*Corcyra cephalonica*	dev	u	Uberoi 1961
coriander seed	*Corcyra cephalonica*	dev	m	Uberoi 1961
cork	*Trogoderma granarium*	dev	u	Gołębiowska 1971
corn flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
cottnseed, whole	*Tribolium castaneum*	dev, fec	u	Ahmad et al. 2012
cotton cloth	*Anthreneus flavipes*	dev	u	Ayappa et al.
cottonseed	*Corcyra cephalonica*	dev	s	Ayyar 1934
cottonseed	*Corcyra cephalonica*	dev	m	Uberoi 1961
cottonseed	*Lasioderma serricorne*	dev	s	Heinze 1983
cottonseed flour	*Tribolium castaneum*	dev, fec	u	Ahmad et al. 2012
cottonseed meal	*Lasioderma serricorne*	dev	s	Heinze 1983
cottonseed meal	*Oryzaephilus mercator*	dev	u	Howe 1956a
cottonseed meal	*Oryzaephilus surinamensis*	dev	u	Howe 1956a
cottonseed meal	*Ptinus tectus*	dev	s	Howe and Burges 1953a
cottonseed oilcake	*Trogoderma angustum*	dev	s	Wohlgemuth1967
cottonseed, crushed	*Corcyra cephalonica*	dev	s	Uberoi 1961
cottonseed, fuzzy	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
cottonseed, kibbled	*Tribolium castaneum*	dev, fec	u	Ahmad et al. 2012
cowpea	*Bruchidius atrolineatus*	dev	s	Ofuya and Credland 1996
cowpea	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
cowpea	*Callosobruchus analis*	dev, fec	s	Giga and Smith 1983
cowpea	*Callosobruchus analis*	dev	s	Rahman et al. 1943
cowpea	*Callosobruchus chinensis*	dev	s	Arora and Paji 1959a
cowpea	*Callosobruchus chinensis*	dev, fec	s	Giga and Smith 1983
cowpea	*Callosobruchus chinensis*	dev, fec	s	Rahman et al. 1943
cowpea	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959
cowpea	*Callosobruchus maculatus*	dev	s	Chandrakantha and Mathavan 1986
cowpea	*Callosobruchus maculatus*	dev, fec	s	Giga and Smith 1983
cowpea	*Callosobruchus maculatus*	dev	s	Howe and Currie 1964
cowpea	*Corcyra cephalonica*	dev	s	Ayyar 1934
cowpea	*Etiella zinckenella*	dev	s	Singh and Dhooria 1971
cowpea	*Prostephanus truncatus*	pop	u	Shires 1977
cowpea	*Rhyzopertha dominica*	dev	u	Kapoor 1964

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
cowpea	*Sitophilus zeamais*	pop	u	Babarinde et al. 2008
cowpea	*Trogoderma granarium*	dev	s	Bhattacharya and Pant 1969
cowpea	*Zabrotes subfasciatus*	dev	s	Davies 1972
cowpea flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
cowpea flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
cowpea, broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
cracker	*Ephestia kuehniella*	dev	m	Gołębiowska 1956
cracker	*Trogoderma granarium*	dev	m	Gołębiowska 1971
cumin flour	*Latheticus oryzae*	dev	u	Pant et al. 1957
cumin seed	*Corcyra cephalonica*	dev	m	Uberoi 1961
date	*Oryzaephilus mercator*	dev	m	Rad et al. 1997
date	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
date meal	*Oryzaephilus mercator*	dev	m	Joshi 1975
date meal	*Oryzaephilus mercator*	fec	u	Joshi 1975
date, dried	*Plodia interpunctella*	dev	m	Hassan et al. 1962
date flour	*Latheticus oryzae*	dev	u	Pant et al. 1957
dill seed	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
dog biscuit	*Trogoderma angustum*	dev	s	Wohlgemuth1967
dog biscuit, ground	*Rhyzopertha dominica*	dev	s	Cline 1973
dog chow	*Dermestes maculatus*	dev	s	Bellemare and Brunelle 1950
dog food, ground	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
dog food, ground	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
dog food, ground	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
dog rose fruit, dried	*Plodia interpunctella*	dev	s	Savov 1973
egg	*Ptinus tectus*	dev	m	Howe and Burges 1953a
egg albumen	*Tineola bisselliella*	dev	s	Griswold 1944
egg noodle	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
egg powder	*Trogoderma angustum*	dev	u	Wohlgemuth1967
elderberry flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
elecampane root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
Eucalyptus wood	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
feather, chicken	*Tineola bisselliella*	dev	s	Griswold 1944
feather, crow	*Tineola bisselliella*	dev	s	Griswold 1944
feather, duck	*Trogoderma angustum*	dev	u	Wohlgemuth1967
fennel flour	*Latheticus oryzae*	dev	u	Pant et al. 1957
fennel fruit	*Idaea inquinata*	dev	s	Locatelli et al. 2005
fennel seed	*Corcyra cephalonica*	dev	u	Uberoi 1961
fennel seed powder	*Corcyra cephalonica*	dev	u	Uberoi 1961

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
fenugreek seed	*Corcyra cephalonica*	dev	u	Uberoi 1961
fenugreek seed, broken	*Corcyra cephalonica*	dev	s	Uberoi 1961
fig	*Oryzaephilus mercator*	dev	s	Rad et al. 1997
fig meal	*Oryzaephilus mercator*	dev	s	Joshi 1975
fig meal	*Oryzaephilus mercator*	fec	m	Joshi 1975
fish scale	*Tineola bisselliella*	dev	u	Griswold 1944
fish, dried	*Dermestes maculatus*	dev	s	Osuji 1978
fishmeal	*Dermestes frischii*	dev	s	Amos 1968
fishmeal	*Dermestes maculatus*	dev	s	Osuji 1978
fishmeal	*Gibbium psyllodes*	dev	s	Howe and Burges 1952
fishmeal	*Niptus hololeucus*	dev	u	Howe and Burges 1952
fishmeal	*Pseudeurostus hilleri*	dev	u	Howe and Burges 1952
fishmeal	*Ptinus fur*	dev	s	Howe and Burges 1951
fishmeal	*Ptinus tectus*	dev	s	Howe and Burges 1953a
fishmeal	*Tineola bisselliella*	dev	s	Griswold 1944
fishmeal	*Trigonogenius globulus*	dev	m	Howe and Burges 1952
fishmeal	*Trogoderma angustum*	dev	u	Wohlgemuth1967
flannel, furry	*Tineola bisselliella*	dev	u	Griswold 1944
flax seed	*Cryptolestes ferrugineus*	pop	u	Rilett 1949
flax seed	*Cryptolestes ferrugineus*	dev	m	Sinha 1972
flax seed	*Oryzaephilus mercator*	dev	s	Sinha 1972
flax seed	*Oryzaephilus surinamensis*	dev	s	Sinha 1972
flax seed	*Tribolium castaneum*	dev	s	Sinha 1972
flax seed	*Tribolium confusum*	dev	s	Sinha 1972
flax seed	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
flax seed	*Trogoderma granarium*	dev, fec	u	Strong et al. 1959
flax seed	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
flax seed, ground	*Cryptolestes ferrugineus*	pop	u	Rilett 1949
flax seed, ground	*Cryptolestes ferrugineus*	dev	m	Sinha 1972
flax seed, ground	*Cryptolestes ferrugineus*	fec	u	Sinha 1972
flax seed, ground	*Oryzaephilus mercator*	dev, fec	s	Sinha 1972
flax seed, ground	*Oryzaephilus surinamensis*	dev, fec	s	Sinha 1972
flax seed, ground	*Tribolium castaneum*	dev, fec	s	Sinha 1972
flax seed, ground	*Tribolium confusum*	dev	s	Sinha 1972
flax seed, ground	*Tribolium confusum*	fec	u	Sinha 1972
flax seed, ground	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
fur, mouse	*Tineola bisselliella*	dev	s	Griswold 1944
fur, rabbit	*Tineola bisselliella*	dev	s	Griswold 1944
fur, rat	*Tineola bisselliella*	dev	s	Griswold 1944

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
gelatin	*Trogoderma granarium*	dev, fec	u	Strong et al. 1959
gelatin	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
gelatin, granulated	*Tineola bisselliella*	dev	u	Griswold 1944
gentian root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
ginger	*Lasioderma serricorne*	dev	m	Heinze 1983
ginger root	*Corcyra cephalonica*	dev	u	Uberoi 1961
ginger root	*Idaea inquinata*	dev	u	Locatelli et al. 2005
ginger root	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
ginger seed	*Corcyra cephalonica*	dev	s	Ayyar 1934
ginseng root	*Idaea inquinata*	dev	s	Locatelli et al. 2005
gourd seed, bottle	*Callosobruchus chinensis*	fec	u	Srivastava and Bhatia 1959
gourd seed, round	*Callosobruchus chinensis*	fec	u	Srivastava and Bhatia 1959
gourd seed, sponge	*Callosobruchus chinensis*	fec	u	Srivastava and Bhatia 1959
graham flour	*Tribolium confusum*	dev	s	Menusan 1936
grape leaf	*Idaea inquinata*	dev	u	Locatelli et al. 2005
grass meal	*Oryzaephilus mercator*	dev	u	Howe 1956a
grass meal	*Oryzaephilus surinamensis*	dev	u	Howe 1956a
grass meal	*Ptinus tectus*	dev	s	Howe and Burges 1953a
grass pea	*Callosobruchus chinensis*	dev	s	Yadav and Pant 1979
grass pea	*Callosobruchus maculatus*	dev	u	Yadav and Pant 1979
grass seed	*Trogoderma granarium*	dev	u	Gołębiowska 1971
hair, human	*Tineola bisselliella*	dev	m	Griswold 1944
halvah	*Trogoderma granarium*	dev	u	Gołębiowska 1971
haricot bean	*Acanthoscelides obtectus*	dev	s	Howe and Currie 1964
hawthorn flower bud	*Idaea inquinata*	dev	s	Locatelli et al. 2005
hay flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
hazelnut	*Oryzaephilus mercator*	dev	s	Rad et al. 1997
hazelnut	*Plodia interpunctella*	dev. fec	s	Hoppe 1981
hazelnut	*Trogoderma angustum*	dev	s	Wohlgemuth1967
hazelnut flour	*Idaea inquinata*	dev	u	Locatelli et al. 2005
hazelnut, ground	*Plodia interpunctella*	dev, fec	m	Hoppe 1981
hazelnut, ground roasted	*Plodia interpunctella*	dev, fec	m	Hoppe 1981
hazelnut, roasted	*Plodia interpunctella*	dev, fec	s	Hoppe 1981
hemp	*Tribolium castaneum*	dev	s	Filipek 1971
hemp	*Tribolium confusum*	dev	s	Filipek 1971
hemp seed	*Plodia interpunctella*	dev	s	Okada et al. 2004
herb	*Trogoderma granarium*	dev	m	Gołębiowska 1971
herb mixture	*Tribolium confusum*	dev	m	Filipek 1971
herb mixture	*Tribolium confusum*	fec	s	Filipek 1971

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
herring meal	*Ptinus tectus*	dev	u	Howe and Burges 1953a
hibiscus root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
hide, buffalo	*Dermestes maculatus*	dev	s	Paul et al. 1963
hide, cow	*Dermestes maculatus*	dev	s	Paul et al. 1963
hide, goat	*Dermestes maculatus*	dev	s	Paul et al. 1963
hide, hamster	*Trogoderma angustum*	dev	u	Wohlgemuth1967
hide, sheep	*Dermestes maculatus*	dev	s	Paul et al. 1963
hog bristle	*Anthreneus flavipes*	dev	s	Ayappa et al.
horsebean	*Lasioderma serricorne*	dev	s	Heinze 1983
hungry rice (fonio)	*Cadra cautella*	dev	s	Gueye and Delobel 1999
hungry rice (fonio)	*Corcyra cephalonica*	dev	s	Gueye and Delobel 1999
hungry rice (fonio)	*Tribolium castaneum*	dev, pop	s	Gueye and Delobel 1999
hungry rice (fonio)	*Tribolium confusum*	dev	s	Gueye and Delobel 1999
hyaciath bean	*Callosobruchus chinensis*	dev	s	Singh 1962
hyaciath bean	*Callosobruchus maculatus*	dev	s	Chandrakantha and Mathavan 1986
hyacinth bean	*Callosobruchus chinensis*	dev, fec	u	Rahman et al. 1943
hyacinth bean	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959
hyacinth bean	*Callosobruchus maculatus*	fec	s	El Sawaf 1956
hyacinth bean	*Callosobruchus maculatus*	dev	s	Gokhale 1976
hyacinth bean	*Callosobruchus maculatus*	dev	s	Howe and Currie 1964
hyacinth bean	*Trogoderma granarium*	dev	u	Bhattacharya and Pant 1969
hyacinth bean, decorticated	*Callosobruchus maculatus*	dev	s	Gokhale 1976
insect, crushed dried	*Ahasverus advena*	fec	u	Woodroffe 1962
insect, crushed dried	*Ahasverus advena*	dev	s	Woodroffe 1962
insect, dried	*Ephestia kuehniella*	dev	u	Gołębiowska 1956
insect, dried	*Ptinus tectus*	dev	s	Howe and Burges 1953a
insect, dried	*Tineola bisselliella*	dev	s	Griswold 1944
Ireland ecumenical moss	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
Island moss	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
juniper berry	*Idaea inquinata*	dev	s	Locatelli et al. 2005
kidney bean	*Acanthoscelides obtectus*	dev, fec	s	Herford 1935
kidney bean	*Acanthoscelides obtectus*	dev, fec	s	Menusan 1934
kidney bean	*Acanthoscelides obtectus*	dev	s	Shade et al. 1987
kidney bean	*Bruchidius atrolineatus*	dev	u	Ofuya and Credland 1996
kidney bean	*Cadra cautella*	dev	m	Chaudhary and Bhattacharya 1976
kidney bean	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
kidney bean	*Callosobruchus maculatus*	fec	u	El Sawaf 1956
kidney bean	*Callosobruchus maculatus*	dev	u	Howe and Currie 1964
kidney bean	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
kidney bean	*Prostephanus truncatus*	pop	u	Shires 1977
kidney bean	*Rhyzopertha dominica*	dev	u	Kapoor 1964
kidney bean	*Zabrotes subfasciatus*	dev, fec	s	Dendy and Credland 1991
kidney bean	*Zabrotes subfasciatus*	dev	s	Howe and Currie 1964
kidney bean flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
kidney bean, broken	*Rhyzopertha dominica*	dev	u	Kapoor 1964
kola nut	*Trogoderma granarium*	dev	s	Gołębiowska 1971
Laural wood	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
lemon balm leaf	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
lentil	*Acanthoscelides obtectus*	dev, fec	s	Herford 1935
lentil	*Bruchidius atrolineatus*	dev	u	Ofuya and Credland 1996
lentil	*Cadra cautella*	dev	u	Chaudhary and Bhattacharya 1976
lentil	*Callosobruchus chinensis*	dev	m	Arora and Paji 1959a
lentil	*Callosobruchus chinensis*	dev, fec	s	Rahman et al. 1943
lentil	*Callosobruchus chinensis*	dev	s	Singh 1962
lentil	*Callosobruchus chinensis*	dev	s	Yadav and Pant 1979
lentil	*Callosobruchus maculatus*	dev	m	Howe and Currie 1964
lentil	*Callosobruchus maculatus*	dev	u	Yadav and Pant 1979
lentil	*Corcyra cephalonica*	dev	m	Uberoi 1961
lentil	*Etiella zinckenella*	dev, fec	s	Jaglan et al. 1995
lentil	*Etiella zinckenella*	dev	s	Singh and Dhooria 1971
lentil	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
lentil	*Rhyzopertha dominica*	dev	u	Kapoor 1964
lentil	*Trogoderma angustum*	dev	u	Wohlgemuth1967
lentil	*Trogoderma granarium*	dev	m	Bhattacharya and Pant 1969
lentil flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
lentil flour	*Cadra cautella*	dev	s	Yadav and Sing 1985
lentil flour	*Corcyra cephalonica*	dev	u	Uberoi 1961
lentil flour	*Corcyra cephalonica*	dev	u	Yadav and Sing 1985
lentil flour	*Cryptolestes pusillus*	dev	u	Yadav and Sing 1985
lentil flour	*Lasioderma serricorne*	dev	s	Yadav and Sing 1985
lentil flour	*Latheticus oryzae*	dev	u	Pant et al. 1957
lentil flour	*Latheticus oryzae*	dev	u	Yadav and Sing 1985
lentil flour	*Stegobium paniceum*	dev	s	Yadav and Sing 1985
lentil flour	*Tribolium castaneum*	dev	s	Yadav and Sing 1985
lentil flour	*Trogoderma granarium*	dev	m	Yadav and Sing 1985

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
lentil, broken	*Corcyra cephalonica*	dev	u	Uberoi 1961
lentil, broken	*Rhyzopertha dominica*	dev	u	Kapoor 1964
licorice powder	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
lima bean	*Prostephanus truncatus*	pop	u	Shires 1977
lima bean	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
lima bean	*Trogoderma granarium*	dev, fec	m	Strong et al. 1959
lima bean	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
lime flower	*Idaea inquinata*	dev	s	Locatelli et al. 2005
linden flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
linseed	*Cadra cautella*	dev, fec	s	Mookherjee et al. 1969
linseed meal	*Trogoderma angustum*	dev	u	Wohlgemuth1967
lovage root	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
lupine	*Acanthoscelides obtectus*	dev, fec	u	Herford 1935
lupine	*Etiella zinckenella*	dev	s	Singh and Dhooria 1971
lupine	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
lupine	*Sitophilus granarius*	dev, fec	u	Kunike 1936
lupine, sweet	*Sitophilus granarius*	dev, fec	u	Kunike 1936
maize	*Cadra cautella*	dev	m	Chaudhary and Bhattacharya 1976
maize	*Cadra cautella*	dev, fec	s	Mookherjee et al. 1969
maize	*Cadra cautella*	dev	s	Sharma et al. 1978
maize	*Corcyra cephalonica*	dev	s	Ayyar 1934
maize	*Corcyra cephalonica*	dev	s	Pathak et al. 2010
maize	*Corcyra cephalonica*	dev	s	Sharma et al. 1978
maize	*Corcyra cephalonica*	dev	s	Uberoi 1961
maize	*Cryptolestes ferrugineus*	pop	m	Rilett 1949
maize	*Cryptolestes pusillus*	pop	u	Cline 1991
maize	*Cynaeus angustus*	dev	s	Krall and Decker 1945
maize	*Idaea inquinata*	dev	s	Locatelli et al. 2005
maize	*Lasioderma serricorne*	dev	s	Heinze 1983
maize	*Pagiocerus frontalis*	dev	s	Eidt-Wendt and Schulz 1991
maize	*Plodia interpunctella*	dev	m	Hassan et al. 1962
maize	*Plodia interpunctella*	dev, fec	s	Schmidt 1982
maize	*Rhyzopertha dominica*	dev	s	Khare and Agrawal 1970
maize	*Rhyzopertha dominica*	dev, fec	s	Gołębiowska 1970
maize	*Sitophilus granarius*	pop	s	Dobie 1978
maize	*Sitophilus granarius*	dev, fec	s	Kunike 1936
maize	*Sitophilus granarius*	pop	s	Ungsunantwiwat and Mills 1979
maize	*Sitophilus oryzae*	pop	s	Dobie 1978
maize	*Sitophilus oryzae*	dev	s	Khare and Agrawal 1970

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
maize	*Sitophilus oryzae*	pop	s	Ungsunantwiwat and Mills 1979
maize	*Sitophilus oryzae*	dev, fec	s	Vijay Kumar and Singh 1985
maize	*Sitophilus zeamais*	pop	s	Babarinde et al. 2008
maize	*Sitophilus zeamais*	pop	s	Dobie 1978
maize	*Sitophilus zeamais*	pop	s	Ungsunantwiwat and Mills 1979
maize	*Sitotroga cerealella*	dev	s	Perez-Mendoza et al. 2004
maize	*Trogoderma angustum*	dev	s	Wohlgemuth1967
maize	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
maize	*Trogoderma granarium*	dev	m	Gołębiowska 1971
maize	*Trogoderma versicolor*	dev	s	Norris 1936
maize cereal	*Trogoderma granarium*	dev, fec	u	Strong et al. 1959
maize cereal	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
maize flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
maize flour	*Cathartus quadricollis*	pop	s	Sousa et al. 2009
maize flour	*Corcyra cephalonica*	dev	s	Uberoi 1961
maize flour	*Ephestia kuehniella*	dev, fec	s	Ayvaz and Karaborklu 2008
maize flour	*Lasioderma serricorne*	fec	s	Hori et al. 2011
maize flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
maize flour	*Plodia interpunctella*	dev	u	Abdel-Rahman 1971
maize flour	*Tribolium castaneum*	dev, fec	s	Khalifa and Badawy 1955
maize germ	*Plodia interpunctella*	dev	s	Abdel-Rahman 1971
maize grit	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
maize meal	*Cryptolestes pusillus*	pop	s	Cline 1991
maize meal	*Idaea inquinata*	dev	s	Locatelli et al. 2005
maize meal	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
maize meal	*Plodia interpunctella*	dev	s	Abdel-Rahman 1971
maize meal	*Plodia interpunctella*	dev	s	Hassan et al. 1962
maize meal	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
maize meal	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
maize meal	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
maize oilcake	*Trogoderma angustum*	dev	s	Wohlgemuth1967
maize on cob	*Plodia interpunctella*	dev	u	Abdel-Rahman 1971
maize, American yellow	*Prostephanus truncatus*	pop	s	Shires 1977
maize, broken	*Cathartus quadricollis*	pop	s	Neto et al. 2006
maize, broken	*Cathartus quadricollis*	pop	s	Sousa et al. 2009
maize, broken	*Corcyra cephalonica*	dev	s	Uberoi 1961
maize, coarse ground	*Ephestia elutella*	dev, fec	s	Waloff et al. 1948
maize, cracked	*Trogoderma granarium*	dev	s	Gołębiowska 1971
maize, ground	*Corcyra cephalonica*	dev	s	Osman 1986

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
maize, ground	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
maize, ground	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
maize, ground	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
maize, ground	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
maize, kiln dried	*Trogoderma angustum*	dev	s	Wohlgemuth1967
maize, shelled	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
maize, shelled	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
maize, soft	*Pagiocerus frontalis*	dev	s	Yust 1957
maize, yellow dent	*Trogoderma glabrium*	dev	s	Kantack and Staples 1969
mallow flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
malt	*Trogoderma granarium*	dev	s	Hadaway 1956
malt	*Trogoderma inclusum*	dev	s	Hadaway 1956
malt coffee	*Tribolium confusum*	fec	m	Filipek 1971
mango seed, milled African	*Oryzaephilus mercator*	dev	s	Lale et al. 1996
marjoram leaf	*Idaea inquinata*	dev	s	Locatelli et al. 2005
meadows knotweed root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
meat meal	*Ptinus tectus*	dev	s	Howe and Burges 1953a
melon	*Sitophilus zeamais*	pop	u	Babarinde et al. 2008
milk thistle fruit, squeezed	*Idaea inquinata*	dev	s	Locatelli et al. 2005
milk, dried	*Attagenus fasciatus*	dev	s	Ali et al. 2011
milk, dried	*Oryzaephilus surinamensis*	dev, fec	m	Nawrot 1971
milk, dried	*Ptinus tectus*	dev	s	Howe and Burges 1953a
milk, dried	*Trogoderma angustum*	dev	u	Wohlgemuth1967
milk, dried	*Trogoderma granarium*	dev	m	Gołębiowska 1971
milk, dried baby	*Ephestia kuehniella*	dev	u	Stampini 2007
milk, dried reconstituted	*Corcyra cephalonica*	dev	m	Stampini 2007
milk, dried reconstituted	*Ephestia kuehniella*	dev	u	Stampini 2007
milk, dried skim	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
milk, dried skim	*Trogoderma granarium*	dev, fec	u	Strong et al. 1959
milk, dried skim	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
milk, dried soya	*Ephestia kuehniella*	dev	s	Stampini 2007
milk, dried whole	*Corcyra cephalonica*	dev	m	Stampini 2007
milk, dried whole	*Ephestia kuehniella*	dev	u	Stampini 2007
millet	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
millet	*Cadra cautella*	dev	s	Gueye and Delobel 1999
millet	*Corcyra cephalonica*	dev	s	Gueye and Delobel 1999
millet	*Corcyra cephalonica*	dev	s	Osman 1986

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
millet	*Corcyra cephalonica*	dev	s	Uberoi 1961
millet	*Cryptolestes ferrugineus*	dev	s	Sinha 1972
millet	*Oryzaephilus mercator*	dev	s	Sinha 1972
millet	*Oryzaephilus surinamensis*	dev	s	Sinha 1972
millet	*Sitophilus zeamais*	pop	s	Babarinde et al. 2008
millet	*Tribolium castaneum*	dev, pop	s	Gueye and Delobel 1999
millet	*Tribolium castaneum*	dev	s	Roorda et al. 1982
millet	*Tribolium castaneum*	dev	s	Sinha 1972
millet	*Tribolium confusum*	dev	s	Gueye and Delobel 1999
millet	*Tribolium confusum*	dev	s	Sinha 1972
millet flour (arraw)	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
millet flour (arraw)	*Cadra cautella*	dev	s	Gueye and Delobel 1999
millet flour (arraw)	*Cadra cautella*	dev	u	Gueye and Delobel 1999
millet flour (arraw)	*Corcyra cephalonica*	dev	s	Gueye and Delobel 1999
millet flour (arraw)	*Corcyra cephalonica*	dev	s	Gueye and Delobel 1999
millet flour (arraw)	*Corcyra cephalonica*	dev	s	Uberoi 1961
millet flour (arraw)	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
millet flour (arraw)	*Tribolium castaneum*	dev, pop	s	Gueye and Delobel 1999
millet flour (arraw)	*Tribolium castaneum*	dev	s	Gueye and Delobel 1999
millet flour (arraw)	*Tribolium castaneum*	dev	s	Roorda et al. 1982
millet flour (arraw)	*Tribolium confusum*	dev	s	Gueye and Delobel 1999
millet flour (arraw)	*Tribolium confusum*	dev	s	Gueye and Delobel 1999
millet flour, pearl	*Latheticus oryzae*	dev	s	Pant et al. 1957
millet meal	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
millet semolina (sankhal)	*Cadra cautella*	dev	s	Gueye and Delobel 1999
millet semolina (sankhal)	*Corcyra cephalonica*	dev	s	Gueye and Delobel 1999
millet semolina (sankhal)	*Tribolium castaneum*	dev, pop	s	Gueye and Delobel 1999
millet semolina (sankhal)	*Tribolium confusum*	dev	s	Gueye and Delobel 1999
millet, dehulled	*Cadra cautella*	dev	s	Gueye and Delobel 1999
millet, dehulled	*Corcyra cephalonica*	dev	s	Gueye and Delobel 1999
millet, dehulled	*Tribolium castaneum*	dev, pop	s	Gueye and Delobel 1999
millet, dehulled	*Tribolium confusum*	dev	s	Gueye and Delobel 1999
millet, finger (ragi)	*Corcyra cephalonica*	dev	s	Ayyar 1934
millet, finger (ragi)	*Corcyra cephalonica*	dev	s	Nathan et al. 2006
millet, foxtail (tenai)	*Corcyra cephalonica*	dev	s	Ayyar 1934
millet, foxtail (tenai)	*Corcyra cephalonica*	dev	s	Jagadish et al. 2009
millet, ground	*Corcyra cephalonica*	dev	s	Osman 1986
millet, ground	*Cryptolestes ferrugineus*	dev, fec	s	Sinha 1972
millet, ground	*Ephestia kuehniella*	dev	s	Gołębiowska 1956

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
millet, ground	*Oryzaephilus mercator*	dev, fec	s	Sinha 1972
millet, ground	*Oryzaephilus surinamensis*	dev, fec	s	Sinha 1972
millet, ground	*Tenebrio molitor*	dev	s	Gołębiowska 1957
millet, ground	*Tribolium castaneum*	dev	s	Filipek 1971
millet, ground	*Tribolium castaneum*	dev, fec	s	Sinha 1972
millet, ground	*Tribolium confusum*	dev, fec	s	Sinha 1972
millet, ground	*Tribolium confusum*	dev	s	Filipek 1971
millet, pearl	*Corcyra cephalonica*	dev	s	Pathak et al. 2010
millet, pearl	*Rhyzopertha dominica*	dev	s	Kapoor 1964
millet, pearl broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
mistletoe leaf	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
moth bean	*Callosobruchus analis*	dev	s	Rahman et al. 1943
moth bean	*Callosobruchus chinensis*	dev	s	Arora and Paji 1959a
moth bean	*Callosobruchus chinensis*	dev, fec	s	Rahman et al. 1943
moth bean	*Callosobruchus chinensis*	dev	s	Singh 1962
moth bean	*Rhyzopertha dominica*	dev	u	Kapoor 1964
moth bean, broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
moth bean flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
mulberry	*Oryzaephilus mercator*	dev	s	Rad et al. 1997
mung bean	*Bruchidius atrolineatus*	dev	s	Ofuya and Credland 1996
mung bean	*Cadra cautella*	dev	m	Chaudhary and Bhattacharya 1976
mung bean	*Callosobruchus analis*	dev	s	Rahman et al. 1943
mung bean	*Callosobruchus chinensis*	dev	s	Arora and Paji 1959a
mung bean	*Callosobruchus chinensis*	dev	s	Gujar and Yadav 1978
mung bean	*Callosobruchus chinensis*	dev, fec	s	Rahman et al. 1943
mung bean	*Callosobruchus chinensis*	dev	s	Singh 1962
mung bean	*Callosobruchus maculatus*	dev	s	Chandrakantha and Mathavan 1986
mung bean	*Callosobruchus maculatus*	dev	s	Girish et al. 1974
mung bean	*Callosobruchus maculatus*	dev	s	Gujar and Yadav 1978
mung bean	*Callosobruchus maculatus*	dev	s	Howe and Currie 1964
mung bean	*Callosobruchus maculatus*	dev	s	Mookherjee and Chawla 1964
mung bean	*Corcyra cephalonica*	dev	s	Uberoi 1961
mung bean	*Rhyzopertha dominica*	dev	u	Kapoor 1964
mung bean	*Trogoderma granarium*	dev	s	Bhattacharya and Pant 1969
mung bean flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
mung bean flour	*Corcyra cephalonica*	dev	s	Uberoi 1961
mung bean flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
mung bean, broken	*Corcyra cephalonica*	dev	s	Uberoi 1961

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
mung bean, broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
mushroom, dried	*Tribolium castaneum*	dev, fec	s	Filipek 1971
mushroom, dried	*Tribolium confusum*	dev, fec	s	Filipek 1971
mushroom, dried	*Trogoderma angustum*	dev	u	Wohlgemuth1967
mushroom, dried	*Trogoderma granarium*	dev	m	Gołębiowska 1971
mustard seed	*Corcyra cephalonica*	dev	s	Uberoi 1961
mustard seed	*Cryptolestes ferrugineus*	dev	u	Sinha 1972
mustard seed	*Oryzaephilus mercator*	dev	m	Sinha 1972
mustard seed	*Oryzaephilus surinamensis*	dev	u	Sinha 1972
mustard seed	*Tribolium castaneum*	dev	u	Sinha 1972
mustard seed	*Tribolium confusum*	dev	u	Sinha 1972
mustard seed	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
mustard seed, crushed	*Corcyra cephalonica*	dev	s	Uberoi 1961
mustard seed, ground	*Cryptolestes ferrugineus*	dev, fec	u	Sinha 1972
mustard seed, ground	*Oryzaephilus mercator*	dev, fec	u	Sinha 1972
mustard seed, ground	*Oryzaephilus surinamensis*	dev, fec	u	Sinha 1972
mustard seed, ground	*Tribolium castaneum*	dev, fec	u	Sinha 1972
mustard seed, ground	*Tribolium confusum*	dev, fec	u	Sinha 1972
nettle leaf	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
noodle	*Ephestia kuehniella*	dev	m	Gołębiowska 1956
noodle	*Sitophilus granarius*	dev, fec	s	Kunike 1936
noodle	*Trogoderma angustum*	dev	s	Wohlgemuth1967
noodle	*Trogoderma granarium*	dev	m	Gołębiowska 1971
nutmeg nut	*Trogoderma angustum*	dev	u	Wohlgemuth1967
oat	*Cryptolestes ferrugineus*	pop	m	Rilett 1949
oat	*Cynaeus angustus*	dev	s	Krall and Decker 1945
oat	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
oat	*Sitophilus granarius*	dev, fec	s	Kunike 1936
oat	*Trogoderma granarium*	dev	m	Gołębiowska 1971
oat cracked	*Trogoderma granarium*	dev	s	Gołębiowska 1971
oat flake	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
oat flake	*Rhyzopertha dominica*	dev, fec	s	Gołębiowska 1970
oat flake	*Tenebrio molitor*	dev	s	Gołębiowska 1957
oat flour	*Ephestia kuehniella*	dev, fec	s	Ayvaz and Karaborklu 2008
oat, ground	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
oat, rolled	*Tribolium castaneum*	fec	s	Filipek 1971
oat, rolled	*Tribolium confusum*	dev, fec	s	Filipek 1971
oat, rolled	*Trogoderma granarium*	dev	s	Gołębiowska 1971
oatmeal	*Trogoderma angustum*	dev	s	Wohlgemuth1967

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
oatmeal	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
oatmeal	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
oatmeal	*Trogoderma versicolor*	dev	s	Norris 1936
oatmeal, instant	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
oatmeal, instant	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
oatmeal, precooked	*Trogoderma granarium*	dev, fec	m	Strong et al. 1959
oatmeal, precooked	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
okra seed	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959
onion	*Ptinus tectus*	dev	m	Howe and Burges 1953a
onion, ground	*Ptinus tectus*	dev	m	Howe and Burges 1953a
orange peel	*Plodia interpunctella*	dev	u	Okada et al. 2004
pablum	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
pablum	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
paddy	*Sitophilus granarius*	dev, fec	u	Kunike 1936
paddy	*Cadra cautella*	dev, fec	u	Mookherjee et al. 1969
paddy with husked, broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
paddy, husked	*Rhyzopertha dominica*	dev	s	Kapoor 1964
paddy, short grain	*Prostephanus truncatus*	pop	u	Shires 1977
paddy, unhusked	*Rhyzopertha dominica*	dev	s	Kapoor 1964
paddy, unhusked broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
palm kernel	*Ahasverus advena*	dev, fec	u	Woodroffe 1962
palm kernel meal	*Dermestes maculatus*	dev	u	Osuji 1978
palm kernel oilcake	*Trogoderma angustum*	dev	s	Wohlgemuth1967
paper	*Trogoderma granarium*	dev	u	Gołębiowska 1971
parsley, dried	*Rhyzopertha dominica*	dev, fec	u	Gołębiowska 1970
parsley, dried	*Tribolium castaneum*	dev	m	Filipek 1971
parsley, dried	*Tribolium castaneum*	fec	s	Filipek 1971
parsley, dried	*Tribolium confusum*	dev, fec	s	Filipek 1971
passion flower leaf	*Idaea inquinata*	dev	s	Locatelli et al. 2005
pea	*Callosobruchus analis*	dev	s	Rahman et al. 1943
pea	*Callosobruchus chinensis*	dev	s	Howe and Currie 1943
pea	*Callosobruchus chinensis*	dev, fec	s	Rahman et al. 1943
pea	*Callosobruchus chinensis*	dev	u	Singh 1962
pea	*Callosobruchus chinensis*	dev	s	Yadav and Pant 1979
pea	*Callosobruchus maculatus*	fec	s	El Sawaf 1956
pea	*Callosobruchus maculatus*	dev	s	Girish et al. 1974
pea	*Callosobruchus maculatus*	dev	s	Yadav and Pant 1979
pea	*Etiella zinckenella*	dev, fec	s	Jaglan et al. 1995

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
pea	*Etiella zinckenella*	dev	s	Singh and Dhooria 1971
pea	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
pea	*Rhyzopertha dominica*	dev	u	Kapoor 1964
pea	*Sitophilus granarius*	dev, fec	u	Kunike 1936
pea	*Trogoderma angustum*	dev	s	Wohlgemuth1967
pea	*Callosobruchus maculatus*	dev	s	Howe and Currie 1964
pea flour	*Ptinus tectus*	dev	s	Howe and Burges 1953a
pea, broken	*Rhyzopertha dominica*	dev	u	Kapoor 1964
pea, cracked	*Trogoderma granarium*	dev	m	Gołębiowska 1971
pea, field	*Acanthoscelides obtectus*	dev, fec	m	Herford 1935
pea, garden	*Acanthoscelides obtectus*	dev, fec	s	Herford 1935
pea, garden	*Callosobruchus analis*	dev	s	Howe and Currie 1964
pea, garden	*Callosobruchus chinensis*	dev	s	Howe and Currie 1964
pea, garden	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959
pea, split	*Sitophilus oryzae*	dev	s	Delobel and Grenier 1993
peach	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
peanut	*Ahasverus advena*	dev, fec	u	Woodroffe 1962
peanut	*Cadra cautella*	dev, fec	s	Mookherjee et al. 1969
peanut	*Cadra cautella*	dev	s	Sharma et al. 1978
peanut	*Corcyra cephalonica*	dev	s	Ayyar 1934
peanut	*Corcyra cephalonica*	dev	s	Sharma et al. 1978
peanut	*Corcyra cephalonica*	dev	m	Uberoi 1961
peanut	*Corcyra cephalonica*	dev	s	Urs and Mookerjee 1966
peanut	*Lasioderma serricorne*	dev	s	Heinze 1983
peanut	*Oryzaephilus surinamensis*	dev	s	Nawrot 1971
peanut	*Plodia interpunctella*	dev	s	Hassan et al. 1962
peanut	*Prostephanus truncatus*	pop	u	Shires 1977
peanut	*Rhyzopertha dominica*	dev	s	Gołębiowska 1970
peanut	*Rhyzopertha dominica*	fec	m	Gołębiowska 1970
peanut	*Sitophilus granarius*	dev, fec	u	Kunike 1936
peanut	*Sitophilus zeamais*	pop	u	Babarinde et al. 2008
peanut	*Tribolium castaneum*	dev	m	Filipek 1971
peanut	*Tribolium castaneum*	dev	m	Howe 1956b
peanut	*Tribolium confusum*	dev	m	Filipek 1971
peanut	*Tribolium confusum*	fec	s	Filipek 1971
peanut	*Trogoderma granarium*	dev	s	Urs and Mookerjee 1966
peanut	*Trogoderma granarium*	dev	s	Gołębiowska 1971
peanut meal	*Oryzaephilus mercator*	dev	u	Howe 1956a
peanut meal	*Oryzaephilus mercator*	dev, fec	s	Joshi 1975

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
peanut meal	*Oryzaephilus surinamensis*	dev	u	Howe 1956a
peanut, broken	*Tribolium castaneum*	dev	s	Urs and Mookerjee 1966
peanut, coarse ground	*Ephestia elutella*	dev, fec	s	Waloff et al. 1948
peanut, crushed	*Corcyra cephalonica*	dev	u	Uberoi 1961
peanut, damaged	*Oryzaephilus mercator*	dev	s	Howe 1956a
peanut, damaged	*Oryzaephilus surinamensis*	dev	s	Howe 1956a
peanut, shelled	*Corcyra cephalonica*	dev	s	Uberoi 1961
peanut, sound	*Oryzaephilus mercator*	dev	u	Howe 1956a
peanut, sound	*Oryzaephilus surinamensis*	dev	u	Howe 1956a
pear, dried	*Plodia interpunctella*	dev	s	Savov 1973
pecan meat	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
pepper	*Sitophilus zeamais*	pop	u	Babarinde et al. 2008
pepper, cayenne	*Plodia interpunctella*	dev	m	Swatonek 1973
pepper, Japanese	*Plodia interpunctella*	dev	u	Okada et al. 2004
pepper, powdered red	*Plodia interpunctella*	dev	s	Swatonek 1973
pepper, red	*Plodia interpunctella*	dev	s	Savov 1973
pepper flour, black	*Latheticus oryzae*	dev	u	Pant et al. 1957
pigeonpea	*Cadra cautella*	dev	m	Chaudhary and Bhattacharya 1976
pigeonpea	*Callosobruchus analis*	dev	s	Rahman et al. 1943
pigeonpea	*Callosobruchus chinensis*	dev, fec	s	Rahman et al. 1943
pigeonpea	*Callosobruchus chinensis*	dev	s	Yadav and Pant 1979
pigeonpea	*Callosobruchus maculatus*	dev	s	Girish et al. 1974
pigeonpea	*Callosobruchus maculatus*	dev	m	Howe and Currie 1964
pigeonpea	*Callosobruchus maculatus*	dev	s	Yadav and Pant 1979
pigeonpea	*Etiella zinckenella*	dev	u	Singh and Dhooria 1971
pigeonpea	*Rhyzopertha dominica*	dev	u	Kapoor 1964
pigeonpea	*Trogoderma granarium*	dev	s	Bhattacharya and Pant 1969
pigeonpea flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
pigeonpea flour	*Corcyra cephalonica*	dev	u	Uberoi 1961
pigeonpea, broken	*Corcyra cephalonica*	dev	u	Uberoi 1961
pigeonpea, broken	*Rhyzopertha dominica*	dev	u	Kapoor 1964
pine nut, Chilgoza	*Oryzaephilus mercator*	dev	u	Rad et al. 1997
pinto bean	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
pinto bean	*Trogoderma granarium*	dev, fec	m	Strong et al. 1959
pinto bean	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
pistachio	*Oryzaephilus mercator*	dev	s	Rad et al. 1997
plantain herb	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
plum, dried	*Trogoderma granarium*	dev	u	Gołębiowska 1971
pollen	*Trogoderma angustum*	dev	s	Wohlgemuth1967

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
pomegranate seed	*Corcyra cephalonica*	dev	m	Uberoi 1961
poplar bud	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
poppy	*Trogoderma angustum*	dev	s	Wohlgemuth1967
poppy head, unripe	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
poppy seed	*Corcyra cephalonica*	dev	s	Uberoi 1961
poppy seed	*Plodia interpunctella*	dev	m	Okada et al. 2004
potato	*Ptinus tectus*	dev	u	Howe and Burges 1953a
potato flour	*Tenebrio molitor*	dev	s	Gołębiowska 1957
potato powder	*Trogoderma angustum*	dev	u	Wohlgemuth1967
potato, dried	*Trogoderma angustum*	dev	s	Wohlgemuth1967
potato, ground	*Ptinus tectus*	dev	m	Howe and Burges 1953a
primrose root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
prune	*Trogoderma angustum*	dev	u	Wohlgemuth1967
prune	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
pumpkin seed	*Idaea inquinata*	dev	s	Locatelli et al. 2005
quassia wood fragments	*Idaea inquinata*	dev	u	Locatelli et al. 2005
quinua	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
raisin	*Oryzaephilus mercator*	dev	m	Rad et al. 1997
raisin	*Plodia interpunctella*	dev	s	Savov 1973
raisin	*Trogoderma angustum*	dev	u	Wohlgemuth1967
raisin	*Idaea inquinata*	dev	u	Locatelli et al. 2005
raisin	*Plodia interpunctella*	dev	m	Hassan et al. 1962
raisin	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
raisin meal	*Oryzaephilus mercator*	dev	m	Joshi 1975
raisin meal	*Oryzaephilus mercator*	fec	u	Joshi 1975
raisin, seedless	*Trogoderma granarium*	dev, fec	u	Strong et al. 1959
raisin, seedless	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
rape oilcake	*Trogoderma angustum*	dev	s	Wohlgemuth1967
rapeseed	*Cryptolestes ferrugineus*	dev	s	Loschiavo and Lamb 1985
rapeseed	*Cryptolestes ferrugineus*	dev	u	Sinha 1972
rapeseed	*Oryzaephilus mercator*	dev	s	Loschiavo and Lamb 1985
rapeseed	*Oryzaephilus mercator*	dev	s	Sinha 1972
rapeseed	*Oryzaephilus surinamensis*	dev	s	Loschiavo and Lamb 1985
rapeseed	*Oryzaephilus surinamensis*	dev	s	Sinha 1972
rapeseed	*Tribolium castaneum*	dev	s	Loschiavo and Lamb 1985
rapeseed	*Tribolium castaneum*	dev	s	Sinha 1972
rapeseed	*Tribolium confusum*	dev	s	Sinha 1972
rapeseed, ground	*Cryptolestes ferrugineus*	dev, fec	u	Sinha 1972
rapeseed, ground	*Oryzaephilus mercator*	dev, fec	s	Sinha 1972

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
rapeseed, ground	*Oryzaephilus surinamensis*	dev	m	Sinha 1972
rapeseed, ground	*Oryzaephilus surinamensis*	fec	u	Sinha 1972
rapeseed, ground	*Tribolium castaneum*	dev	s	Sinha 1972
rapeseed, ground	*Tribolium castaneum*	fec	u	Sinha 1972
rapeseed, ground	*Tribolium confusum*	dev	m	Sinha 1972
rapeseed, ground	*Tribolium confusum*	fec	u	Sinha 1972
rice	*Cadra cautella*	dev, fec	s	Mookherjee et al. 1969
rice	*Cadra cautella*	dev	s	Sharma et al. 1978
rice	*Corcyra cephalonica*	dev	s	Ayyar 1934
rice	*Corcyra cephalonica*	dev	s	Sharma et al. 1978
rice	*Corcyra cephalonica*	dev	s	Uberoi 1961
rice	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
rice	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
rice	*Idaea inquinata*	dev	s	Locatelli et al. 2005
rice	*Sitophilus granarius*	dev, fec	s	Kunike 1936
rice	*Sitophilus oryzae*	dev, fec	s	Vijay Kumar and Singh 1985
rice	*Sitophilus zeamais*	pop	s	Babarinde et al. 2008
rice	*Sitotroga cerealella*	dev	s	Maity et al. 1999
rice	*Trogoderma angustum*	dev	s	Wohlgemuth1967
rice	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
rice bean	*Callosobruchus chinensis*	dev	s	Singh 1962
rice bran	*Plodia interpunctella*	dev	s	Okada et al. 2004
rice flake	*Tribolium confusum*	dev	m	Filipek 1971
rice flake	*Trogoderma granarium*	dev	m	Gołębiowska 1971
rice flour	*Corcyra cephalonica*	dev	s	Ayyar 1934
rice flour	*Corcyra cephalonica*	dev	s	Uberoi 1961
rice flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
rice flour	*Ptinus tectus*	dev	s	Hickin 1942
rice flour	*Rhyzopertha dominica*	dev	s	Kapoor 1964
rice flour, polished	*Latheticus oryzae*	dev, fec	s	Khalifa and Badawy 1955
rice, broken	*Cathartus quadricollis*	pop	m	Sousa et al. 2009
rice, brown	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
rice, brown	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
rice, brown cracked	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
rice, brown cracked	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
rice, cracked rough	*Carpophilus dimidiatus*	dev	s	Balzer 1942
rice, ground	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
rice, ground	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
rice, milled ground	*Corcyra cephalonica*	dev	s	Osman 1986

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
rice, polished	*Lasioderma serricorne*	fec	s	Hori et al. 2011
rice, polished	*Rhyzopertha dominica*	dev	u	Kapoor 1964
rice, polished	*Trogoderma granarium*	dev	m	Gołębiowska 1971
rice, polished broken	*Rhyzopertha dominica*	dev	u	Kapoor 1964
rice, raw	*Tenebroides mauritanicus*	dev	s	Rout et al. 1978
rice, rough ground	*Corcyra cephalonica*	dev	s	Osman 1986
rice, rough whole	*Corcyra cephalonica*	dev	m	Osman 1986
rice, short grain white	*Corcyra cephalonica*	dev	s	Nathan et al. 2006
rice, unpolished	*Lasioderma serricorne*	fec	s	Hori et al. 2011
rice, white	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
rice, white cracked	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
rice, white instant	*Trogoderma granarium*	dev, fec	u	Strong et al. 1959
rice, white instant	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959
rolled oat	*Ahasverus advena*	dev, fec	u	Woodroffe 1962
rolled oat	*Oryzaephilus mercator*	dev	s	Komson and Stewart 1968
rolled oat	*Oryzaephilus surinamensis*	dev	s	Komson and Stewart 1968
rose hip	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
rye	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
rye	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
rye	*Plodia interpunctella*	dev, fec	s	Schmidt 1982
rye	*Rhyzopertha dominica*	dev, fec	s	Gołębiowska 1970
rye	*Sitophilus granarius*	dev, fec	s	Kunike 1936
rye	*Tenebrio molitor*	dev	s	Gołębiowska 1957
rye	*Trogoderma angustum*	dev	s	Wohlgemuth1967
rye	*Trogoderma granarium*	dev	m	Gołębiowska 1971
rye flour	*Ephestia kuehniella*	dev, fec	s	Ayvaz and Karaborklu 2008
rye, ground	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
safflower seed	*Cadra cautella*	pop	u	Gill and Strong 1964
safflower seed	*Callosobruchus maculatus*	pop	u	Gill and Strong 1964
safflower seed	*Cryptolestes pusilus*	pop	u	Gill and Strong 1964
safflower seed	*Ephestia kuehniella*	pop	u	Gill and Strong 1964
safflower seed	*Gnathocerus cornutus*	pop	u	Gill and Strong 1964
safflower seed	*Lasioderma serricorne*	pop	s	Gill and Strong 1964
safflower seed	*Latheticus oryzae*	pop	u	Gill and Strong 1964
safflower seed	*Oryzaephilus surinamensis*	pop	u	Gill and Strong 1964
safflower seed	*Plodia interpunctella*	pop	u	Gill and Strong 1964
safflower seed	*Rhyzopertha dominica*	pop	u	Gill and Strong 1964
safflower seed	*Sitophilus granarius*	pop	u	Gill and Strong 1964
safflower seed	*Sitophilus oryzae*	pop	u	Gill and Strong 1964

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
safflower seed	*Sitotroga cerealella*	pop	u	Gill and Strong 1964
safflower seed	*Stegobium paniceum*	pop	s	Gill and Strong 1964
safflower seed	*Tenebrio molitor*	pop	u	Gill and Strong 1964
safflower seed	*Tribolium castaneum*	pop	u	Gill and Strong 1964
safflower seed	*Tribolium confusum*	pop	u	Gill and Strong 1964
safflower seed	*Trogoderma glabrium*	pop	s	Gill and Strong 1964
safflower seed	*Trogoderma inclusum*	pop	s	Gill and Strong 1964
safflower seed	*Trogoderma simplex*	pop	m	Gill and Strong 1964
safflower seed	*Trogoderma variabile*	pop	s	Gill and Strong 1964
safflower seed meal	*Cadra cautella*	pop	u	Gill and Strong 1964
safflower seed meal	*Cryptolestes pusilus*	pop	u	Gill and Strong 1964
safflower seed meal	*Ephestia kuehniella*	pop	u	Gill and Strong 1964
safflower seed meal	*Gnathocerus cornutus*	pop	s	Gill and Strong 1964
safflower seed meal	*Lasioderma serricorne*	pop	s	Gill and Strong 1964
safflower seed meal	*Latheticus oryzae*	pop	s	Gill and Strong 1964
safflower seed meal	*Oryzaephilus surinamensis*	pop	u	Gill and Strong 1964
safflower seed meal	*Plodia interpunctella*	pop	u	Gill and Strong 1964
safflower seed meal	*Stegobium paniceum*	pop	s	Gill and Strong 1964
safflower seed meal	*Tenebrio molitor*	pop	s	Gill and Strong 1964
safflower seed meal	*Tribolium castaneum*	pop	s	Gill and Strong 1964
safflower seed meal	*Tribolium confusum*	pop	s	Gill and Strong 1964
safflower seed meal	*Trogoderma glabrium*	pop	s	Gill and Strong 1964
safflower seed meal	*Trogoderma inclusum*	pop	s	Gill and Strong 1964
safflower seed meal	*Trogoderma simplex*	pop	u	Gill and Strong 1964
safflower seed meal	*Trogoderma variabile*	pop	u	Gill and Strong 1964
safflower, broken	*Cadra cautella*	pop	s	Gill and Strong 1964
safflower, broken	*Cryptolestes pusilus*	pop	u	Gill and Strong 1964
safflower, broken	*Ephestia kuehniella*	pop	s	Gill and Strong 1964
safflower, broken	*Gnathocerus cornutus*	pop	s	Gill and Strong 1964
safflower, broken	*Lasioderma serricorne*	pop	s	Gill and Strong 1964
safflower, broken	*Latheticus oryzae*	pop	u	Gill and Strong 1964
safflower, broken	*Oryzaephilus surinamensis*	pop	s	Gill and Strong 1964
safflower, broken	*Plodia interpunctella*	pop	u	Gill and Strong 1964
safflower, broken	*Stegobium paniceum*	pop	s	Gill and Strong 1964
safflower, broken	*Tenebrio molitor*	pop	s	Gill and Strong 1964
safflower, broken	*Tribolium castaneum*	pop	s	Gill and Strong 1964
safflower, broken	*Tribolium confusum*	pop	s	Gill and Strong 1964
safflower, broken	*Trogoderma glabrium*	pop	u	Gill and Strong 1964
safflower, broken	*Trogoderma inclusum*	pop	u	Gill and Strong 1964

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
safflower, broken	*Trogoderma simplex*	pop	u	Gill and Strong 1964
safflower, broken	*Trogoderma variabile*	pop	u	Gill and Strong 1964
sage leaf	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
salvia root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
sardine meal	*Dermestes maculatus*	dev	m	Scoggin and Tauber 1951
sardine, dried	*Lasioderma serricorne*	fec	s	Hori et al. 2011
sarsaparilla root	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
scarlet runner bean	*Acanthoscelides obtectus*	dev, fec	s	Herford 1935
seaweed	*Plodia interpunctella*	dev	u	Okada et al. 2004
senna leaf	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
senna pod	*Idaea inquinata*	dev	s	Locatelli et al. 2005
senna pod	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
sesame seed	*Plodia interpunctella*	dev	s	Okada et al. 2004
sesame seed (til seed)	*Cadra cautella*	dev, fec	s	Mookherjee et al. 1969
sesame seed (til seed)	*Corcyra cephalonica*	dev	s	Urs and Mookerjee 1966
sesame seed (til seed)	*Tribolium castaneum*	dev	s	Urs and Mookerjee 1966
sesame seed (til seed)	*Trogoderma granarium*	dev	s	Urs and Mookerjee 1966
silk cloth	*Anthreneus flavipes*	dev	u	Ayappa et al.
silk, raw	*Tineola bisselliella*	dev	u	Griswold 1944
soft wheat flour	*Idaea inquinata*	dev	u	Locatelli et al. 2005
sorghum	*Cadra cautella*	dev, fec	s	Mookherjee et al. 1969
sorghum	*Cadra cautella*	dev	s	Rathore et al. 1980
sorghum	*Cadra cautella*	dev	s	Sharma et al. 1978
sorghum	*Cathartus quadricollis*	pop	s	Neto et al. 2006
sorghum	*Corcyra cephalonica*	dev	s	Osman 1986
sorghum	*Corcyra cephalonica*	dev	s	Pathak et al. 2010
sorghum	*Corcyra cephalonica*	dev	s	Sharma et al. 1978
sorghum	*Corcyra cephalonica*	dev fec	s	Shazali and Smith 1986
sorghum	*Corcyra cephalonica*	dev	s	Uberoi 1961
sorghum	*Rhyzopertha dominica*	dev	s	Kapoor 1964
sorghum	*Sitophilus granarius*	pop	s	Ungsunantwiwat and Mills 1979
sorghum	*Sitophilus oryzae*	dev fec	s	Shazali and Smith 1985
sorghum	*Sitophilus oryzae*	pop	s	Ungsunantwiwat and Mills 1979
sorghum	*Sitophilus oryzae*	dev, fec	s	Vijay Kumar and Singh 1985
sorghum	*Sitophilus zeamais*	pop	s	Babarinde et al. 2008
sorghum	*Sitophilus zeamais*	pop	s	Morrison 1964
sorghum	*Sitophilus zeamais*	pop	s	Ungsunantwiwat and Mills 1979
sorghum	*Sitotroga cerealella*	dev fec	s	Shazali and Smith 1985
sorghum flour	*Corcyra cephalonica*	dev	s	Uberoi 1961

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
sorghum flour	*Tribolium castaneum*	dev, fec	s	Ahmad et al. 2012
sorghum flour	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
sorghum flour	*Tribolium castaneum*	dev fec	s	Shazali and Smith 1986
sorghum meal	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
sorghum, broken	*Cathartus quadricollis*	pop	s	Sousa et al. 2009
sorghum, broken	*Corcyra cephalonica*	dev	s	Uberoi 1961
sorghum, broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
sorghum, durra	*Corcyra cephalonica*	dev	s	Nathan et al. 2006
sorghum, ground	*Corcyra cephalonica*	dev	s	Osman 1986
sorghum, ground	*Sitophilus zeamais*	pop	u	Morrison 1964
sorghum, kibbled	*Tribolium castaneum*	dev, fec	s	Ahmad et al. 2012
sorghum, whole	*Tribolium castaneum*	dev, fec	s	Ahmad et al. 2012
soybean	*Acanthoscelides obtectus*	dev, fec	u	Herford 1935
soybean	*Bruchidius atrolineatus*	dev	u	Ofuya and Credland 1996
soybean	*Cadra cautella*	dev	s	Bhattacharya et al. 1976
soybean	*Cadra cautella*	dev	m	Chaudhary and Bhattacharya 1976
soybean	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959
soybean	*Callosobruchus maculatus*	fec	s	El Sawaf 1956
soybean	*Callosobruchus maculatus*	dev	s	Girish et al. 1974
soybean	*Cryptolestes ferrugineus*	pop	u	Rilett 1949
soybean	*Rhyzopertha dominica*	dev	u	Kapoor 1964
soybean	*Sitophilus granarius*	dev, fec	u	Kunike 1936
soybean	*Sitophilus zeamais*	pop	u	Babarinde et al. 2008
soybean	*Trogoderma granarium*	dev	m	Bhattacharya and Pant 1969
soybean flour	*Cadra cautella*	dev	s	Bhattacharya et al. 1976
soybean flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
soybean flour	*Lasioderma serricorne*	dev, fec	s	Bhattacharya et al. 1977
soybean flour	*Lasioderma serricorne*	fec	s	Hori et al. 2011
soybean grit	*Ephestia elutella*	dev, fec	s	Waloff et al. 1948
soybean meal	*Dermestes maculatus*	dev	s	Scoggin and Tauber 1951
soybean meal	*Ptinus tectus*	dev	s	Howe and Burges 1953a
soybean meal	*Trogoderma angustum*	dev	u	Wohlgemuth1967
soybean, broken	*Rhyzopertha dominica*	dev	u	Kapoor 1964
soybean, ground	*Cryptolestes ferrugineus*	pop	m	Rilett 1949
soybean, whole	*Lasioderma serricorne*	dev, fec	u	Bhattacharya et al. 1977
spaghetti	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
sultana	*Ephestia elutella*	dev, fec	s	Waloff et al. 1948
sunflower oilcake	*Trogoderma angustum*	dev	s	Wohlgemuth1967
sunflower seed	*Cryptolestes ferrugineus*	pop	m	Rilett 1949

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
sunflower seed	*Cryptolestes ferrugineus*	dev	s	Sinha 1972
sunflower seed	*Oryzaephilus mercator*	dev	s	Sinha 1972
sunflower seed	*Oryzaephilus surinamensis*	dev	s	Sinha 1972
sunflower seed	*Tribolium castaneum*	dev	s	Sinha 1972
sunflower seed	*Tribolium confusum*	dev	s	Sinha 1972
sunflower seed, ground	*Cryptolestes ferrugineus*	pop	m	Rilett 1949
sunflower seed, ground	*Cryptolestes ferrugineus*	dev	s	Sinha 1972
sunflower seed, ground	*Cryptolestes ferrugineus*	fec	u	Sinha 1972
sunflower seed, ground	*Oryzaephilus mercator*	dev, fec	s	Sinha 1972
sunflower seed, ground	*Oryzaephilus surinamensis*	dev, fec	s	Sinha 1972
sunflower seed, ground	*Tribolium castaneum*	dev, fec	s	Sinha 1972
sunflower seed, ground	*Tribolium confusum*	dev, fec	s	Sinha 1972
swede	*Ptinus tectus*	dev	m	Howe and Burges 1953a
swede, ground	*Ptinus tectus*	dev	s	Howe and Burges 1953a
sweetpotato	*Cylas formicarius elegantulus*	dev	s	Mullen 1981
sword bean	*Callosobruchus chinensis*	fec	s	Srivastava and Bhatia 1959
tamarind	*Sitophilus oryzae*	dev	s	Delobel and Grenier 1993
tapioca	*Trogoderma granarium*	dev	u	Lindgren et al. 1955
tea leaf	*Idaea inquinata*	dev	u	Locatelli et al. 2005
tea leaf	*Tribolium confusum*	fec	u	Filipek 1971
tea leaf	*Lasioderma serricorne*	fec	s	Hori et al. 2011
teff	*Cadra cautella*	pop	m	McFarlane and Dobie 1972
teff	*Cryptolestes pusillus*	pop	u	McFarlane and Dobie 1972
teff	*Oryzaephilus surinamensis*	pop	u	McFarlane and Dobie 1972
teff	*Rhyzopertha dominica*	pop	u	McFarlane and Dobie 1972
teff	*Sitophilus oryzae*	pop	u	McFarlane and Dobie 1972
teff	*Sitotroga cerealella*	pop	u	McFarlane and Dobie 1972
teff	*Tribolium castaneum*	pop	s	McFarlane and Dobie 1972
teff	*Tribolium destructor*	pop	m	McFarlane and Dobie 1972
tepary bean	*Acanthoscelides obtectus*	dev	s	Shade et al. 1987
thyme	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
toadflax	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
tobacco leaf	*Lasioderma serricorne*	dev	m	Heinze 1983
tobacco leaf	*Lasioderma serricorne*	fec	s	Hori et al. 2011
tobacco leaf	*Lasioderma serricorne*	dev	m	Yamamoto and Fraenkel 1960
tobacco seed	*Attagenus fasciatus*	dev	s	Patel and Chari 1977
tomato	*Glischrochilus quadrisignatus*	dev, fec	s	Peng and Williams 1991
triticale	*Sitophilus granarius*	pop	s	Dobie 1978
triticale	*Sitophilus oryzae*	pop	s	Dobie 1978

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
triticale	*Sitophilus zeamais*	pop	s	Dobie 1978
tumeric powder	*Corcyra cephalonica*	dev	u	Uberoi 1961
tumeric root	*Corcyra cephalonica*	dev	u	Uberoi 1961
valerian root	*Idaea inquinata*	dev	s	Locatelli et al. 2005
valerian root	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
vanilla capsule	*Idaea inquinata*	dev	u	Locatelli et al. 2005
vegetable, dried	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
verbascum flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
vetch, common	*Acanthoscelides obtectus*	dev, fec	u	Herford 1935
walnut	*Oryzaephilus mercator*	dev	s	Rad et al. 1997
walnut	*Plodia interpunctella*	dev	s	Savov 1973
walnut	*Tribolium castaneum*	dev	m	Filipek 1971
walnut	*Trogoderma angustum*	dev	s	Wohlgemuth1967
walnut leaf	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
walnut meat	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
walnut oilcake	*Trogoderma angustum*	dev	s	Wohlgemuth1967
water fennel	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
whale meal	*Trogoderma angustum*	dev	u	Wohlgemuth1967
wheat	*Ahasverus advena*	dev, fec	u	Woodroffe 1962
wheat	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
wheat	*Cadra cautella*	pop	s	McFarlane and Dobie 1972
wheat	*Cadra cautella*	dev, fec	s	Mookherjee et al. 1969
wheat	*Cadra cautella*	dev	s	Sharma et al. 1978
wheat	*Cathartus quadricollis*	pop	s	Neto et al. 2006
wheat	*Corcyra cephalonica*	dev	s	Ayyar 1934
wheat	*Corcyra cephalonica*	dev	s	Locatelli and Limonta 1998
wheat	*Corcyra cephalonica*	dev	m	Osman 1986
wheat	*Corcyra cephalonica*	dev	s	Sharma et al. 1978
wheat	*Corcyra cephalonica*	dev	s	Uberoi 1961
wheat	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
wheat	*Cryptolestes pusillus*	pop	s	McFarlane and Dobie 1972
wheat	*Cynaeus angustus*	dev	s	Krall and Decker 1945
wheat	*Ephestia kuehniella*	dev	s	Locatelli and Limonta 1998
wheat	*Idaea inquinata*	dev	s	Locatelli et al. 2005
wheat	*Lasioderma serricorne*	dev	s	Heinze 1983
wheat	*Oryzaephilus surinamensis*	pop	s	McFarlane and Dobie 1972
wheat	*Oryzaephilus surinamensis*	dev, fec	s	Nawrot 1971
wheat	*Pagiocerus frontalis*	dev	u	Eidt-Wendt and Schulz 1991
wheat	*Plodia interpunctella*	dev	s	Locatelli and Limonta 1998

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
wheat	*Ptinus tectus*	dev	s	Howe and Burges 1953a
wheat	*Rhyzopertha dominica*	dev	s	Kapoor 1964
wheat	*Rhyzopertha dominica*	dev	s	Khare and Agrawal 1970
wheat	*Rhyzopertha dominica*	pop	s	McFarlane and Dobie 1972
wheat	*Rhyzopertha dominica*	dev, fec	s	Gołębiowska 1970
wheat	*Sitophilus granarius*	pop	s	Dobie 1978
wheat	*Sitophilus granarius*	pop	s	Ungsunantwiwat and Mills 1979
wheat	*Sitophilus granarius*	dev, fec	s	Kunike 1936
wheat	*Sitophilus oryzae*	pop	s	Dobie 1978
wheat	*Sitophilus oryzae*	dev	s	Khare and Agrawal 1970
wheat	*Sitophilus oryzae*	pop	s	McFarlane and Dobie 1972
wheat	*Sitophilus oryzae*	pop	s	Ungsunantwiwat and Mills 1979
wheat	*Sitophilus oryzae*	dev, fec	s	Vijay Kumar and Singh 1985
wheat	*Sitophilus zeamais*	pop	s	Dobie 1978
wheat	*Sitophilus zeamais*	pop	s	Ungsunantwiwat and Mills 1979
wheat	*Sitotroga cerealella*	dev	s	Boldt 1974
wheat	*Sitotroga cerealella*	pop	s	McFarlane and Dobie 1972
wheat	*Tenebrio molitor*	dev	m	Gołębiowska 1957
wheat	*Tenebroides mauritanicus*	dev	s	Rout et al. 1978
wheat	*Tribolium castaneum*	pop	s	McFarlane and Dobie 1972
wheat	*Tribolium castaneum*	dev, fec	s	White 1987
wheat	*Tribolium destructor*	pop	m	McFarlane and Dobie 1972
wheat	*Trogoderma angustum*	dev	s	Wohlgemuth1967
wheat	*Trogoderma glabrium*	dev	s	Kantack and Staples 1969
wheat	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
wheat	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
wheat	*Trogoderma granarium*	dev	s	Gołębiowska 1971
wheat	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
wheat	*Trogoderma versicolor*	dev	s	Norris 1936
wheat bran	*Carpophilus dimidiatus*	dev	s	Lefkovitch 1966
wheat bran	*Cathartus quadricollis*	pop	m	Sousa et al. 2009
wheat bran	*Corcyra cephalonica*	dev, fec	s	El-Buzz et al. 1975
wheat bran	*Ephestia kuehniella*	dev, fec	s	Ayvaz and Karaborklu 2008
wheat bran	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
wheat bran	*Idaea inquinata*	dev	s	Locatelli et al. 2005
wheat bran	*Latheticus oryzae*	dev	s	Khalifa and Badawy 1955
wheat bran	*Ptinus tectus*	dev	s	Howe and Burges 1953a
wheat bran	*Sitophilus granarius*	dev, fec	u	Kunike 1936
wheat bran	*Tenebrio molitor*	dev	s	Gołębiowska 1957

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
wheat bran	*Tribolium castaneum*	dev, fec	s	Filipek 1971
wheat bran	*Tribolium castaneum*	dev	s	Khalifa and Badawy 1955
wheat bran	*Tribolium confusum*	dev	s	Khalifa and Badawy 1955
wheat bran	*Tribolium confusum*	dev, fec	s	Filipek 1971
wheat flour	*Ahasverus advena*	dev, fec	u	Woodroffe 1962
wheat flour	*Cadra cautella*	dev	s	Chaudhary and Bhattacharya 1976
wheat flour	*Cadra cautella*	dev	s	Yadav and Sing 1985
wheat flour	*Corcyra cephalonica*	dev, fec	s	El-Buzz et al. 1975
wheat flour	*Corcyra cephalonica*	dev	s	Locatelli and Limonta 1998
wheat flour	*Corcyra cephalonica*	dev	s	Uberoi 1961
wheat flour	*Corcyra cephalonica*	dev	s	Yadav and Sing 1985
wheat flour	*Cryptolestes pusillus*	dev, fec	s	Davies 1949
wheat flour	*Cryptolestes pusillus*	dev	s	Yadav and Sing 1985
wheat flour	*Ephestia kuehniella*	dev, fec	s	Ayvaz and Karaborklu 2008
wheat flour	*Ephestia kuehniella*	dev	s	Brindley 1930
wheat flour	*Ephestia kuehniella*	dev	s	Locatelli and Limonta 1998
wheat flour	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
wheat flour	*Gibbium psyllodes*	dev	s	Howe and Burges 1952
wheat flour	*Lasioderma serricorne*	fec	s	Hori et al. 2011
wheat flour	*Lasioderma serricorne*	dev	s	Yadav and Sing 1985
wheat flour	*Latheticus oryzae*	dev	s	Pant et al. 1957
wheat flour	*Latheticus oryzae*	dev	s	Yadav and Sing 1985
wheat flour	*Niptus hololeucus*	dev	u	Howe and Burges 1952
wheat flour	*Palorus subdepressus*	dev	s	Halstead 1967
wheat flour	*Plodia interpunctella*	dev	s	Locatelli and Limonta 1998
wheat flour	*Pseudeurostus hilleri*	dev	s	Howe and Burges 1952
wheat flour	*Ptinus tectus*	dev	s	Hickin 1942
wheat flour	*Ptinus tectus*	dev	s	Howe and Burges 1953a
wheat flour	*Sitophilus granarius*	dev, fec	u	Kunike 1936
wheat flour	*Stegobium paniceum*	dev	s	Yadav and Sing 1985
wheat flour	*Tenebrio molitor*	dev	s	Gołębiowska 1957
wheat flour	*Tineola bisselliella*	dev	s	Griswold 1944
wheat flour	*Tribolium castaneum*	dev, fec	s	Ahmad et al. 2012
wheat flour	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
wheat flour	*Tribolium castaneum*	dev	s	Yadav and Sing 1985
wheat flour	*Tribolium confusum*	dev	s	Brindley 1930
wheat flour	*Tribolium confusum*	dev, fec	s	Khalifa and Badawy 1955
wheat flour	*Tribolium confusum*	dev, fec	s	Filipek 1971
wheat flour	*Trigonogenius globulus*	dev	s	Howe and Burges 1952

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
wheat flour	*Trogoderma angustum*	dev	u	Wohlgemuth1967
wheat flour	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
wheat flour	*Trogoderma granarium*	dev	s	Yadav and Sing 1985
wheat flour	*Trogoderma granarium*	dev	s	Gołębiowska 1971
wheat flour	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
wheat flour	*Trogoderma versicolor*	dev	s	Norris 1936
wheat flour	*Tribolium castaneum*	dev, fec	s	Filipek 1971
wheat flour with germ	*Trogoderma glabrium*	dev	s	Kantack and Staples 1969
wheat flour, white	*Ephestia kuehniella*	dev, fec	s	Jacob and Cox 1977
wheat flour, white	*Tenebroides mauritanicus*	dev	s	Rout et al. 1978
wheat flour, whole	*Tenebroides mauritanicus*	dev	s	Rout et al. 1978
wheat germ	*Ahasverus advena*	dev, fec	s	Woodroffe 1962
wheat germ	*Idaea inquinata*	dev	s	Locatelli et al. 2005
wheat germ	*Ptinus tectus*	dev	s	Howe and Burges 1953a
wheat germ	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
wheat germ	*Trogoderma granarium*	dev	s	Gołębiowska 1971
wheat germ	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959
wheat meal	*Corcyra cephalonica*	dev, fec	s	El-Buzz et al. 1975
wheat meal	*Ptinus tectus*	dev	s	Hickin 1942
wheat meal	*Sitophilus granarius*	dev, fec	u	Kunike 1936
wheat meal	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
wheat middling	*Ephestia elutella*	dev, fec	s	Waloff et al. 1948
wheat semolina	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
wheat semolina	*Idaea inquinata*	dev	s	Locatelli et al. 2005
wheat semolina	*Oryzaephilus surinamensis*	dev, fec	s	Nawrot 1971
wheat semolina	*Tenebrio molitor*	dev	s	Gołębiowska 1957
wheat semolina	*Tribolium castaneum*	fec	s	Filipek 1971
wheat semolina	*Tribolium confusum*	dev	m	Filipek 1971
wheat semolina	*Tribolium confusum*	fec	s	Filipek 1971
wheat semolina	*Trogoderma granarium*	dev	s	Gołębiowska 1971
wheat, broken	*Cathartus quadricollis*	pop	s	Sousa et al. 2009
wheat, broken	*Corcyra cephalonica*	dev	s	Uberoi 1961
wheat, broken	*Rhyzopertha dominica*	dev	s	Kapoor 1964
wheat, coarse ground	*Ephestia elutella*	dev, fec	s	Waloff et al. 1948
wheat, cracked	*Ephestia kuehniella*	dev	s	Gołębiowska 1956
wheat, cracked	*Oryzaephilus surinamensis*	dev, fec	s	Nawrot 1971
wheat, cracked	*Trogoderma granarium*	dev, fec	s	Strong et al. 1959
wheat, cracked	*Trogoderma granarium*	dev	s	Gołębiowska 1971
wheat, cracked	*Trogoderma variabile*	dev, fec	s	Strong et al. 1959

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
wheat, crushed	*Tribolium castaneum*	dev	s	Khalifa and Badawy 1955
wheat, damaged	*Ptinus tectus*	dev	s	Howe and Burges 1953a
wheat, ground	*Alphitobius diaperinus*	dev	s	Wilson and Miner 1969
wheat, ground	*Corcyra cephalonica*	dev	s	Osman 1986
wheat, ground	*Cryptolestes ferrugineus*	pop	s	Rilett 1949
wheat, ground	*Trogoderma granarium*	dev	s	Lindgren et al. 1955
wheat, hard winter	*Prostephanus truncatus*	pop	m	Shires 1977
wheat, kibbled	*Ahasverus advena*	dev	s	Jacob 1996
wheat, kibbled	*Oryzaephilus surinamensis*	dev	s	Beckett and Evans 1994
wheat, kibbled	*Tribolium castaneum*	dev, fec	s	Ahmad et al. 2012
wheat, kibbled	*Typhaea stercorea*	dev	s	Jacob 1988
wheat, soft	*Sitophilus granarius*	dev	s	Delobel and Grenier 1993
wheat, soft	*Sitophilus oryzae*	dev	s	Delobel and Grenier 1993
wheat, soft	*Sitophilus zeamais*	dev	s	Delobel and Grenier 1993
wheat, soft white	*Corcyra cephalonica*	dev	s	Nathan et al. 2006
wheat, whole	*Tribolium castaneum*	dev, fec	s	Ahmad et al. 2012
wheatfeed	*Cryptolestes pusilloides*	dev	s	Lefkovitch 1964
wheatfeed	*Cryptolestes pusillus*	dev	s	Currie 1967
wheatfeed	*Gibbium psyllodes*	dev	m	Howe and Burges 1952
wheatfeed	*Mezium affine*	dev, fec	s	Howe 1959
wheatfeed	*Mezium affine*	fec	s	Howe and Burges 1953b
wheatfeed	*Niptus hololeucus*	dev	m	Howe and Burges 1952
wheatfeed	*Oryzaephilus mercator*	dev	s	Howe 1956a
wheatfeed	*Oryzaephilus surinamensis*	dev	s	Howe 1956a
wheatfeed	*Pseudeurostus hilleri*	fec	s	Howe and Bull 1956
wheatfeed	*Pseudeurostus hilleri*	dev	s	Howe and Burges 1952
wheatfeed	*Ptinus fur*	dev	s	Howe and Burges 1951
wheatfeed	*Ptinus latro*	dev	s	Howe 1959
wheatfeed	*Ptinus pusillus*	dev	s	Howe 1956c
wheatfeed	*Ptinus tectus*	dev	s	Howe and Burges 1953a
wheatfeed	*Stegobium paniceum*	dev	s	Lefkovitch 1967
wheatfeed	*Tribolium castaneum*	dev	s	Howe 1956b
wheatfeed	*Trigonogenius globulus*	dev	s	Howe and Burges 1952
wheatfeed	*Trogoderma granarium*	dev	s	Burges 1957
wheatfeed	*Trogoderma variabile*	dev	s	Burges 1961
white bryony root	*Trogoderma angustum*	dev	s	Wohlgemuth 1975
white horehound	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
white nettle flower	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
wool cloth	*Anthreneus flavipes*	dev	s	Ayappa et al.

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TABLE 4.1 Suitability of commodities as food *(continued from previous page)*

Commodity	Insect Species	Studied	Ranking	Source
wool cloth	*Trogoderma angustum*	dev	u	Wohlgemuth1967
wool, raw	*Tineola bisselliella*	dev	m	Griswold 1944
wormwood herb	*Trogoderma angustum*	dev	u	Wohlgemuth 1975
yam	*Araecerus fasciculatus*	dev	s	Plumbley and Rees 1983
yam chip	*Sitophilus zeamais*	pop	s	Babarinde et al. 2008
yam flour	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
yam meal	*Tribolium castaneum*	dev	s	Ajayi and Rahman 2006
yeast	*Trogoderma granarium*	dev	u	Bhattacharya and Pant 1969
yeast	*Trogoderma granarium*	dev, fec	m	Strong et al. 1959
yeast	*Ptinus tectus*	dev	s	Howe and Burges 1953a
yeast	*Trogoderma angustum*	dev	u	Wohlgemuth1967
yeast	*Trogoderma variabile*	dev, fec	u	Strong et al. 1959

TABLE 4.2 Number of commodities per species for which suitability has been studied

Species	No. Commodities	Species	No. Commodities
Corcyra cephalonica	139	*Dermestes lardarius*	8
Trogoderma angustum	110	*Endrosis sarcitrella*	8
Plodia interpunctella	104	*Etiella zinckenella*	8
Trogoderma granarium	88	*Necrobia rufipes*	7
Tribolium castaneum	77	*Sitotroga cerealella*	6
Lasioderma serricorne	76	*Tinea pellionella*	6
Cadra cautella	71	*Cadra calidella*	5
Oryzaephilus surinamensis	61	*Cadra figulilella*	5
Tribolium confusum	61	*Dermestes frischii*	5
Oryzaephilus mercator	54	*Latheticus oryzae*	5
Rhyzopertha dominica	53	*Tenebroides mauritanicus*	5
Trogoderma variabile	50	*Trigonogenius globulus*	5
Ptinus ocellus	36	*Anthreneus flavipes*	4
Trogoderma glabrum	36	*Araecerus fasciculatus*	4
Cryptolestes ferrugineus	35	*Cynaeus angustus*	4
Trogoderma inclusum	35	*Dermestes ater*	4
Stegobium paniceum	34	*Trogoderma versicolor*	4
Trogoderma simplex	34	*Callosobruchus subinnotatus*	3
Ephestia kuehniella	33	*Dermestes haemorrhoidalis*	3
Idaea inquinata	32	*Dermestes peruvianus*	3
Sitophilus granarius	31	*Gibbium psyllodes*	3
Callosobruchus chinensis	26	*Gnathocerus cornutus*	3
Ephestia elutella	24	*Niptus hololeucus*	3
Cryptolestes pusilus	23	*Pseudeurostus hilleri*	3
Sitophilus zeamais	23	*Attagenus fasciatus*	2
Cryptolestes turcicus	21	*Carpophilus dimidiatus*	2
Pagiocerus frontalis	19	*Glischrochilus quadrisignatus*	2
Tineola bisselliella	18	*Ptinus fur*	2
Sitophilus oryzae	17	*Tribolium destructor*	2
Callosobruchus maculatus	16	*Typhaea stercorea*	2
Hofmannophila pseudospretella	16	*Zabrotes subfasciatus*	2
Tenebrio molitor	15	*Attagenus pellio*	1
Dermestes maculatus	14	*Cryptolestes pusilloides*	1
Acanthoscelides obtectus	13	*Cylas formicarius elegantulus*	1
Alphitobius diaperinus	13	*Dinoderus minutus*	1
Cathartus quadricollis	13	*Mezium affine*	1
Ahasverus advena	11	*Palorus subdepressus*	1
Prostephanus truncatus	9	*Ptinus clavipes*	1
Bruchidius atrolineatus	8	*Ptinus pusillus*	1
Callosobruchus analis	8	*Tenebrio obscurus*	1

TABLE 4.3 Species of stored-product insects feeding on fungi

Species	Source
Acanthoscelides obtectus	Sinha 1971
Ahasverus advena	David and Mills 1974, David et al. 1974, Hill 1978
Cryptolestes ferrugineus	Rilett 1949, Sinha 1965
Cryptolestes pusillus	Wright and Burroughs 1973
Cryptolestes turcicus	Chang and Loschiavo 1971
Cynaeus angustus	Sinha 1971
Dienerella arga	Sinha 1971
Lathridius minutus	Sinha 1971
Lepinotus reticulatus	Sinha 1971
Oryzaephilus mercator	Sinha 1965
Tribolium castaneum	Sinha 1966, Wright and Burroughs 1973
Tribolium confusum	Sinha 1966, Wright et al. 1980
Typhaea stercorea	Tsai et al. 2007

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CHAPTER 5

INFESTATION RECORDS

Literature citations for records of stored-product insect species infesting commodities are given in Table 5.1. Many insect species-commodity combinations were reported more than once, so the total number of records reported here is 15,611. The actual total number of records is likely to be much larger, because many records included multiple observations of an insect species-commodity combination. Conversely, some of these records are the result of cross contamination of commodities that are not suitable for insect development, reproduction and population growth (see Chapters 3 and 4). Also, some authors may have reported records from earlier papers rather than new records. For example, Carter (1984) has many of the same records as Hayhurst and Britten (1942), Patton (1931) and Richards and Thomson (1932), however, Carter (1984) also reports additional new records. Other problems with species-commodity association records are the incorrect identification of an insect or a commodity, inadequate description of the commodity and the lumping together of commodities.

There are 150 species-commodity combinations for which 10 or more records have been reported (Table 5.2). These records include 45 insect species and 38 commodities, representing some of the most common and economically important insect species and the life histories of all of these insect species have been studied. Ninty-five percent of these species have common names. The records for the insect species-commodity combinations may be less likely to be the result of cross contamination, because they have been reported quite often.

The numbers of species-commodity association records for each literature citation with more than 50 records are given in Table 5.3. The maximum species-commodity association was 960 records from a single source. Of the total 15,611 records (n=219 sources), 75.9% were from sources with 100 or more records (n=38 sources), 85.87% were from sources with 50 or more records (n=59 sources) and 93.6% were from sources with 20 or more records (n=110 sources). Only 6.4% of the species-commodity association records were from sources with less than 20 records (n=109). The largest number of sources with 50 or more records were from North American (n=10) followed by those from Africa (n=8) and Asia and the Middle East (n=7). The lowest number of sources were from Central America and the Caribbean (n=1), Europe (n=2), and Oceania (n=1). No studies with more than 50 records were included from South America. Twelve sources reported insects in imported commodities from many different countries and two sources reported insects sent from many countries for identification. The remaining 17 of thse sources were not restricted to a specific geographical region.

A total of 3995 of the 15,611 species-commodity association records (25.6%) were reported by only one source. The average for sources with more than 50 records was 20% with a range of 1.4 to 46.8% (Table 5.3). Conversely, on average, 75 to 80% of the species-commodity association records were confirmed by another source. Species-commodity associations records reported by only one source included some of the records for 74% of sources (n=163), 92% of the commodities (n=892) and 92% of the species (n=217).

TABLE 5.1 Commodities reported to be infested by each insect species and literature sources for these records (n=7003).

Insect species	Commodity	Category[a]	Source[b]
Acanthoscelides obtectus	bambara groundnut	p	Forsyth66, Delobel-Tran93, Haines81, Kingsolver04, Walker79
Acanthoscelides obtectus	bean	p	Aitken75, Davies60, Haines81, Shomar63, Strong-Okumura58
Acanthoscelides obtectus	bean, white	p	Aitken75
Acanthoscelides obtectus	broad bean (fava bean, horsebean)	p	Anton et al97, Archibald-Chalmers83, Delobel-Tran93, Kingsolver04
Acanthoscelides obtectus	chickpea (Bengal gram, garbanzo)	p	Aton et al97, Delobel-Tran93, Kingsolver04
Acanthoscelides obtectus	coffee	bc	Haines74
Acanthoscelides obtectus	cowpea	p	Anton et al97, Archibald-Chalmers83, Campbell89, Davies60, Delobel-Tran93, Kingsolver04, Singh90
Acanthoscelides obtectus	hyaciath bean	p	Kingsolver04
Acanthoscelides obtectus	kidney bean	p	Aitken75, Anton et al97, Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Delobel-Tran93, Forsyth66, Gupta et al04, 05; Haines81, Hill02, Imura03, Kingsolver04, Pierrard62, Walker79
Acanthoscelides obtectus	lentil (masur)	p	Anton et al97, Delobel-Tran93, Kingsolver04
Acanthoscelides obtectus	lima bean	p	Aitken75, Anton et al97, Delobel-Tran93, Kingsolver04
Acanthoscelides obtectus	lupine seed	se	Kingsolver04, Pierrard62
Acanthoscelides obtectus	moth bean	p	Kingsolver04
Acanthoscelides obtectus	pea	p	Anton et al97, Campbell89, Davies60, Delobel-Tran93, Haines74, Imura03
Acanthoscelides obtectus	pigeonpea (arhar, red gram)	p	Delobel-Tran93, Haines81, Kingsolver04, Pierrard62, Singh90
Acanthoscelides obtectus	pulse	p	McFarlane63
Acanthoscelides obtectus	rice bean	p	Kingsolver04
Acanthoscelides obtectus	scarlet runner bean	p	Archibald-Chalmers83, Delobel-Tran93, Kingsolver04
Acanthoscelides obtectus	sesbania seed	p	Kingsolver04
Acanthoscelides obtectus	sorghum (broomcorn)	g	Strong-Okumura58
Acanthoscelides obtectus	soybean	p	Aitken75, Anton et al97, Delobel-Tran93, Kingsolver04

(*continued on next page*)

[a] Category abbreviations are from Table 3.2
[b] Source of infestation records are given as first author and last two digits of the year of publication

TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Acanthoscelides obtectus	tepary bean	p	Davies60, Delobel-Tran93
Acanthoscelides obtectus	wattle seed	se	Archibald-Chalmers83
Acanthoscelides obtectus	wheat bran (pollard)	gp	Archibald-Chalmers83
Acanthoscelides obtectus	yard long bean	p	Kingsolver04
Achroia grisella	apple, dried	df	Cotton-Good37
Achroia grisella	beehive	aninv	Cotton-Good37, Strong-Okumura58
Achroia grisella	berseem (Egyptian clover)	v	Attia-Kamel66
Achroia grisella	dried fruit	df	Carter84, Corbet-Tams43
Achroia grisella	grain, cereal	g	Cotton-Good37
Achroia grisella	honeycomb (bee, wasp)	aninv	Carter84, Corbet-Tams43, McFarlane63, Rajendran-Parveen05
Achroia grisella	insect, dried	aninv	Carter84, Corbet-Tams43
Achroia grisella	raisin	df	Cotton-Good37
Aglossa dimidiata	herbarium specimen	v	Imura03
Aglossa dimidiata	insect, dried	aninv	Carter84, Corbet-Tams43, Trematerra86
Aglossa dimidiata	medicine, Chinese traditional	me	Guilin et al99
Aglossa dimidiata	medicine, drug	me	Imura03
Aglossa dimidiata	rice	g	Carter84, Corbet-Tams43, Cotton-Good37, Imura03, Kim et al88
Aglossa dimidiata	tea leaf	bc	Carter84, Corbet-Tams43, Imura03, Trematerra86
Aglossa dimidiata	wheat	g	Imura03, Trematerra86, Watt65
Aglossa pinguinalis	barley	g	Attia-Kamel66, Cotton-Good37
Aglossa pinguinalis	book	oc	Trematerra86
Aglossa pinguinalis	butter	anv	Trematerra86
Aglossa pinguinalis	cereal (cereal product)	gp	Attia-Kamel66
Aglossa pinguinalis	cereal residue	res	Attia-Kamel66, Carter84
Aglossa pinguinalis	cheese	anv	Trematerra86
Aglossa pinguinalis	grain, cereal	g	Yan et al10
Aglossa pinguinalis	lard	anv	Trematerra86
Aglossa pinguinalis	rice	g	Trematerra86
Aglossa pinguinalis	seed	se	Carter84, Corbet-Tams43
Ahasverus advena	algarroba pod	p	Richards-Herford30
Ahasverus advena	almond hull	np	Okumura-Strong65
Ahasverus advena	animal feed	oc	Sinha-Watters85
Ahasverus advena	apple pomace	v	Sinha-Watters85, Strong-Okumura58
Ahasverus advena	apricot seed	se	Guilin et al99
Ahasverus advena	bamboo, dried leaf or shoot	v	Zimmerman90
Ahasverus advena	banana, dried	df	Howe-Freeman55

(*continued on next page*)

TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ahasverus advena	barley	g	Archibald-Chalmers83, Buchelos-Katopodis95, Calderon-Donahaye64, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83
Ahasverus advena	basketware, wicker	v	Archibald-Chalmers83
Ahasverus advena	BBQ sauce	oc	Zimmerman90
Ahasverus advena	bean	p	Hedges-Lacey96, Howe-Freeman55, Patton31, Strong-Okumura58, Wheeler21
Ahasverus advena	bean curd	pp	Olsen81, Zimmerman90
Ahasverus advena	bean sauce, chili	oc	Zimmerman90
Ahasverus advena	bean sauce, yellow	oc	Zimmerman90
Ahasverus advena	biscuit	bg	Hedges-Lacey96, Patton31
Ahasverus advena	bone	anv	Howe-Freeman55
Ahasverus advena	Brazil nut (para nut)	n	Delobel-Tran93
Ahasverus advena	bulb	r	Patton31, Richards-Herford30
Ahasverus advena	cake	bg	Sinha-Watters85, Strong-Okumura58
Ahasverus advena	cashew	n	Archibald-Chalmers83, Nair et al79, Pinheiro68
Ahasverus advena	cassava root chip	rp	Parker et al81, Wohlgemuth-Reichmuth83
Ahasverus advena	cassava root meal	rp	Pierrard62
Ahasverus advena	castor bean	se	Howe-Freeman55
Ahasverus advena	cereal (cereal product)	gp	Campbell89, Delobel-Tran93, Haines81, Halstead93, Hill02, Sinha-Watters85
Ahasverus advena	chocolate	bc	Haines81, Zimmerman90
Ahasverus advena	cocoa	bc	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Forsyth66, Hedges-Lacey96, Hill02, Imura03, Patton31, Richards-Herford30, Wheeler21
Ahasverus advena	cocoa bean	bc	Aitken75, Cornes73, Cotterell52, Halstead93, Howe-Freeman55, Olsen81, Schulten-Roorda84, Sinha-Watters85
Ahasverus advena	cocoa cake	bc	Howe-Freeman55
Ahasverus advena	coffee	bc	Archibald-Chalmers83, Casteels et al96, Davies60, Delobel-Tran93, Haines74, Patton31, Sinha-Watters85

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ahasverus advena	coffee bean	bc	Howe-Freeman55, Olsen81, Zimmerman90
Ahasverus advena	copra	osp	Aitken75, Archibald-Chalmers83, Bawalan04, Campbell89, Cornes73, Delobel-Tran93, Forsyth66, Hedges-Lacey96, Hill02, Howe-Freeman55, Haines81, Halstead93, Imura03, Sinha-Watters85
Ahasverus advena	copra meal	osp	Bawalan04, Wohlgemuth-Reichmuth83
Ahasverus advena	coriander	sea	Archibald-Chalmers83
Ahasverus advena	cottonseed	os	Howe-Freeman55
Ahasverus advena	cottonseed meal pellet	osp	Wohlgemuth-Reichmuth83
Ahasverus advena	cowpea	p	Delobel-Tran93
Ahasverus advena	date	df	Archibald-Chalmers83, Hedges-Lacey96, Patton31, Wheeler21
Ahasverus advena	dried fruit	df	Aitken75, Archibald-Chalmers83, Campbell89, Halstead93, Hill02
Ahasverus advena	egg plant	ffv	Archibald-Chalmers83
Ahasverus advena	fennel seed	se	Zimmerman90
Ahasverus advena	fig	ffv	Hedges-Lacey96, Patton31, Wheeler21
Ahasverus advena	fig, dried	df	Okumura-Strong65
Ahasverus advena	fish, preserved	anv	Zimmerman90
Ahasverus advena	flax	v	Archibald-Chalmers83
Ahasverus advena	flower, chrysanthemum dried (pyrethrum)	v	Guilin et al99
Ahasverus advena	flower, lily dried	v	Zimmerman90
Ahasverus advena	fungus, dried	v	Olsen81, Zimmerman90
Ahasverus advena	garlic	sea	Archibald-Chalmers83, Calderon-Donahaye64
Ahasverus advena	ginger	sea	Cornes73, Delobel-Tran93, Howe-Freeman55, Patton31, Richards-Herford30
Ahasverus advena	grain product	gp	Aitken75
Ahasverus advena	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Campbell89, Halstead93, Hedges-Lacey96, Hill02, Yan et al10
Ahasverus advena	grain, moldy	gs	Cotton-Good37, Imura03
Ahasverus advena	grass seed	se	Archibald-Chalmers83
Ahasverus advena	hay	v	Buchelos-Athanassiou98

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ahasverus advena	herb	v	Archibald-Chalmers83, Campbell89, Halstead93, Hill02, Richards-Herford30, Sinha-Watters85, Zimmerman90
Ahasverus advena	illipenut	os	Aitken75
Ahasverus advena	kidney bean	p	Delobel-Tran93
Ahasverus advena	kiwi	ffv	Archibald-Chalmers83
Ahasverus advena	leaf, dried	v	Zimmerman90
Ahasverus advena	licorice apricot	rp	Zimmerman90
Ahasverus advena	linseed meal	osp	Wohlgemuth-Reichmuth83
Ahasverus advena	litchi nut (lychee)	n	Archibald-Chalmers83, Wheeler21
Ahasverus advena	maize	g	Archibald-Chalmers83, Caliboso et al86, Cornes73, Davies60, Forsyth66, Haines81, Richards-Herford30, Sedlacek et al98, Sinha-Watters85, Strong-Okumura58, Tadesse96, Wheeler21
Ahasverus advena	maize bran	gp	Davies60
Ahasverus advena	maize cob	gp	Archibald-Chalmers83
Ahasverus advena	malt	gp	Pierrard62
Ahasverus advena	mango	ffv	Archibald-Chalmers83
Ahasverus advena	medicine, Chinese traditional	me	Guilin et al99
Ahasverus advena	medicine, dandelion	me	Guilin et al99
Ahasverus advena	medicine, herbal	me	Basak91
Ahasverus advena	medicine, Indian madder	me	Basak91
Ahasverus advena	medicine, senna pod	me	Weidner73
Ahasverus advena	melon	ffv	Archibald-Chalmers83
Ahasverus advena	melon rind	v	Olsen81
Ahasverus advena	millet	g	Archibald-Chalmers83
Ahasverus advena	mushroom, dried	v	Archibald-Chalmers83
Ahasverus advena	mussel, dried	aninv	Zimmerman90
Ahasverus advena	nut	n	Imura03, Schulten-Roorda84, Zimmerman90
Ahasverus advena	nutmeg (mace)	sea	Delobel-Tran93, Patton31, Richards-Herford30, Schulten-Roorda84
Ahasverus advena	oat	g	Sinha-Watters85, Strong-Okumura58
Ahasverus advena	oilcake	osp	Aitken75
Ahasverus advena	oilseed	os	Aitken75, Campbell89, Halstead93, Imura03
Ahasverus advena	olive	oc	Wohlgemuth-Reichmuth83
Ahasverus advena	onion	ffv	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ahasverus advena	orange	ffv	Archibald-Chalmers83
Ahasverus advena	orange pomace	v	Sinha-Watters85, Strong-Okumura58
Ahasverus advena	orchard grass seed	se	Archibald-Chalmers83
Ahasverus advena	paddy	g	Haines81, Pires et al07
Ahasverus advena	palm kernel	os	Aitken75, Allotey88, Calderon-Donahaye64, Cornes73, Delobel-Tran93, Hedges-Lacey96, Hill02, Howe-Freeman55, Sinha-Watters85
Ahasverus advena	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Ahasverus advena	peach	ffv	Archibald-Chalmers83
Ahasverus advena	peanut	os	Archibald-Chalmers83, Arthur56, Champ65, Cornes73, Cotterell52, Delobel-Tran93, Haines81, Halstead93, Hedges-Lacey96, Hill02, Howe-Freeman55, Imura03, Redlinger-Davis82, Schulten-Roorda84, Sinha-Watters85, Wohlgemuth-Reichmuth83
Ahasverus advena	peanut oilcake	osp	Howe-Freeman55
Ahasverus advena	pepper	sea	Delobel-Tran93
Ahasverus advena	pepper, black	sea	White57
Ahasverus advena	pepper, chilli paste	sea	Zimmerman90
Ahasverus advena	pepper, pod dried chilli	sea	Archibald-Chalmers83, Olsen81, Zimmerman87, 90
Ahasverus advena	pigeonpea (arhar, red gram)	p	Delobel-Tran93
Ahasverus advena	pine nut	v	Richards-Herford30
Ahasverus advena	pineapple	ffv	Archibald-Chalmers83
Ahasverus advena	plum	ffv	Zimmerman90
Ahasverus advena	prune	df	Olsen81
Ahasverus advena	pulse	p	Schulten-Roorda84
Ahasverus advena	raisin	df	Archibald-Chalmers83, Okumura-Strong65
Ahasverus advena	rice	g	Archibald-Chalmers83, Cornes73, Forsyth66, Haines81, Imura03, Patton31, Pierrard62, Stejskal-Kucerova93, Wheeler21
Ahasverus advena	rice meal	gp	Caliboso et al86
Ahasverus advena	root (tuber)	r	Halstead93, Wheeler21
Ahasverus advena	root, dried (tuber)	r	Campbell89, Hill02

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ahasverus advena	root, dried cassava (manioc)	r	Archibald-Chalmers83, Delobel92, Delobel-Tran93, Forsyth66, Ratti-Rampini77
Ahasverus advena	root, lonchocarpus (rotenone)	r	Downes-Williams50
Ahasverus advena	safflower	os	Sinha-Watters85, Strong-Okumura58
Ahasverus advena	sago flour	v	Aitken75
Ahasverus advena	seafood, dried	aninv	Archibald-Chalmers83
Ahasverus advena	sesame seed	os	Cornes73, Howe-Freeman55
Ahasverus advena	sheanut	n	Cornes73, Delobel-Tran93, Forsyth66, Howe-Freeman55
Ahasverus advena	shrimp, dried	aninv	Olsen81
Ahasverus advena	sorghum (broomcorn)	g	Archibald-Chalmers83, Cornes73, Giles64, Sinha-Watters85, Strong-Okumura58
Ahasverus advena	soup mix, dried	oc	Olsen81, Zimmerman90
Ahasverus advena	soybean	p	Archibald-Chalmers83, Howe-Freeman55
Ahasverus advena	spice	sea	Archibald-Chalmers83, Campbell89, Halstead93, Hill02, Sinha-Watters85, Zimmerman90
Ahasverus advena	sunflower seed	os	Athanassov74
Ahasverus advena	sweet potato	r	Delobel-Tran93
Ahasverus advena	tamarind	v	Olsen81
Ahasverus advena	tapioca	r	Delobel-Tran93
Ahasverus advena	tapioca shred	rp	Zimmerman90
Ahasverus advena	taro	r	Archibald-Chalmers83
Ahasverus advena	tobacco leaf	v	Cornes73, Hedges-Lacey96, Livingstone-Reed36, Patton31
Ahasverus advena	tomato	ffv	Archibald-Chalmers83
Ahasverus advena	tomato, dried	v	Zimmerman90
Ahasverus advena	turmeric	sea	Archibald-Chalmers83
Ahasverus advena	turtle shell	anv	Archibald-Chalmers83
Ahasverus advena	vegetable, preserved	v	Zimmerman90
Ahasverus advena	wheat	g	Archibald-Chalmers83, Haines81, Patton31, Sinha-Watters85, Wheeler21
Ahasverus advena	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Wohlgemuth-Reichmuth83
Ahasverus advena	wheat flour	gp	Buchelos-Athanassiou98, Cotton-Good37, Hedges-Lacey96, Hill02, Patton31, Wheeler21
Ahasverus advena	wheat meal	gp	Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ahasverus advena	yam	r	Cornes73, Delobel-Tran93, Hedges-Lacey96, Patton31, Richards-Herford30
Alphitobius diaperinus	animal feed	oc	Archibald-Chalmers83, Gorham91, McFarlane63, Strong-Okumura58
Alphitobius diaperinus	animal product	anv	Aitken75
Alphitobius diaperinus	apricot seed	se	Guilin et al99
Alphitobius diaperinus	barley	g	Gorham91, Strong-Okumura58
Alphitobius diaperinus	bean	p	Kiritani59
Alphitobius diaperinus	bean sauce, yellow	oc	Zimmerman90
Alphitobius diaperinus	bean, split	pp	Zimmerman90
Alphitobius diaperinus	betel nut (areca nut)	n	Patton31
Alphitobius diaperinus	biscuit	bg	Delobel-Tran93, Gorham91
Alphitobius diaperinus	black gram (mash, urd)	p	Gorham91
Alphitobius diaperinus	bone	anv	Cornes73, Gorham91
Alphitobius diaperinus	bread	bg	Patton31
Alphitobius diaperinus	casein, dried	anv	Rajendran-Parveen05
Alphitobius diaperinus	cashew	n	Nair et al79, Pinheiro68
Alphitobius diaperinus	cassava root chip	rp	Gorham91, Parker et al81
Alphitobius diaperinus	castor bean	se	Kiritani59
Alphitobius diaperinus	cereal (cereal product)	gp	Delobel-Tran93, Gorham91, Hayhurst-Britten42, Richards-Herford30
Alphitobius diaperinus	cereal product, spoiled	gs	Campbell89
Alphitobius diaperinus	chocolate	bc	Delobel-Tran93, Gorham91, Hayhurst-Britten42, Richards-Herford30
Alphitobius diaperinus	cocoa	bc	Forsyth66, Gorham91, Hayhurst-Britten42, Richards-Herford30
Alphitobius diaperinus	cocoa bean	bc	Aitken75
Alphitobius diaperinus	coffee bean	bc	Delobel-Tran93, Zimmerman90
Alphitobius diaperinus	copra	osp	Aitken75, Gorham91, Haines81, Kiritani59
Alphitobius diaperinus	copra meal	osp	Wohlgemuth-Reichmuth83
Alphitobius diaperinus	copra oilcake	osp	Haines81, Wohlgemuth-Reichmuth83
Alphitobius diaperinus	coriander	sea	Archibald-Chalmers83
Alphitobius diaperinus	cottonseed	os	Attia-Kamel66, Davies60, Delobel-Tran93, Gorham91Hayhurst-Britten42, Kiritani59, Richards-Herford30, Strong-Okumura58
Alphitobius diaperinus	cottonseed meal	osp	Wohlgemuth-Reichmuth83
Alphitobius diaperinus	cottonseed oilcake	osp	Pierrard62
Alphitobius diaperinus	cowpea	p	Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Alphitobius diaperinus	fertilizer	oc	Archibald-Chalmers83
Alphitobius diaperinus	fishmeal	anv	Haines81
Alphitobius diaperinus	flax seed	os	Gorham91
Alphitobius diaperinus	fungus, dried	v	Olsen81
Alphitobius diaperinus	grain product	gp	Aitken75
Alphitobius diaperinus	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Yan et al10
Alphitobius diaperinus	grain, moldy	gs	Cotton-Good37, Gorham91, Imura03
Alphitobius diaperinus	gum dammar	v	Gorham91, Hayhurst-Britten42
Alphitobius diaperinus	hay	v	Buchelos-Athanassiou98
Alphitobius diaperinus	hide, pelt or skin	anv	Archibald-Chalmers83, Delobel-Tran93, Gorham91, Hayhurst-Britten42
Alphitobius diaperinus	illipenut	os	Aitken75
Alphitobius diaperinus	kapok seed	se	Archibald-Chalmers83, Kiritani59
Alphitobius diaperinus	linseed	os	Delobel-Tran93, Gorham91, Hayhurst-Britten42, Richards-Herford30
Alphitobius diaperinus	maize	g	Caliboso et al86, Davies60, Forsyth66, Haines81, Kiritani59, Patton31, Sedlacek98
Alphitobius diaperinus	maize meal	gp	Davies60, Wohlgemuth-Reichmuth83
Alphitobius diaperinus	meat meal	anv	Awadallah et al90
Alphitobius diaperinus	medicine, Chinese traditional	me	Guilin et al99
Alphitobius diaperinus	medicine, drug	me	Gorham91
Alphitobius diaperinus	millet	g	Guilin et al99
Alphitobius diaperinus	mung bean	p	Olsen81
Alphitobius diaperinus	mushroom, dried	v	Delobel-Tran93
Alphitobius diaperinus	noodle	gp	Archibald-Chalmers83
Alphitobius diaperinus	oat	g	Calderon-Donahaye64
Alphitobius diaperinus	oatmeal	gp	Gorham91
Alphitobius diaperinus	oilcake	osp	Aitken75, Delobel-Tran93
Alphitobius diaperinus	oilseed	os	Aitken75
Alphitobius diaperinus	oilseed product	osp	Gorham91
Alphitobius diaperinus	paddy	g	Pires et al07
Alphitobius diaperinus	palm kernel	os	Allotey88, Kiritani59
Alphitobius diaperinus	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Alphitobius diaperinus	peanut	os	Archibald-Chalmers83, Champ65, Delobel-Tran93, Gorham91, Hayhurst-Britten42, Patton31, Redlinger-Davis82, Richards-Herford30
Alphitobius diaperinus	peanut meal	osp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Alphitobius diaperinus	peanut, shelled	osp	Wohlgemuth-Reichmuth83
Alphitobius diaperinus	pepper, white	sea	Weidner73
Alphitobius diaperinus	pimento	sea	McFarlane63
Alphitobius diaperinus	rice	g	Archibald-Chalmers83, Douglas41, Gorham91, Haines81, Kiritani59, Patton31, Zimmerman90
Alphitobius diaperinus	rice bran	gp	Caliboso et al86, Wohlgemuth-Reichmuth83
Alphitobius diaperinus	rice flour	gp	Kiritani59
Alphitobius diaperinus	rice meal	gp	Caliboso et al86, Hayhurst-Britten42, McFarlane63, Wohlgemuth-Reichmuth83
Alphitobius diaperinus	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93, Gorham91, Wohlgemuth-Reichmuth83
Alphitobius diaperinus	sesame seed	os	Kiritani59
Alphitobius diaperinus	silkworm cocoon	aninv	Gorham91
Alphitobius diaperinus	sisal	v	Archibald-Chalmers83
Alphitobius diaperinus	sorghum (broomcorn)	g	Cornes73
Alphitobius diaperinus	soybean	p	Delobel-Tran93, Gorham91
Alphitobius diaperinus	soybean flour	pp	Wohlgemuth-Reichmuth83
Alphitobius diaperinus	soybean meal	pp	Caliboso et al86
Alphitobius diaperinus	spice	sea	Archibald-Chalmers83
Alphitobius diaperinus	straw	v	Calderon-Donahaye64
Alphitobius diaperinus	sunflower seed	os	Athanassov74
Alphitobius diaperinus	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Alphitobius diaperinus	sweet potato	r	Delobel-Tran93, Gorham91
Alphitobius diaperinus	taro	r	Archibald-Chalmers83
Alphitobius diaperinus	tobacco leaf	v	Calderon-Donahaye64, Gorham91, Hayhurst-Britten42, Richards-Herford30
Alphitobius diaperinus	wheat	g	Archibald-Chalmers83, Athanassiou et al01, Attia-Kamel66, Calderon-Donahaye64, Caliboso et al86, Casteels et al96, Gorham91, Strong-Okumura58, Trematerra-Gentile06
Alphitobius diaperinus	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Davies60, Pierrard62
Alphitobius diaperinus	wheat flour	gp	Buchelos-Athanassiou98, Delobel-Tran93, Gorham91, Haines81, Hayhurst-Britten42, Imura03, Patton31
Alphitobius diaperinus	wheat, damp moldy	gs	Calderon-Donahaye64, Cotton-Good37
Alphitobius diaperinus	yam	r	Sauphanor et al87, Cornes73

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Alphitobius laevigatus	animal feed	oc	Gorham91, Strong-Okumura58
Alphitobius laevigatus	animal product	anv	Aitken75, Delobel-Tran93, Gorham91, McFarlane63
Alphitobius laevigatus	apricot seed	se	Guilin et al99
Alphitobius laevigatus	barley	g	Archibald-Chalmers83
Alphitobius laevigatus	bread	bg	Hedges-Lacey96
Alphitobius laevigatus	cashew	n	Nair et al79, Pinheiro68
Alphitobius laevigatus	cereal (cereal product)	gp	Delobel-Tran93, Gorham91, Hayhurst-Britten42, Hedges-Lacey96, McFarlane63
Alphitobius laevigatus	chocolate	bc	Hedges-Lacey96
Alphitobius laevigatus	cocoa	bc	Gorham91, Hedges-Lacey96, Richards-Herford30
Alphitobius laevigatus	cocoa bean	bc	Aitken75, Cornes73, Delobel-Tran93
Alphitobius laevigatus	coffee	bc	Nayar et al76
Alphitobius laevigatus	coffee bean	bc	Zimmerman90
Alphitobius laevigatus	copra	osp	Aitken75, Gorham91, Haines81
Alphitobius laevigatus	copra meal	osp	Wohlgemuth-Reichmuth83
Alphitobius laevigatus	copra oilcake	osp	Haines81, Wohlgemuth-Reichmuth83
Alphitobius laevigatus	cottonseed	os	Cotterell52, Davies60, Gorham91, Hayhurst-Britten42, Hedges-Lacey96, Strong-Okumura58
Alphitobius laevigatus	cottonseed oilcake	osp	Wohlgemuth-Reichmuth83
Alphitobius laevigatus	dried fruit	df	Delobel-Tran93, Gorham91
Alphitobius laevigatus	fish, dried	anv	Cornes73
Alphitobius laevigatus	ginger	sea	Weidner73
Alphitobius laevigatus	grain product	gp	Aitken75
Alphitobius laevigatus	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Gorham91, Strong-Okumura58, Yan et al10
Alphitobius laevigatus	grain, moldy	gs	Cotton-Good37, Gorham91, Imura03
Alphitobius laevigatus	grass seed	se	Archibald-Chalmers83
Alphitobius laevigatus	hide, pelt or skin	anv	McFarlane63
Alphitobius laevigatus	horn	anv	Cornes73
Alphitobius laevigatus	illipenut	os	Aitken75, Delobel-Tran93, Gorham91
Alphitobius laevigatus	linseed	os	Hayhurst-Britten42, Hedges-Lacey96
Alphitobius laevigatus	maize	g	Caliboso et al86, Cornes73, Davies60, Forsyth66, Haines81, Hedges-Lacey96, McFarlane63

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Alphitobius laevigatus	maize meal	gp	Davies60
Alphitobius laevigatus	meat, cured, dried or smoked	anv	Delobel-Tran93
Alphitobius laevigatus	medicine, Chinese traditional	me	Guilin et al99
Alphitobius laevigatus	millet	g	Cornes73
Alphitobius laevigatus	nut	n	Archibald-Chalmers83, Delobel-Tran93, Gorham91
Alphitobius laevigatus	oilcake	osp	Aitken75, Delobel-Tran93
Alphitobius laevigatus	oilseed	os	Aitken75, Gorham91
Alphitobius laevigatus	oilseed product	osp	Gorham91
Alphitobius laevigatus	onion	ffv	Nayar et al76
Alphitobius laevigatus	paddy	g	Haines81
Alphitobius laevigatus	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Alphitobius laevigatus	peanut	os	Archibald-Chalmers83, Champ65, Cornes73, Cotterell52, Delobel-Tran93, Gorham91, Haines81, Hayhurst-Britten42, Hedges-Lacey96, Nayar et al76
Alphitobius laevigatus	pulse	p	Delobel-Tran93, Gorham91
Alphitobius laevigatus	rice	g	Haines81
Alphitobius laevigatus	rice meal	gp	Caliboso et al86, McFarlane63
Alphitobius laevigatus	root, derris (rotenone)	r	Downes-Williams50
Alphitobius laevigatus	root, dried cassava (manioc)	r	Davies60, Haines81
Alphitobius laevigatus	root, lonchocarpus (rotenone)	r	Downes-Williams50
Alphitobius laevigatus	sesame seed	os	Archibald-Chalmers83, Cornes73
Alphitobius laevigatus	sheanut	n	Cornes73, Davies60
Alphitobius laevigatus	sisal	v	Archibald-Chalmers83
Alphitobius laevigatus	sorghum (broomcorn)	g	Cornes73, Davies60
Alphitobius laevigatus	soybean	p	Hayhurst-Britten42
Alphitobius laevigatus	spice	sea	Gorham91
Alphitobius laevigatus	sugar beet	r	Gorham91, Strong-Okumura58
Alphitobius laevigatus	sunflower	os	Davies60
Alphitobius laevigatus	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Alphitobius laevigatus	tamarind	v	Nayar et al76
Alphitobius laevigatus	tobacco leaf	v	Hayhurst-Britten42
Alphitobius laevigatus	vegetable material, dried	v	Archibald-Chalmers83
Alphitobius laevigatus	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Gorham91, Strong-Okumura58
Alphitobius laevigatus	wheat flour	gp	Caliboso et al86, Hayhurst-Britten42, Hedges-Lacey96, Imura03

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Alphitobius laevigatus	wheat flour, damp moldy	gs	Cotton-Good37
Alphitophagus bifasciatus	animal feed	oc	Gorham91, Strong-Okumura58
Alphitophagus bifasciatus	barley	g	Calderon-Donahaye64, Gorham91, Strong-Okumura58
Alphitophagus bifasciatus	bean	p	Gorham91, Strong-Okumura58
Alphitophagus bifasciatus	cereal (cereal product)	gp	Delobel-Tran93
Alphitophagus bifasciatus	cereal product, spoiled	gs	Gorham91
Alphitophagus bifasciatus	chickpea (Bengal gram, garbanzo)	p	Gorham91, Strong-Okumura58
Alphitophagus bifasciatus	copra	osp	Aitken75
Alphitophagus bifasciatus	cottonseed	os	Attia-Kamel66
Alphitophagus bifasciatus	cottonseed oilcake	osp	Delobel-Tran93
Alphitophagus bifasciatus	food, decaying	sp	Imura03
Alphitophagus bifasciatus	grain product	gp	Cotton-Good37
Alphitophagus bifasciatus	grain, cereal	g	Buchelos-Athanassiou98, Yan et al10
Alphitophagus bifasciatus	grain, moldy	gs	Cotton-Good37, Imura03
Alphitophagus bifasciatus	hoof	anv	Aitken75
Alphitophagus bifasciatus	horn	anv	Aitken75
Alphitophagus bifasciatus	maize	g	Sedlacek et al98
Alphitophagus bifasciatus	maize meal, moldy	gs	Gorham91
Alphitophagus bifasciatus	oat	g	Campbell89
Alphitophagus bifasciatus	palm kernel	os	Aitken75
Alphitophagus bifasciatus	rice	g	Gorham91, Kim et al88, Strong-Okumura58
Alphitophagus bifasciatus	sago flour	v	Aitken75
Alphitophagus bifasciatus	sorghum (broomcorn)	g	Gorham91
Alphitophagus bifasciatus	sunflower seed	os	Athanassov74, Stojanovic-Kosovac74
Alphitophagus bifasciatus	vegetable material, decaying	sp	Gorham91
Alphitophagus bifasciatus	wheat	g	Attia-Kamel66, Gorham91, Strong-Okumura58
Alphitophagus bifasciatus	wheat flour	gp	Aitken75, Buchelos-Athanassiou98
Anobium punctatum	book	oc	Calderon-Donahaye64
Anobium punctatum	orchard grass seed	se	Archibald-Chalmers83
Anobium punctatum	root, dried cassava (manioc)	r	Hill02
Anobium punctatum	wood	w	Calderon-Donahaye64, Hayhurst-Britten42, Hill02
Anobium punctatum	wood furniture	w	Campbell89, Calderon-Donahaye64
Anthrenus coloratus	animal specimen	anv	Ansari-Basalingappa86, Rajendran-Parveen05

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Anthrenus coloratus	bone	anv	Aitken75
Anthrenus coloratus	caraway seed	se	Ansari-Basalingappa86, Hinton45
Anthrenus coloratus	carrot	r	Nayar et al76
Anthrenus coloratus	hide, pelt or skin	anv	Delobel-Tran93
Anthrenus coloratus	insect, dried	aninv	Ansari-Basalingappa86
Anthrenus coloratus	wool	anv	Rajendran-Parveen05, VijayVeer-Rao95, VijayVeer et al91
Anthrenus flavipes	animal feed	oc	Strong-Okumura58
Anthrenus flavipes	animal specimen, mammal	anv	Ayappa et al57
Anthrenus flavipes	apricot seed	se	Aitken75, Peacock93
Anthrenus flavipes	barley	g	Strong-Okumura58
Anthrenus flavipes	bedding (blanket, spread)	t	Patton31
Anthrenus flavipes	blood, dried	anv	Ayappa et al57
Anthrenus flavipes	bone	anv	Aitken75, Delobel-Tran93
Anthrenus flavipes	bone meal	anv	Aitken75, Peacock93
Anthrenus flavipes	book	oc	Ayappa et al57, Peacock93
Anthrenus flavipes	bristle, brush	anv	Beal03, Calderon-Donahaye64, Campbell89, Hedges-Lacey96, Patton31, Peacock93
Anthrenus flavipes	carpet	t	Hedges-Lacey96, Patton31
Anthrenus flavipes	casein	anv	Ayappa et al57
Anthrenus flavipes	cheese	anv	Ayappa et al57
Anthrenus flavipes	cloth	t	Archibald-Chalmers83, Hedges-Lacey96
Anthrenus flavipes	cloth, cotton	t	Ayappa et al57
Anthrenus flavipes	cloth, linen	t	Ayappa et al57
Anthrenus flavipes	cottonseed oilcake	osp	Aitken75, Peacock93
Anthrenus flavipes	feather	anv	Archibald-Chalmers83, Beal03, Campbell89, Hedges-Lacey96, Peacock93
Anthrenus flavipes	fur	anv	Beal03, Campbell89, Hedges-Lacey96, Peacock93
Anthrenus flavipes	furniture, upholstered	oc	Archibald-Chalmers83, Hedges-Lacey96, Patton31
Anthrenus flavipes	grain, old	g	Ayappa et al57
Anthrenus flavipes	hair	anv	Campbell89, Delobel-Tran93, Hedges-Lacey96, Patton31, Peacock93
Anthrenus flavipes	hide, pelt or skin	anv	Delobel-Tran93, Peacock93
Anthrenus flavipes	hoof	anv	Aitken75
Anthrenus flavipes	horn	anv	Aitken75, Beal03, Campbell89, Delobel-Tran93, Hedges-Lacey96

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Anthrenus flavipes	insect, dried	aninv	Delobel-Tran93, Peacock93
Anthrenus flavipes	jute	v	Hedges-Lacey96
Anthrenus flavipes	leather	anv	Hedges-Lacey96
Anthrenus flavipes	mohair	anv	Peacock93
Anthrenus flavipes	museum collection	oc	Rajendran-Parveen05
Anthrenus flavipes	pepper, bell or green	ffv	Aitken75
Anthrenus flavipes	rice	g	Aitken75, Peacock93
Anthrenus flavipes	silk	aninv	Ayappa et al57, Beal03, Hedges-Lacey96
Anthrenus flavipes	silkworm cocoon	aninv	Kim et al99, Rajendran-Parveen05, VijayVeer et al96
Anthrenus flavipes	sponge	aninv	Ayappa et al57
Anthrenus flavipes	tortoise shell	anv	Campbell89, Hedges-Lacey96, Peacock93
Anthrenus flavipes	wheat germ	gp	Aitken75
Anthrenus flavipes	wood, soft	w	Ayappa et al57
Anthrenus flavipes	wool	anv	Beal03, Campbell89, Delobel-Tran93, Hedges-Lacey96, Patton31, Peacock93, Rajendren-Parveen05, VijayVeer-Rao95, VijayVeer et al91
Anthrenus fuscus	insect, dried	aninv	Beal03, Peacock93
Anthrenus nipponensis	animal specimen	anv	Imura03, Rajendran-Parveen05
Anthrenus nipponensis	fur	anv	Imura03
Anthrenus nipponensis	grain, cereal	g	Yan et al10
Anthrenus nipponensis	silkworm cocoon	aninv	Kim et al99, Rajendran-Parveen05
Anthrenus nipponensis	wool	anv	Rajendran-Parveen05
Anthrenus pimpinellae	animal feed	oc	Strong-Okumura58
Anthrenus pimpinellae	fish, dried	anv	Campbell89, Patton31, Peacock93
Anthrenus pimpinellae	furniture, upholstered	oc	Campbell89
Anthrenus pimpinellae	hair	anv	Campbell89, Peacock93
Anthrenus pimpinellae	insect, dried	aninv	Beal03, Campbell89, Peacock93
Anthrenus pimpinellae	saddle	oc	Campbell89
Anthrenus pimpinellae	silkworm cocoon	aninv	VijayVeer et al96
Anthrenus pimpinellae	wool	anv	Campbell89, Peacock93, Rajendran-Parveen05
Anthrenus scrophulariae	animal feed	oc	Strong-Okumura58
Anthrenus scrophulariae	barley, rolled	gp	Strong-Okumura58
Anthrenus scrophulariae	bristle	anv	Campbell89, Hinton45, Patton31, Peacock93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Anthrenus scrophulariae	carpet	t	Campbell89, Cotton-Good37, Hedges-Lacey96, Hinton45, Patton31
Anthrenus scrophulariae	cloth	t	Peacock93
Anthrenus scrophulariae	feather	anv	Campbell89, Cotton-Good37, Hedges-Lacey96, Hinton45, Patton31, Peacock93
Anthrenus scrophulariae	fur	anv	Campbell89, Hedges-Lacey96, Hinton45, Patton31, Peacock93
Anthrenus scrophulariae	furniture, upholstered	oc	Cotton-Good37
Anthrenus scrophulariae	grain	g	Yan et al10
Anthrenus scrophulariae	hair	anv	Campbell89, Hinton45, Peacock93
Anthrenus scrophulariae	hair brush	oc	Hedges-Lacey96
Anthrenus scrophulariae	herbarium specimen	v	Hedges-Lacey96
Anthrenus scrophulariae	hide, pelt or skin	anv	Patton31
Anthrenus scrophulariae	horn	anv	Campbell89, Hinton45, Peacock93
Anthrenus scrophulariae	insect, dried	aninv	Campbell89, Hinton45, Peacock93
Anthrenus scrophulariae	leather	anv	Hedges-Lacey96
Anthrenus scrophulariae	museum collection	oc	Cotton-Good37, Hedges-Lacey96, Hinton45, Patton31
Anthrenus scrophulariae	oat	g	Okumura-Strong65
Anthrenus scrophulariae	rye flour	gp	Cotton-Good37, Peacock93
Anthrenus scrophulariae	silk	aninv	Campbell89, Hedges-Lacey96, Hinton45, Patton31, Peacock93, VijayVeer et al96
Anthrenus scrophulariae	vegetable material, dried	v	Peacock93
Anthrenus scrophulariae	water grass seed	se	Strong-Okumura58
Anthrenus scrophulariae	wheat	g	Campbell89, Peacock93
Anthrenus scrophulariae	wheat flour	gp	Cotton-Good37
Anthrenus scrophulariae	wool	anv	Campbell89, Cotton-Good37, Hedges-Lacey96, Hinton45, Patton31, Rajendran-Parveen05
Anthrenus verbasci	almond hull meal	np	Strong-Okumura58
Anthrenus verbasci	animal feed	oc	Strong-Okumura58
Anthrenus verbasci	animal product	anv	Cotton-Good37
Anthrenus verbasci	animal specimen	anv	Peacock93, Rajendran-Parveen05, Richards-Herford30
Anthrenus verbasci	baby food	oc	Peacock93
Anthrenus verbasci	barley	g	Strong-Okumura58
Anthrenus verbasci	barley, rolled	gp	Strong-Okumura58
Anthrenus verbasci	bean	p	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Anthrenus verbasci	bedding (blanket, spread)	t	Peacock93
Anthrenus verbasci	beehive	aninv	Strong-Okumura58
Anthrenus verbasci	biscuit	bg	Peacock93
Anthrenus verbasci	blood meal	anv	Strong-Okumura58
Anthrenus verbasci	bone skeleton	anv	Hinton45
Anthrenus verbasci	bone, whale	anv	Hinton45
Anthrenus verbasci	book	oc	Hinton45, Peacock93
Anthrenus verbasci	bristle	anv	Hinton45
Anthrenus verbasci	cake	bg	Hinton45, Peacock93
Anthrenus verbasci	carpet	t	Archibald-Chalmers83, Hedges-Lacey96, Patton31
Anthrenus verbasci	casein, dried	anv	Archibald-Chalmers83, Rajendran-Parveen05
Anthrenus verbasci	cereal (cereal product)	gp	Gorham91, Hedges-Lacey96, Peacock93
Anthrenus verbasci	cheese	anv	Peacock93
Anthrenus verbasci	chickpea (Bengal gram, garbanzo)	p	Strong-Okumura58
Anthrenus verbasci	cloth	t	Archibald-Chalmers83, Peacock93
Anthrenus verbasci	clover seed	se	Strong-Okumura58
Anthrenus verbasci	copra meal	osp	Strong-Okumura58
Anthrenus verbasci	cotton	t	Archibald-Chalmers83
Anthrenus verbasci	cottonseed	os	Strong-Okumura58
Anthrenus verbasci	cuttle fish, dried	aninv	Archibald-Chalmers83
Anthrenus verbasci	dried fruit	df	Peacock93
Anthrenus verbasci	egg, dried	anv	Strong-Okumura58
Anthrenus verbasci	feather	anv	Archibald-Chalmers83, Cotton-Good37, Hedges-Lacey96, Hinton45, Patton31
Anthrenus verbasci	fishmeal	anv	Hedges-Lacey96, Strong-Okumura58
Anthrenus verbasci	fur	anv	Campbell89, Hedges-Lacey96, Hinton45, Patton31
Anthrenus verbasci	grain, cereal	g	Buchelos-Athanassiou98, Cotton-Good37, Imura03, Yan et al10
Anthrenus verbasci	hair	anv	Cotton-Good37, Delobel-Tran93, Hedges-Lacey96, Hinton45
Anthrenus verbasci	hide, pelt or skin	anv	Delobel-Tran93, Hedges-Lacey96, Hinton45, Patton31, Strong-Okumura58
Anthrenus verbasci	horn	anv	Campbell89, Hedges-Lacey96, Hinton45, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Anthrenus verbasci	insect, dried	aninv	Archibald-Chalmers83, Beal03, Campbell89, Cotton-Good37, Delobel-Tran93, Hedges-Lacey96,Hinton45, Imura03, Peacock93, Strong-Okumura58
Anthrenus verbasci	insulation, house	oc	Peacock93
Anthrenus verbasci	leather	anv	Hinton45
Anthrenus verbasci	maize	g	Gorham91, Patton31, Peacock93, Richards-Herford30, Strong-Okumura58
Anthrenus verbasci	maize ear	g	Hinton45
Anthrenus verbasci	maize meal	gp	Strong-Okumura58
Anthrenus verbasci	medicine, belladonna leaf	me	Hinton45
Anthrenus verbasci	medicine, drug	me	Gorham91, Hinton45, Peacock93
Anthrenus verbasci	medicine, herbal	me	Toh98
Anthrenus verbasci	melon seed	se	Strong-Okumura58
Anthrenus verbasci	milk, dried	anv	Somerfield et al80
Anthrenus verbasci	nut	n	Peacock93
Anthrenus verbasci	oat	g	Hinton45, Peacock93
Anthrenus verbasci	paper	wp	Archibald-Chalmers83
Anthrenus verbasci	peanut	os	Aitken75, Champ65, Gorham91, Hinton45, Peacock93
Anthrenus verbasci	peanut meal	osp	Hinton45
Anthrenus verbasci	pepper, black	sea	White57
Anthrenus verbasci	pepper, cayenne	sea	Hinton45, Peacock93
Anthrenus verbasci	pepper, red	sea	Hedges-Lacey96
Anthrenus verbasci	potato, dried	r	Okumura-Strong65
Anthrenus verbasci	raisin	df	Aitken75
Anthrenus verbasci	rice	g	Archibald-Chalmers83, Douglas41, Peacock93, Strong-Okumura58
Anthrenus verbasci	rice meal	gp	Strong-Okumura58
Anthrenus verbasci	rye	g	Strong-Okumura58
Anthrenus verbasci	rye meal	gp	Hinton45, Patton31
Anthrenus verbasci	sausage rusk	oc	Peacock93
Anthrenus verbasci	seed	se	Cotton-Good37, Gorham91, Hinton45, Peacock93
Anthrenus verbasci	silk	aninv	Hedges-Lacey96, Hinton45, Patton31, VijayVeer et al96
Anthrenus verbasci	silkworm cocoon	aninv	Kim et al99, Peacock93, Rajendran-Parveen05, VijayVeer et al96

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Anthrenus verbasci	sorghum (broomcorn)	g	Strong-Okumura58
Anthrenus verbasci	soybean meal	pp	Strong-Okumura58
Anthrenus verbasci	spice	sea	Gorham91, Peacock93
Anthrenus verbasci	Sudan grass seed	se	Strong-Okumura58
Anthrenus verbasci	tobacco leaf	v	Archibald-Chalmers83, Livingstone-Reed36
Anthrenus verbasci	walnut	n	Aitken75, Archibald-Chalmers83
Anthrenus verbasci	wheat	g	Gorham91, Hinton45, Peacock93, Strong-Okumura58
Anthrenus verbasci	wheat bran (pollard)	gp	Buchelos-Athanassiou98
Anthrenus verbasci	wheat chaff	gp	Cotton-Good37, Hinton45
Anthrenus verbasci	wheat flour	gp	Buchelos-Athanassiou98, Cotton-Good37, Delobel-Tran93, Gorham91, Hinton45, Imura03
Anthrenus verbasci	wheat flour, spoiled	gs	Hinton45
Anthrenus verbasci	wool	anv	Archibald-Chalmers83, Campbell89, Cotton-Good37, Delobel-Tran93, Hedges-Lacey96, Hinton45, Patton31, Peacock93, Rajendran-Parveen05, Strong-Okumura58
Araecerus fasciculatus	apple, dried	df	Chittenden96
Araecerus fasciculatus	bambara groundnut	p	Forsyth66, Mphuru74
Araecerus fasciculatus	banana, dried	df	Forsyth66, Mphuru74
Araecerus fasciculatus	bean	p	Patton31
Araecerus fasciculatus	betel nut (areca nut)	n	Majumder61, Mphuru74, Nayar et al76, Patton31, Richards-Herford30
Araecerus fasciculatus	biscuit	bg	Patton31
Araecerus fasciculatus	Brazil nut (para nut)	n	Hedges-Lacey96, Hill02, Mphuru74
Araecerus fasciculatus	breadfruit (bread nut)	v	Mphuru74, Nayar et al76
Araecerus fasciculatus	cassava root chip	rp	Delobel-Tran93, Parker et al81, Wohlgemuth-Reichmuth83
Araecerus fasciculatus	cassia	v	Richards-Herford30
Araecerus fasciculatus	castor bean	se	Howe-Freeman55
Araecerus fasciculatus	cocoa	bc	Campbell89, Forsyth66, Majumder61, Mphuru74, Richards-Herford30, USDA36-61
Araecerus fasciculatus	cocoa bean	bc	Aitken75, Attia-Kamel66, Chittenden96, Cornes73, Cotterell52, Hedges-Lacey96, Hill02, Howe-Freeman55, Patton31, Schmidt-Grabner87, Schulten-Roorda84
Araecerus fasciculatus	cocoa cake	bc	Howe-Freeman55

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Araecerus fasciculatus	coffee	bc	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Mphuru74, Nayar et al76, Richards-Herford30
Araecerus fasciculatus	coffee bean	bc	Aitken75, Attia-Kamel66, Chittenden96, Hedges-Lacey96, Hill02, Howe-Freeman55, Imura03,Majumder61, Mphuru74, Patton31, Zimmerman90
Araecerus fasciculatus	copra	osp	Bawalan04, Howe-Freeman55
Araecerus fasciculatus	copra meal	osp	Bawalan04
Araecerus fasciculatus	cotton	t	Nayar et al76
Araecerus fasciculatus	cottonseed	os	Delobel-Tran93, Howe-Freeman55, Imura03, Mphuru74
Araecerus fasciculatus	curcumin	sea	Attia-Kamel66
Araecerus fasciculatus	date	df	Archibald-Chalmers83
Araecerus fasciculatus	dried fruit	df	Archibald-Chalmers83, Cotton-Good37, Hedges-Lacey96, Patton31
Araecerus fasciculatus	ginger	sea	Guilin et al99, Howe-Freeman55, Mphuru74, Richards-Herford30, USDA36-61
Araecerus fasciculatus	grain, cereal	g	Yan et al10
Araecerus fasciculatus	herb	v	Archibald-Chalmers83
Araecerus fasciculatus	illipenut	os	Aitken75, Kalshoven36, Mphuru74
Araecerus fasciculatus	kava stick	df	Archibald-Chalmers83
Araecerus fasciculatus	kidney bean	p	Delobel-Tran93
Araecerus fasciculatus	kiwi	ffv	Archibald-Chalmers83
Araecerus fasciculatus	kola nut	n	Delobel-Tran93, Weidner73
Araecerus fasciculatus	lima bean	p	Mphuru74
Araecerus fasciculatus	maize	g	Archibald-Chalmers83, Caliboso et al86, Cornes73, Cotton-Good37, Davies60, Delobel-Tran93, Forsyth66, Haines81, Hedges-Lacey96, Hill02, Imura03, Mphuru74, Sedlacek et al98
Araecerus fasciculatus	maize flour	gp	Delobel-Tran93
Araecerus fasciculatus	medicine, Chinese traditional	me	Guilin et al99
Araecerus fasciculatus	medicine, drug	me	Patton31
Araecerus fasciculatus	medicine, hibiscus flower	me	Schulten-Roorda84
Araecerus fasciculatus	medicine, rhubarb root	me	Weidner73
Araecerus fasciculatus	monkey pod	p	Richards-Herford30
Araecerus fasciculatus	mung bean	p	Davies60

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Araecerus fasciculatus	mushroom, dried	v	Archibald-Chalmers83
Araecerus fasciculatus	nasturtium seed	se	Hill02
Araecerus fasciculatus	nut	n	Archibald-Chalmers83, Imura03, Mphuru74, Schulten-Roorda84
Araecerus fasciculatus	nutmeg (mace)	sea	Archibald-Chalmers83, Attia-Kamel66, Chittenden96, Delobel-Tran93, Forsyth66, Haines81, Hill02, Mphuru74, Patton31, Richards-Herford30, Schulten-Roorda84
Araecerus fasciculatus	oilseed	os	Aitken75, Schulten-Roorda84
Araecerus fasciculatus	onion	ffv	Imura03
Araecerus fasciculatus	palm kernel	os	Archibald-Chalmers83, Cornes73, Delobel-Tran93, Mphuru74
Araecerus fasciculatus	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Araecerus fasciculatus	papaw fruit	ffv	Archibald-Chalmers83
Araecerus fasciculatus	peanut	os	Archibald-Chalmers83, Arthur56, Delobel-Tran93, Forsyth66, Hedges-Lacey96, Hill02, Howe-Freeman55, LaHue et al59, Redlinger-Davis82
Araecerus fasciculatus	pepper, chilli	sea	Archibald-Chalmers83
Araecerus fasciculatus	rice	g	Archibald-Chalmers83, Cornes73, Davies60, Delobel-Tran93
Araecerus fasciculatus	root, dried (tuber)	r	Hedges-Lacey96, Hill02
Araecerus fasciculatus	root, dried cassava (manioc)	r	Davies60, Delobel92, Forsyth66, Haines81, Hill02, Mphuru74, Pierrard62, Ratti-Rampini77, Sukprakarn86
Araecerus fasciculatus	root, ginger	r	Abraham75, Chittenden96, Delobel-Tran93
Araecerus fasciculatus	root, lonchocarpus (rotenone)	r	Downes-Williams50, Mphuru74
Araecerus fasciculatus	seed	se	Cotton-Good37, Hedges-Lacey96, Hill02
Araecerus fasciculatus	sesame seed	os	Howe-Freeman55
Araecerus fasciculatus	sheanut	n	Cornes73, Cotterell52, Howe-Freeman55, Mphuru74
Araecerus fasciculatus	sorghum (broomcorn)	g	Cornes73, Davies60, Delobel-Tran93, Mphuru74
Araecerus fasciculatus	soybean	p	Howe-Freeman55, Mphuru74
Araecerus fasciculatus	spice	sea	Aitken75, Archibald-Chalmers83, Hedges-Lacey96, Hill02, Imura03, Majumder61, Patton31
Araecerus fasciculatus	strychnine	oc	Richards-Herford30
Araecerus fasciculatus	sunflower seed	os	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Araecerus fasciculatus	sweet potato	r	Davies60, Delobel-Tran93, Mphuru74, Patton31, Richards-Herford30, USDA36-61
Araecerus fasciculatus	tamarind	v	USDA36-61, Zimmerman90
Araecerus fasciculatus	tapioca chip	rp	Majumder61
Araecerus fasciculatus	tapioca root	r	Delobel-Tran93
Araecerus fasciculatus	taro	r	Archibald-Chalmers83
Araecerus fasciculatus	tobacco leaf	v	Cornes73, Mphuru74
Araecerus fasciculatus	turmeric	sea	Abraham75
Araecerus fasciculatus	walnut	n	Haines74
Araecerus fasciculatus	yam	r	Cornes73, Delobel-Tran93, Iheagwam-Wojtusiak89, Mphuru74, Richards-Herford30, Sauphanor et al. 87
Atomaria lewisi	grain, cereal	g	Yan et al10
Atomaria lewisi	medicine, Chinese traditional	me	Guilin et al99
Attagenus fasciatus	animal feed	oc	Stejskal06
Attagenus fasciatus	animal product	anv	Aitken75
Attagenus fasciatus	barley	g	Delobel-Tran93
Attagenus fasciatus	barley malt	gp	Hinton43
Attagenus fasciatus	buttermilk, dried	anv	Delobel-Tran93
Attagenus fasciatus	carpet	t	Patton31
Attagenus fasciatus	cocoa bean	bc	Cornes73
Attagenus fasciatus	coffee bean	bc	McFarlane63
Attagenus fasciatus	coriander	sea	Delobel-Tran93, Tawfik et al85
Attagenus fasciatus	cottonseed	os	Delobel-Tran93
Attagenus fasciatus	cowpea	p	Stejskal06
Attagenus fasciatus	feather	anv	Hill02, Hinton43
Attagenus fasciatus	feather, down	anv	Imura03
Attagenus fasciatus	fish, dried	anv	Cornes73
Attagenus fasciatus	flower, hibiscus dried	v	Schulten-Roorda84
Attagenus fasciatus	fur	anv	Hinton43, Imura03, Peacock93
Attagenus fasciatus	grain product	gp	Aitken75
Attagenus fasciatus	grain, insect damaged	gs	Hinton43
Attagenus fasciatus	gum dammar	v	Schulten-Roorda84
Attagenus fasciatus	hide, pelt or skin	anv	Delobel-Tran93, Hinton43, Peacock93
Attagenus fasciatus	horsehair	anv	Hinton43
Attagenus fasciatus	insect, dried	aninv	Hill02
Attagenus fasciatus	kidney bean	p	Haines81
Attagenus fasciatus	maize	g	Davies60, McFarlane63

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Attagenus fasciatus	malt	gp	Attia-Kamel66
Attagenus fasciatus	meat meal	anv	Awadallah et al90
Attagenus fasciatus	medicine, belladonna	me	Tawfik et al85
Attagenus fasciatus	medicine, hibiscus flower	me	Weidner73
Attagenus fasciatus	millet	g	Cornes73
Attagenus fasciatus	museum collection	oc	Hinton43
Attagenus fasciatus	myrabolan	p	Aitken75
Attagenus fasciatus	oilcake	osp	Aitken75
Attagenus fasciatus	oilseed	os	Aitken75
Attagenus fasciatus	peanut	os	Cornes73, Cotterell52, Davies60, Delobel-Tran93, Hinton43
Attagenus fasciatus	rice	g	Delobel-Tran93
Attagenus fasciatus	rosebud, dried	v	Olsen81
Attagenus fasciatus	seafood, dried	aninv	Archibald-Chalmers83
Attagenus fasciatus	silk fabric	aninv	VijayVeer et al96
Attagenus fasciatus	silkworm cocoon	aninv	Rajendran-Parveen05, VijayVeer et al96
Attagenus fasciatus	sorghum (broomcorn)	g	Cornes73, Delobel-Tran93, Giles64
Attagenus fasciatus	soybean flour	pp	Delobel-Tran93
Attagenus fasciatus	tobacco leaf	v	Calderon-Donahaye64
Attagenus fasciatus	wheat	g	Calderon-Donahaye64, Delobel-Tran93
Attagenus fasciatus	wheat flour	gp	Haines81
Attagenus fasciatus	wool	anv	Hinton43, Imura03, Peacock93, Patton31, Rajendran-Parveen05, VijayVeer-Rao95, VijayVeer et al91
Attagenus lobatus	wheat	g	Attia-Kamel66
Attagenus lobatus	wool	anv	Rajendran-Parveen05, VijayVeer-Rao95, VijayVeer et al91
Attagenus pantherinus	feather	anv	Nawrot-Klejdysz09
Attagenus pantherinus	fur	anv	Nawrot-Klejdysz09
Attagenus pantherinus	wool	anv	Nawrot-Klejdysz09
Attagenus pellio	animal feed	oc	Campbell89, Hayhurst-Britten42
Attagenus pellio	carpet	t	Campbell89, Cotton-Good37, Hayhurst-Britten42, Patton31
Attagenus pellio	cereal (cereal product)	gp	Campbell89, Gorham91, Peacock93
Attagenus pellio	feather	anv	Cotton-Good37, Patton31
Attagenus pellio	feather, down	anv	Gorham91, Imura03
Attagenus pellio	fish, preserved	anv	Campbell89
Attagenus pellio	fur	anv	Campbell89, Gorham91, Hayhurst-Britten42, Imura03, Peacock93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Attagenus pellio	furniture, upholstered	oc	Campbell89
Attagenus pellio	grain, cereal	g	Campbell89, Cotton-Good37, Yan et al10
Attagenus pellio	hair	anv	Cotton-Good37, Patton31
Attagenus pellio	hay residue	res	Hayhurst-Britten42
Attagenus pellio	hide, pelt or skin	anv	Campbell89, Peacock93
Attagenus pellio	insect, dried	aninv	Peacock93
Attagenus pellio	maize	g	Campbell89, Hayhurst-Britten42
Attagenus pellio	meat, cured, dried or smoked	anv	Campbell89, Gorham91
Attagenus pellio	millet	g	Aitken75
Attagenus pellio	museum collection	oc	Hayhurst-Britten42
Attagenus pellio	oilcake	osp	Aitken75
Attagenus pellio	palm kernel	os	Aitken75
Attagenus pellio	peanut meal	osp	Aitken75
Attagenus pellio	rice bran	gp	Aitken75
Attagenus pellio	rye	g	Campbell89
Attagenus pellio	rye bran	gp	Campbell89
Attagenus pellio	silk	aninv	Campbell89
Attagenus pellio	silkworm cocoon	aninv	Rajendran-Parveen05, VijayVeer et al96
Attagenus pellio	sugar	v	Campbell89, Hayhurst-Britten42
Attagenus pellio	vegetable material, dried	v	Peacock93
Attagenus pellio	wheat bran (pollard)	gp	Campbell89
Attagenus pellio	wheat flour	gp	Campbell89, Hayhurst-Britten42
Attagenus pellio	wheat meal	gp	Campbell89
Attagenus pellio	wool	anv	Campbell89, Cotton-Good37, Imura03, Patton31, Peacock93, Rajendran-Parveen05
Attagenus smirnovi	animal feed	oc	Haines81
Attagenus smirnovi	coffee	bc	Haines81
Attagenus smirnovi	feather	anv	Peacock93
Attagenus smirnovi	fur	anv	Peacock93
Attagenus smirnovi	hide, pelt or skin	anv	Peacock93
Attagenus smirnovi	insect, dried	aninv	Peacock93
Attagenus smirnovi	wheat flour	gp	Haines81
Attagenus smirnovi	wool	anv	Peacock93
Attagenus unicolor	alfalfa meal	v	Campbell89, Delobel-Tran93, Strong-Okumura58
Attagenus unicolor	alfalfa seed (lucerne)	se	Strong-Okumura58
Attagenus unicolor	almond hull meal	np	Strong-Okumura58
Attagenus unicolor	animal feed	oc	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Attagenus unicolor	animal product	anv	Attia-Kamel66, Cotton-Good37
Attagenus unicolor	barley	g	Athanassiou et al10, Campbell89, Strong-Okumura58
Attagenus unicolor	barley, rolled	gp	Strong-Okumura58
Attagenus unicolor	bean	p	Back-Cotton38, Hinton45, Peacock93, Strong-Okumura58
Attagenus unicolor	beet seed	se	Hinton45
Attagenus unicolor	biscuit	bg	Peacock93
Attagenus unicolor	bone	anv	Aitken75
Attagenus unicolor	bone meal	anv	Aitken75
Attagenus unicolor	book	oc	Back-Cotton38, Hedges-Lacey96
Attagenus unicolor	bristle	anv	Hinton45
Attagenus unicolor	cake mix	oc	Campbell89
Attagenus unicolor	carpet	t	Back-Cotton38, Hedges-Lacey96, Hinton45, Patton31
Attagenus unicolor	casein, dried	anv	Back-Cotton38, Hedges-Lacey96, Rajendran-Parveen05
Attagenus unicolor	cereal (cereal product)	gp	Chittenden96, Delobel-Tran93, Hedges-Lacey96, Hinton45, Peacock93, Strong-Okumura58
Attagenus unicolor	chicory	sea	Aitken75
Attagenus unicolor	cloth	t	Back-Cotton38, Campbell89, Hedges-Lacey96
Attagenus unicolor	cloth, felt	t	Back-Cotton38, Hedges-Lacey96
Attagenus unicolor	cloth, velvet	t	Back-Cotton38, Hedges-Lacey96
Attagenus unicolor	clusterbean meal (guar meal)	pp	Aitken75
Attagenus unicolor	cocoa bean	bc	Aitken75
Attagenus unicolor	copra meal	osp	Strong-Okumura58
Attagenus unicolor	cottonseed	os	Strong-Okumura58
Attagenus unicolor	cottonseed meal	osp	Hinton45, Strong-Okumura58
Attagenus unicolor	cottonseed meal cake	osp	Strong-Okumura58
Attagenus unicolor	cottonseed oilcake	osp	Aitken75
Attagenus unicolor	dog biscuit	bg	Peacock93
Attagenus unicolor	feather	anv	Back-Cotton38, Hedges-Lacey96, Hinton45, Patton31
Attagenus unicolor	feather, down	anv	Imura03
Attagenus unicolor	fennel seed	se	Aitken75, Zimmerman90
Attagenus unicolor	fishmeal	anv	Strong-Okumura58
Attagenus unicolor	fur	anv	Back-Cotton38, Hedges-Lacey96, Imura03, Patton31, Peacock93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Attagenus unicolor	furniture, upholstered	oc	Back-Cotton38, Hedges-Lacey96, Hinton45
Attagenus unicolor	grain debris	res	Campbell89
Attagenus unicolor	grain product	gp	Cotton-Good37
Attagenus unicolor	grain, cereal	g	Buchelos-Athanassiou98, Chittenden96, Cotton-Good37, Gorham91, Hedges-Lacey96, Hinton45, Yan et al10
Attagenus unicolor	grass seed	se	Strong-Okumura58
Attagenus unicolor	hair	anv	Back-Cotton38, Delobel-Tran93, Patton31
Attagenus unicolor	hide, pelt or skin	anv	Back-Cotton38, Hedges-Lacey96, Peacock93, Strong-Okumura58
Attagenus unicolor	horn	anv	Back-Cotton38, Hedges-Lacey96
Attagenus unicolor	horsebean (jackbean, overlook)	p	Aitken75
Attagenus unicolor	insect, dried	aninv	Back-Cotton38, Delobel-Tran93, Hinton45
Attagenus unicolor	insulation, house	oc	Hedges-Lacey96, Hinton45
Attagenus unicolor	leather	anv	Hedges-Lacey96, Hinton45
Attagenus unicolor	linseed meal	osp	Strong-Okumura58
Attagenus unicolor	maize	g	Aitken75, Back-Cotton38, Caliboso et al86, Strong-Okumura58
Attagenus unicolor	maize cob	gp	Strong-Okumura58
Attagenus unicolor	maize gluten	gp	Aitken75
Attagenus unicolor	maize meal	gp	Campbell89
Attagenus unicolor	meat meal	anv	Back-Cotton38
Attagenus unicolor	meat scrap	anv	Strong-Okumura58
Attagenus unicolor	meat, cured, dried or smoked	anv	Back-Cotton38, Hedges-Lacey96
Attagenus unicolor	medicine, Chinese traditional	me	Guilin et al99
Attagenus unicolor	medicine, hawthorn fruit	me	Guilin et al99
Attagenus unicolor	milk, dried	anv	Back-Cotton38, Hedges-Lacey96, Hinton45, Peacock93, Strong-Okumura58
Attagenus unicolor	millet	g	Chittenden96
Attagenus unicolor	mohair	anv	Aitken75
Attagenus unicolor	museum collection	oc	Hinton45, Rajendran-Parveen05
Attagenus unicolor	myrabolan	p	Aitken75
Attagenus unicolor	nut	n	Hedges-Lacey96
Attagenus unicolor	oat	g	Strong-Okumura58
Attagenus unicolor	oatmeal	gp	Peacock93
Attagenus unicolor	oilcake	osp	Aitken75, Peacock93
Attagenus unicolor	pea	p	Back-Cotton38, Hinton45

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Attagenus unicolor	peanut	os	Campbell89, Redlinger-Davis82
Attagenus unicolor	peanut oilcake	osp	Delobel-Tran93
Attagenus unicolor	pepper, black	sea	White57
Attagenus unicolor	pepper, cayenne	sea	Back-Cotton38, Hedges-Lacey96, Hinton45
Attagenus unicolor	pumpkin seed	se	Chittenden96
Attagenus unicolor	raisin	df	Delobel-Tran93
Attagenus unicolor	rice	g	Back-Cotton38, Delobel-Tran93, Douglas41, Hinton45, Kim et al88, Strong-Okumura58
Attagenus unicolor	rice bran	gp	Aitken75
Attagenus unicolor	safflower	os	Strong-Okumura58
Attagenus unicolor	seed	se	Back-Cotton38, Gorham91, Hedges-Lacey96, Hinton45
Attagenus unicolor	shark fin, dried	anv	Delobel-Tran93, Olsen81
Attagenus unicolor	silk	aninv	Delobel-Tran93, Hedges-Lacey96, Hinton45, Patton31
Attagenus unicolor	silk fabric	aninv	Back-Cotton38, Campbell89, Cotton-Good37, Hinton45
Attagenus unicolor	silkworm cocoon	aninv	Delobel-Tran93, Rajendran-Parveen05, VijayVeer et al96
Attagenus unicolor	soybean	p	Strong-Okumura58
Attagenus unicolor	spice	sea	Aitken75, Gorham91
Attagenus unicolor	spinach seed	se	Strong-Okumura58
Attagenus unicolor	squid, dried	aninv	Delobel-Tran93, Olsen81
Attagenus unicolor	sunflower seed	os	Strong-Okumura58
Attagenus unicolor	timothy grass seed	se	Chittenden96, Hinton45
Attagenus unicolor	tobacco leaf	v	Hinton45, Livingstone-Reed36, Patton31
Attagenus unicolor	tobacco seed	se	Hinton45
Attagenus unicolor	vetch seed	p	Strong-Okumura58
Attagenus unicolor	walnut meat	np	Strong-Okumura58
Attagenus unicolor	wheat	g	Aitken75, Athanassiou et al05, Back-Cotton38, Patton31, Peacock93, Strong-Okumura58
Attagenus unicolor	wheat bran (pollard)	gp	Aitken75, Buchelos-Athanassiou98, Campbell89, Haines74, Patton31, Strong-Okumura58
Attagenus unicolor	wheat flour	gp	Aitken75, Buchelos-Athanassiou98, Gorham91, Haines74, Hinton45, Peacock93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Attagenus unicolor	whey, dried	anv	Okumura-Strong65
Attagenus unicolor	wool	anv	Back-Cotton38, Calderon-Donahaye64, Campbell89, Cotton-Good37, Delobel-Tran93, Hedges-Lacey96, Hinton45, Imura03, Patton31, Rajendran-Parveen05, Strong-Okumura58, VijayVeer-Rao95
Attagenus unicolor	yarn	t	Back-Cotton38, Hedges-Lacey96
Blaps japonensis	grain, cereal	g	Yan et al10
Blaps japonensis	grain, moldy	gs	Imura03
Blaps lethifera	plant debris, damp moldy	sp	Nawrot-Klejdysz09
Blaps mortisaga	plant debris	v	Nawrot-Klejdysz09
Bostrychoplites cornutus	bamboo	v	Fisher50
Bostrychoplites cornutus	cassava root chip	rp	Delobel-Tran93
Bostrychoplites cornutus	root, dried cassava (manioc)	r	Aitken75, Davies60, Delobel92, Haines74, 81; Pierrard62, Ratti-Rampini77, Walker79
Bostrychoplites cornutus	sweet potato	r	Davies60
Bostrychoplites cornutus	wood mask	w	Archibald-Chalmers83
Bostrychoplites cornutus	wood ornament	w	Aitken75
Bostrychoplites cornutus	wood souvenir carving and drum	w	Archibald-Chalmers83, Weidner67
Bostrychoplites cornutus	wood toy	w	Archibald-Chalmers83
Bruchidius atrolineatus	bean	p	Aitken75, Davies60, Haines74
Bruchidius atrolineatus	cowpea	p	Aitken75, Cornes73, Davies60, Delobel-Tran83, Forsyth66, Gupta et al05, Haines81, Singh90
Bruchidius atrolineatus	hyaciath bean	p	Attia-Kamel66, Shomar63
Bruchidius atrolineatus	mung bean	p	Delobel-Tran93, Haines81
Bruchidius atrolineatus	pigeonpea (arhar, red gram)	p	Davies60
Bruchidius atrolineatus	sorghum (broomcorn)	g	Cornes73, Giles64
Bruchidius sahlbergi	bagaruwa seed (Gambia pod)	se	Attia-Kamel66, Shomar63
Bruchidius sahlbergi	futna seed	p	Anton et al97, Attia-Kamel66, Shomar63
Bruchus atomarius	kidney bean	p	Kingsolver04
Bruchus brachialis	vetch seed	p	Campbell89, Kingsolver04
Bruchus ervi	bean	p	Aitken75
Bruchus ervi	lentil (masur)	p	Aitken75, Anton et al97, Attia-Kamel66, Bhalla et al04, Delobel-Tran93, Kingsolver04, Shomar63
Bruchus ervi	pea	p	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Bruchus ervi	vetch seed	p	Aitken75
Bruchus lentis	bean	p	Patton31
Bruchus lentis	broad bean (fava bean, horsebean)	p	Gupta et al04
Bruchus lentis	lentil (masur)	p	Aitken75, Anton et al97, Bhalla et al04, Gupta et al02, 04, 05; Hill02, Kingsolver04, Patton31, Shomar63
Bruchus lentis	pea	p	Anton et al97, Patton31
Bruchus lentis	soybean	p	Anton et al97
Bruchus pisorum	broad bean (fava bean, horsebean)	p	Archibald-Chalmers83, Imura03, Kingsolver04
Bruchus pisorum	futna seed	p	Attia-Kamel66
Bruchus pisorum	grain, cereal	g	Strong-Okumura58, Yan et al10
Bruchus pisorum	horsebean (jackbean, overlook)	p	Strong-Okumura58
Bruchus pisorum	kidney bean	p	Imura03
Bruchus pisorum	lentil (masur)	p	Attia-Kamel66
Bruchus pisorum	pea	p	Aitken75, Anton et al97, Archibald-Chalmers83, Attia-Kame66, Campbell89, Gorham91, Gupta et al05, Hill02, Imura03, Kingsolver04, Shomar63, Strong-Okumura58
Bruchus pisorum	sunnhemp	v	Nayar et al76
Bruchus rufimanus	bagaruwa seed	se	Tawfik et al85
Bruchus rufimanus	broad bean (fava bean, horsebean)	p	Aitken75, Anton et al97, Attia-Kamel66, Campbell89, Hill02, Imura03, Kingsolver04
Bruchus rufimanus	chickpea (Bengal gram, garbanzo)	p	Anton et al97
Bruchus rufimanus	fenugreek seed	se	Anton et al97
Bruchus rufimanus	grain, cereal	g	Strong-Okumura58, Yan et al10
Bruchus rufimanus	horsebean (jackbean, overlook)	p	Aitken75, Strong-Okumura58
Bruchus rufimanus	kidney bean	p	Attia-Kamel66
Bruchus rufimanus	lentil (masur)	p	Aitken75, Anton et al97
Bruchus rufimanus	medicine, herbal	me	Strong-Okumura58
Bruchus rufimanus	pea	p	Anton et al97, Campbell89
Bruchus rufimanus	saffron	sea	Tawfik et al85
Bruchus rufimanus	vetch seed	p	Aitken75, Anton et al97, Campbell89, Kingsolver04
Bruchus rufipes	broad bean (fava bean, horsebean)	p	Gupta et al04

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Bruchus rufipes	lentil (masur)	p	Anton et al97
Bruchus rufipes	vetch seed	p	Aitken75, Anton et al97, Kingsolver04
Cadra calidella	almond	n	Aitken84, Carter84, Hayhurst-Britten42, Richards-Thomson32
Cadra calidella	animal product	anv	Corbet-Tams43, Hill02
Cadra calidella	carob (locust)	df	Aitken94, Carter84, Gorham91, Hayhurst-Britten42, Hill02, Richards-Thomson32, Roesler73, Schulten-Roorda84, Solis99, USDA36-61
Cadra calidella	cork	wp	Hayhurst-Britten42, Hill02, Richards-Thomson32, Roesler73
Cadra calidella	currant	df	Carter84, Hayhurst-Britten42, Richards-Thomson32
Cadra calidella	date	df	Attia-Kamel66, Carter84, Donahaye-Calderon64, Hayhurst-Britten42, Hill02, Richards-Thomson32, Solis99
Cadra calidella	dried fruit	df	Aitken84, Calderon-Donahaye64, Carter84, Corbet-Tams43, Gorham91, Hill02, Roesler73
Cadra calidella	fig	ffv	Corbet-Tams43, Hayhurst-Britten42, Richards-Thomson32, Roesler73, Solis99, USDA36-61
Cadra calidella	gallnut	aninv	Aitken84
Cadra calidella	grain product	gp	Roesler73
Cadra calidella	hazel nut	n	Aitken84
Cadra calidella	insect, dried	aninv	Carter84, Hayhurst-Britten42, Richards-Thomson32
Cadra calidella	lentil (masur)	p	Aitken84
Cadra calidella	maize	g	Haines81
Cadra calidella	nut	n	Carter84, Corbet-Tams43, Gorham91, Hayhurst-Britten42, Hill02, Richards-Thomson32, Roesler73
Cadra calidella	oilcake	osp	Aitken84
Cadra calidella	peanut	os	Aitken84
Cadra calidella	prune	df	Aitken84
Cadra calidella	raisin	df	Carter84, Hayhurst-Britten42, Richards-Thomson32Roesler73
Cadra calidella	vegetable material, dried	v	Roesler73
Cadra calidella	vetch seed	p	Aitken84

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cadra cautella	almond	n	Carter84, Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	animal feed	oc	Haines81, McFarlane63, Walker79
Cadra cautella	animal product	anv	Aitken84
Cadra cautella	apple, dried	df	Carter84, Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	apricot seed	se	Lal-Verma74
Cadra cautella	apricot, dried	df	Okumura-Strong65
Cadra cautella	asparagus berry	v	Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	banana, dried	df	Howe-Freeman55, Wise55
Cadra cautella	barley	g	Athanassiou et al10
Cadra cautella	bean	p	Carter84, Casteels et al96, Howe-Freeman55
Cadra cautella	bird feed	se	Wise55
Cadra cautella	biscuit	bg	Hayhurst-Britten42, Lal-Verma74, Richards-Thomson32
Cadra cautella	bone	anv	Howe-Freeman55
Cadra cautella	candy	oc	Strong-Okumura58
Cadra cautella	carob (locust)	df	Aitken84, Calderon-Donahaye64, Carter84, Hayhurst-Britten42, Schulten-Roorda84
Cadra cautella	carob meal	dfp	Aitken84
Cadra cautella	cashew	n	Nair et al79, Nayar et al76, Pinheiro68
Cadra cautella	cassava root chip	rp	Parker et al81, Wohlgemuth-Reichmuth83
Cadra cautella	cassava root meal	rp	Cotterell52, Wohlgemuth-Reichmuth83
Cadra cautella	castor bean	se	Howe-Freeman55
Cadra cautella	cereal (cereal product)	gp	Calderon-Donahaye64, Corbet-Tams43, Haines81, Lal-Verma74, McFarlane63
Cadra cautella	chestnut	n	Solis99
Cadra cautella	chickpea (Bengal gram, garbanzo)	p	Carter84, Hayhurst-Britten42, Nayar et al76, Richards-Thomson32
Cadra cautella	chocolate	bc	Hayhurst-Britten42, Lal-Verma74, Richards-Thomson32
Cadra cautella	chocolate bonbon	oc	Hayhurst-Britten42
Cadra cautella	citrus fruit (rotting)	sp	Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	citrus pulp, dried	dfp	Hill02, Laudani et al59
Cadra cautella	clove	sea	Okumura-Strong65
Cadra cautella	cocoa	bc	Forsyth66, Richards-Herford30, Solis99

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cadra cautella	cocoa bean	bc	Aitken84, Cornes73, Cotterell52, Hayhurst-Britten42, Hill02, Howe-Freeman55, Lal-Verma74, McFarlane63, Okumura-Strong65, Richards-Thomson32, Schulten-Roorda84
Cadra cautella	cocoa cake	bc	Howe-Freeman55
Cadra cautella	coffee	bc	Casteels et al96, Cornes73, Solis99
Cadra cautella	coffee bean	bc	Howe-Freeman55, McFarlane63
Cadra cautella	copra	osp	Aitken84, Bawalan04, Calderon-Donahaye64, Cornes73, Haines81, Howe-Freeman55, McFarlane63
Cadra cautella	copra meal	osp	Bawalan04, Wohlgemuth-Reichmuth83
Cadra cautella	cottonseed	os	Cornes73, Cotterell52, Richards-Thomson32, Hayhurst-Britten42, Howe-Freeman55, Walker79
Cadra cautella	cottonseed meal	osp	Wohlgemuth-Reichmuth83
Cadra cautella	cottonseed oilcake	osp	Richards-Thomson32
Cadra cautella	cowpea	p	Cornes73, Haines81
Cadra cautella	currant	df	Carter84, Hayhurst-Britten42, Richards-Herford30, Richards-Thomson32
Cadra cautella	date	df	Attia-Kamel66, Calderon-Donahaye64, Cotton-Good37, Donahaye-Calderon64, Hayhurst-Britten42, Hill02, Patton31, Richards-Thomson32
Cadra cautella	dog food	oc	Okumura-Strong65
Cadra cautella	dried fruit	df	Aitken84, Attia-Kamel66, Calderon-Donahaye64, Carter84, Corbet-Tams43, Cotton-Good37, Hill02, Lal-Verma74, Patton31, Richards-Herford30, Richards-Thomson32, Roesler73
Cadra cautella	fig	ffv	Calderon-Donahaye64, Cotton-Good37, Patton31, Richards-Herford30, Richards-Thomson32, Roesler73
Cadra cautella	filbert	n	Okumura-Strong65
Cadra cautella	fruit	ffv	Imura03
Cadra cautella	gallnut	aninv	Hayhurst-Britten42, Richards-Thomson32

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cadra cautella	garlic	sea	Attia-Kamel66, Lal-Verma74, Okumura-Strong65, Roesler73, Solis99
Cadra cautella	ginger	sea	Howe-Freeman55
Cadra cautella	gourd (squash)	ffv	Solis99
Cadra cautella	grain product	gp	Aitken84, Roesler73
Cadra cautella	grain, cereal	g	Aitken84, Cotton-Good37, Hill02, Strong-Okumura58, Yan et al10
Cadra cautella	gum dammar	v	Schulten-Roorda84
Cadra cautella	herb, dried	v	Roesler73
Cadra cautella	hide, pelt or skin	anv	Howe-Freeman55
Cadra cautella	hominy grit	gp	Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	honeycomb (bee, wasp)	aninv	Okumura-Strong65
Cadra cautella	illipenut	os	Kalshoven36
Cadra cautella	linseed	os	Nayar et al76
Cadra cautella	maize	g	Caliboso et al86, Cornes73, Cotterell52, Forsyth66, Haines74, 81; McFarlane63, Peng98, Richards-Thomson32, Solis99, Sukprakarn86, Tadesse96, Walker79, Wohlgemuth-Reichmuth83
Cadra cautella	maize flour	gp	Walker79
Cadra cautella	maize meal	gp	Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	malted milk	oc	Lal-Verma74
Cadra cautella	mango juice, dried	v	Lal-Verma74
Cadra cautella	mango seed	se	Cornes73
Cadra cautella	mango, dried	df	Haines81
Cadra cautella	medicine, Chinese angelica	me	Guilin et al99
Cadra cautella	medicine, Chinese traditional	me	Guilin et al99
Cadra cautella	millet	g	Cornes73, Guilin et al99, Haines81, Nayar et al76
Cadra cautella	mung bean	p	Olsen81
Cadra cautella	noodle	gp	Imura03
Cadra cautella	nut	n	Aitken84, Corbet-Tams43, Hill02, Imura03, McFarlane63, Roesler73, Schulten-Roorda84
Cadra cautella	nut meat	np	Cotton-Good37, Patton31
Cadra cautella	nutmeg (mace)	sea	Haines81, Richards-Herford30, Schulten-Roorda84
Cadra cautella	oat	g	Haines81
Cadra cautella	oatmeal	gp	Hayhurst-Britten42, Richards-Thomson32

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cadra cautella	oilcake	osp	Aitken84, Richards-Thomson32
Cadra cautella	oilseed	os	Aitken84, Hill02, Lal-Verma74, Schulten-Roorda84
Cadra cautella	oilseed meal	osp	McFarlane63
Cadra cautella	olive fruit	ffv	Hayhurst-Britten42
Cadra cautella	onion, dried	v	Calderon-Donahaye64, Forsyth66, Haines81, Lal-Verma74
Cadra cautella	paddy	g	McFarlane63, Nayar et al76
Cadra cautella	palm kernel	os	Cornes73, Cotterell52, Howe-Freeman55
Cadra cautella	peanut	os	Arthur56, Bissell-DuPree46, Carter84, Champ65, Calderon-Donahaye64, Cornes73, Cotterell52, Forsyth66, Haines81, Hayhurst-Britten42, Howe-Freeman55, Okumura-Strong65, Redlinger-Davis82, Richards-Herford30, Richards-Thomson32, Schulten-Roorda84, Singh90, Solis99, Wohlgemuth-Reichmuth83
Cadra cautella	peanut flour	osp	Lal-Verma74
Cadra cautella	peanut oilcake	osp	Howe-Freeman55
Cadra cautella	peanut, shelled	osp	Wohlgemuth-Reichmuth83
Cadra cautella	pear	ffv	Carter84, Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	pecan	n	Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	pepper, chilli	sea	Cotterell52, Howe-Freeman55, Olsen81, Solis99
Cadra cautella	pepper, paprika	sea	Weidner73
Cadra cautella	pimento	sea	McFarlane63
Cadra cautella	pomegranate	ffv	Carter84, Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	poppy petal dried	v	Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	pulse	p	Aitken84, Hill02, McFarlane63, Schulten-Roorda84, Sukprakarn86
Cadra cautella	pulse product	pp	Aitken84
Cadra cautella	raisin	df	Calderon-Donahaye64, Carter84, Hayhurst-Britten42, Okumura-Strong65, Richards-Thomson32, Roesler73,
Cadra cautella	rice	g	Carter84, Haines74, 81; Hayhurst-Britten42, Imura03, Nayar et al76, Richards-Thomson32, Solis99, Stejskal-Kucerova93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cadra cautella	rice bran	gp	Haines74, Imura03
Cadra cautella	rice meal	gp	McFarlane63
Cadra cautella	rose	v	Solis99
Cadra cautella	safflower	os	Casteels et al96
Cadra cautella	seed	se	Carter84, Corbet-Tams43, Cotton-Good37, Hill02, Roesler73
Cadra cautella	sesame seed	os	Cornes73, Howe-Freeman55, Nayar et al76, Solis99
Cadra cautella	sheanut	n	Cornes73, Cotterell52, Howe-Freeman55
Cadra cautella	sorghum (broomcorn)	g	Haines81, Sukprakarn86
Cadra cautella	soybean	p	Howe-Freeman55
Cadra cautella	soybean flour	pp	Singh90
Cadra cautella	spice	sea	Aitken84, Hill02
Cadra cautella	sultana, dried	df	Carter84, Hayhurst-Britten42, Richards-Herford30, Richards-Thomson32
Cadra cautella	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Cadra cautella	tamarind seed	v	Lal-Verma74, Nayar et al76, Olsen81, Solis99
Cadra cautella	tobacco seed	se	Nayar et al76
Cadra cautella	tonka bean	p	Hayhurst-Britten42, Richards-Thomson32
Cadra cautella	vegetable material, dried	v	Hill02, Roesler73, Solis99
Cadra cautella	walnut	n	Carter84, Hayhurst-Britten42, Okumura-Strong65, Richards-Thomson32, Roesler73
Cadra cautella	wheat	g	Haines81
Cadra cautella	wheat bran (pollard)	gp	Hayhurst-Britten42, Richards-Thomson32, Wohlgemuth-Reichmuth83
Cadra cautella	wheat flour	gp	Cornes73, Forsyth66, Hayhurst-Britten42, Hill02, Richards-Thomson32
Cadra figulilella	almond	n	Aitken84, Okumura-Strong65
Cadra figulilella	animal feed	oc	Strong-Okumura58
Cadra figulilella	bean	p	Gorham91, Solis99
Cadra figulilella	candy	oc	Strong-Okumura58
Cadra figulilella	carob (locust)	df	Aitken84, Carter84, Hill02, Schulten-Roorda84
Cadra figulilella	carob meal	dfp	Aitken84, Hill02
Cadra figulilella	castor bean	se	Okumura-Strong65
Cadra figulilella	chestnut	n	Solis99
Cadra figulilella	chocolate	bc	Roesler73

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cadra figulilella	cocoa bean	bc	Hill02
Cadra figulilella	cottonseed oilcake	osp	Hayhurst-Britten42, Richards-Thomson32
Cadra figulilella	cracker	bg	Strong-Okumura58
Cadra figulilella	currant	df	Carter84, Hayhurst-Britten42, Richards-Thomson32
Cadra figulilella	date	df	Aitken84, Attia-Kamel66, Calderon-Donahaye64, Carter84, Donahaye-Calderon64, Hayhurst-Britten42, Hill02
Cadra figulilella	dried fruit	df	Aitken84, Carter84, Corbet-Tams43, Cotton-Good37, Gorham91, Hill02, Roesler73, Solis99, Strong-Okumura58
Cadra figulilella	fig	ffv	Carter84, Hayhurst-Britten42, Hill02, Richards-Thomson32, Roesler73, Solis99
Cadra figulilella	fig, dried	df	Attia-Kamel66, Okumura-Strong65
Cadra figulilella	garlic	sea	Solis99
Cadra figulilella	grain product	gp	Roesler73
Cadra figulilella	grain, cereal	g	Cotton-Good37
Cadra figulilella	maize	g	Cotton-Good37
Cadra figulilella	medicine, Chinese traditional	me	Guilin et al99
Cadra figulilella	nut	n	Gorham91, Hill02, Solis99
Cadra figulilella	oatmeal	gp	Cotton-Good37, Hayhurst-Britten42, Richards-Thomson32
Cadra figulilella	oilseed product	osp	Hill02
Cadra figulilella	peanut	os	Aitken84
Cadra figulilella	pecan	n	Okumura-Strong65
Cadra figulilella	pepper, chilli	sea	Solis99
Cadra figulilella	raisin	df	Attia-Kamel66, Carter84, Donohoe39, Hayhurst-Britten42, Hill02, Okumura-Strong65, Olsen81, Richards-Thomson32, Roesler73
Cadra figulilella	rice	g	Cotton-Good37
Cadra figulilella	rice meal	gp	Hayhurst-Britten42, Richards-Thomson32
Cadra figulilella	root, dried cassava (manioc)	r	Solis99
Cadra figulilella	seed	se	Gorham91, Roesler73, Solis99
Cadra figulilella	sorghum (broomcorn)	g	Strong-Okumura58
Cadra figulilella	sugarcane	v	Solis99
Cadra figulilella	sunflower	os	Haines81
Cadra figulilella	tamarind	v	Olsen81

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cadra figulilella	vegetable material, dried	v	Roesler73
Cadra figulilella	walnut	n	Schulten-Roorda84
Cadra figulilella	wheat meal	gp	Cotton-Good37
Callosobruchus analis	adzuki bean	p	Delobel-Tran93
Callosobruchus analis	bean	p	Rao et al73
Callosobruchus analis	black gram (mash, urd)	p	Delobel-Tran93, Southgate78, Vats74
Callosobruchus analis	chickpea (Bengal gram, garbanzo)	p	Delobel-Tran93, Haines81, Southgate78, Tuda et al05, USDA36-61, Vats74
Callosobruchus analis	coriander	sea	Haines81
Callosobruchus analis	cowpea	p	Delobel-Tran93, Gupta et al05, Haines89, Singh90, Tuda et al05, Vats74
Callosobruchus analis	gram	p	Aitken75
Callosobruchus analis	hyaciath bean	p	Delobel-Tran93, USDA36-61
Callosobruchus analis	kidney bean	p	Haines81
Callosobruchus analis	lentil (masur)	p	Delobel-Tran93, Rao et al73, USDA36-61
Callosobruchus analis	moth bean	p	Delobel-Tran93, Southgate78, Tuda et al05
Callosobruchus analis	mung bean	p	Delobel-Tran93, Haines89, Southgate78, Tuda et al05, USDA36-61, Vats74
Callosobruchus analis	pea	p	Aitken75, Delobel-Tran93, USDA36-61
Callosobruchus analis	pigeonpea (arhar, red gram)	p	Delobel-Tran93, Singh90, Vats74
Callosobruchus analis	rice bean	p	Delobel-Tran93
Callosobruchus analis	soybean	p	Aitken75, Delobel-Tran93, Haines89, Tuda et al05, USDA36-61, Vats74
Callosobruchus analis	tepary bean	p	Vats74
Callosobruchus analis	yard long bean	p	Delobel-Tran93
Callosobruchus chinensis	adzuki bean	p	Archibald-Chalmers83, Delobel-Tran93, Imura03, Gorham91, Kingsolver04, Tuda et al05, USDA36-61
Callosobruchus chinensis	bambara groundnut	p	Delobel-Tran93
Callosobruchus chinensis	bean	p	Aitken75, Campbell89, Forsyth66, Rao et al73, Singh90
Callosobruchus chinensis	black gram (mash, urd)	p	Delobel-Tran93, Kingsolver04, Tuda et al05
Callosobruchus chinensis	broad bean (fava bean, horsebean)	p	Calderon-Donahaye64, Delobel-Tran93, Gorham91, Gupta et al05, Haines81, Imura03, Kingsolver04, Tuda et al05, USDA36-61
Callosobruchus chinensis	castor bean	se	Davies60
Callosobruchus chinensis	catjag	p	Kingsolver04

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Callosobruchus chinensis	chickling vetch	p	Kingsolver04, Patton31
Callosobruchus chinensis	chickpea (Bengal gram, garbanzo)	p	Anton et al97, Attia-Kamel66, Delobel-Tran93, Haines81, Hill02, Kingsolver04, Shomar63, Tuda et al05, USDA36-61, Vats74
Callosobruchus chinensis	clusterbean (guar)	p	Delobel-Tran93, Kingsolver04, Tuda et al05
Callosobruchus chinensis	cowpea	p	Anton et al97, Attia-Kamel66, Delobel-Tran93,Gorham91, Gupta et al05, Haines81, Imura03, Hill02, Kingsolver04, Singh90, Tuda et al05, Vats74, USDA36-61
Callosobruchus chinensis	grain, cereal	g	Yan et al10
Callosobruchus chinensis	gram	p	Aitken75
Callosobruchus chinensis	horsegram	p	Delobel-Tran93, USDA36-61, Vats74
Callosobruchus chinensis	hyaciath bean	p	Delobel-Tran93, Gorham91, Kingsolver04, Southgate78, USDA36-61
Callosobruchus chinensis	kidney bean	p	Attia-Kamel66, Haines81, Imura03, Gorham91, Kingsolver04, Shomar63, USDA36-61
Callosobruchus chinensis	kudzu bean	p	USDA36-61
Callosobruchus chinensis	lentil (masur)	p	Aitken75, Anton et al97, Archibald-Chalmers83, Delobel-Tran93, Hill02, Kingsolver04, Rao et al73, Vats74
Callosobruchus chinensis	lima bean	p	Delobel-Tran93, Kingsolver04, Tuda et al05, USDA36-61
Callosobruchus chinensis	lotus seed	se	Delobel-Tran93, Kingsolver79, 04
Callosobruchus chinensis	moth bean	p	Delobel-Tran93, Kingsolver04
Callosobruchus chinensis	mung bean	p	Archibald-Chalmers83, Caliboso et al86, Davies60, Delobel-Tran93, Gorham91, Haines81, Kingsolver04, Tuda et al05, USDA36-61, Vats74, Walker79
Callosobruchus chinensis	nut	n	Archibald-Chalmers83
Callosobruchus chinensis	pea	p	Aitken75, Anton et al97, Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Campbell89, Delobel-Tran93, Kingsolver04, Shomar63, Tuda et al05, Vats74
Callosobruchus chinensis	pepper, black	sea	White57

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Callosobruchus chinensis	pigeonpea (arhar, red gram)	p	Archibald-Chalmers83, Davies60, Delobel-Tran93, Gorham91, Haines81, Kingsolver04, Nayar et al76, Patton31, Singh90, Tuda et al05, Vats74, Zimmerman90
Callosobruchus chinensis	pulse	p	Hill02, McFarlane63, Sukprakarn86
Callosobruchus chinensis	rice bean	p	Delobel-Tran93
Callosobruchus chinensis	soybean	p	Aitken75, Anton et al97, Caliboso et al86, Davies60, Delobel-Tran93, Kingsolver04, Singh90, Tuda et al05, USDA36-61
Callosobruchus chinensis	soybean meal	pp	Caliboso et al86
Callosobruchus chinensis	spice	sea	Archibald-Chalmers83
Callosobruchus chinensis	tepary bean	p	Vats74
Callosobruchus chinensis	vetch seed	p	Campbell89
Callosobruchus chinensis	winged bean	p	Delobel-Tran93, Kingsolver04
Callosobruchus chinensis	yard long bean	p	USDA36-61
Callosobruchus maculatus	adzuki bean	p	Archibald-Chalmers83, Delobel-Tran93, Imura03, Tuda et al05
Callosobruchus maculatus	bambara groundnut	p	Cornes73, Delobel-Tran93, Forsyth66, USDA36-61
Callosobruchus maculatus	banana, dried	df	Forsyth66
Callosobruchus maculatus	bean	p	Aitken75, Campbell89, Forsyth66, Haines74, Rao et al73, Singh90, Strong-Okumura58
Callosobruchus maculatus	black gram (mash, urd)	p	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Haines81, Kingsolver04, Tuda et al05, Vats74
Callosobruchus maculatus	broad bean (fava bean, horsebean)	p	Attia-Kamel66, Calderon-Donahaye64, Kingsolver04, Shomar63, USDA36-61
Callosobruchus maculatus	chickling vetch	p	Kingsolver04
Callosobruchus maculatus	chickpea (Bengal gram, garbanzo)	p	Anton et al97, Archibald-Chalmers83, Attia-Kamel66, Delobel-Tran93, Hedges-Lacey96, Hill02, Kingsolver04, Tuda et al05, USDA36-61, Vats74
Callosobruchus maculatus	coriander	sea	Haines81
Callosobruchus maculatus	cottonseed	os	Cornes73

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Callosobruchus maculatus	cowpea	p	Anton et al97, Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Campbell89, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Gorham91, Gupta et al05, Haines81, Hedges-Lacey96, Hill02, Imura03, Kingsolver04, Okumura-Strong65, Shomar63, Singh90, Tuda et al05, USDA36-61, Vats74, Walker79
Callosobruchus maculatus	fenugreek seed	se	Haines81
Callosobruchus maculatus	ginger	sea	Archibald-Chalmers83, Cornes73
Callosobruchus maculatus	grain, cereal	g	Yan et al10
Callosobruchus maculatus	gram	p	Aitken75,
Callosobruchus maculatus	herb	v	Archibald-Chalmers83
Callosobruchus maculatus	hyaciath bean	p	Archibald-Chalmers83, Delobel-Tran93,Gorham91, Kingsolver04
Callosobruchus maculatus	kidney bean	p	Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Gorham91, Haines81, Imura03, USDA36-61
Callosobruchus maculatus	lentil (masur)	p	Aitken75, Anton et al97, Attia-Kamel66, Calderon-Donahaye64, Delobel-Tran93, Hedges-Lacey96, Hill02, Kingsolver04, Rao et al73, Tuda et al05
Callosobruchus maculatus	lima bean	p	Kingsolver04, USDA36-61
Callosobruchus maculatus	maize	g	Cornes73
Callosobruchus maculatus	moth bean	p	Delobel-Tran93, USDA36-61
Callosobruchus maculatus	mung bean	p	Archibald-Chalmers83, Caliboso et al86, Davies60, Delobel-Tran93, Forsyth66, Gorham91, Haines74, 81;Kingsolver04, Tuda et al05, USDA36-61, Vats74
Callosobruchus maculatus	nut	n	Archibald-Chalmers83
Callosobruchus maculatus	pea	p	Aitken75, Anton et al97, Archibald-Chalmers83,Attia-Kamel6 6, Calderon-Donahaye64, Davies60, Delobel-Tran93, Forsyth66, Imura03, Kingsolver04, Shomar63, Tuda et al05, USDA36-61, Vats74
Callosobruchus maculatus	peanut	os	Cornes73, Forsyth66
Callosobruchus maculatus	pepper, black	sea	White57
Callosobruchus maculatus	phane (edible caterpillar)	aninv	Rajendran-Parveen05

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Callosobruchus maculatus	pigeonpea (arhar, red gram)	p	Archibald-Chalmers83, Davies60, Delobel-Tran93, Forsyth66, Haines81, Kingsolver04, Singh90, Tuda et al05, USDA36-61, Vats74, Walker79
Callosobruchus maculatus	pulse	p	Aitken75, Haines81, McFarlane63, Sukprakarn86
Callosobruchus maculatus	residue	res	Haines81
Callosobruchus maculatus	rice	g	Archibald-Chalmers83
Callosobruchus maculatus	rice bean	p	Archibald-Chalmers83, Delobel-Tran93, USDA36-61
Callosobruchus maculatus	sheanut	n	Forsyth66
Callosobruchus maculatus	sorghum (broomcorn)	g	Cornes73, Giles64, Haines81, Strong-Okumura58
Callosobruchus maculatus	soybean	p	Aitken75, Anton et al97, Archibald-Chalmers83,Caliboso et al86, Cornes73, Davies60, Delobel-Tran93, Kingsolver04, USDA36-61
Callosobruchus maculatus	soybean flour	pp	Singh90
Callosobruchus maculatus	soybean meal	pp	Caliboso et al86
Callosobruchus maculatus	tepary bean	p	Archibald-Chalmers83, Davies60, Kingsolver04, Vats74
Callosobruchus maculatus	vetch seed	p	Kingsolver04, USDA36-61
Callosobruchus maculatus	yard long bean	p	Kingsolver04
Callosobruchus maculatus	yellow pea	p	Kingsolver04
Callosobruchus phaseoli	adzuki bean	p	Kingsolver04
Callosobruchus phaseoli	bambara groundnut	p	Cornes73
Callosobruchus phaseoli	black gram (mash, urd)	p	Delobel-Tran93
Callosobruchus phaseoli	broad bean (fava bean, horsebean)	p	Anton et al97, Kingsolver04
Callosobruchus phaseoli	chickpea (Bengal gram, garbanzo)	p	Anton et al97, Delobel-Tran93, Kingsolver04
Callosobruchus phaseoli	coffee bean	bc	Davies60
Callosobruchus phaseoli	cowpea	p	Delobel-Tran93, Haines81
Callosobruchus phaseoli	hyaciath bean	p	Anton et al97, Davies60, Delobel-Tran93, Haines89, Hill02, Kingsolver04, Tuda et al05, USDA36-61
Callosobruchus phaseoli	kidney bean	p	Anton et al97, Kingsolver04, USDA36-61
Callosobruchus phaseoli	lima bean	p	Delobel-Tran93, Kingsolver04
Callosobruchus phaseoli	mung bean	p	Delobel-Tran93, Kingsolver04
Callosobruchus phaseoli	pea	p	Anton et al97, Delobel-Tran93
Callosobruchus phaseoli	pigeonpea (arhar, red gram)	p	Aitken75, Delobel-Tran93, Kingsolver04

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Callosobruchus phaseoli	rice bean	p	Delobel-Tran93
Carcinops pumilio	bone meal	anv	Hinton44
Carcinops pumilio	cracker	bg	Strong-Okumura58
Carcinops pumilio	grain residue	res	Hinton44
Carcinops pumilio	grain, cereal	g	Buchelos-Athanassiou98, Hinton44, Strong-Okumura58, Yan et al10
Carcinops pumilio	hay	v	Buchelos-Athanassiou98
Carcinops pumilio	maize	g	McFarlane63
Carcinops pumilio	maize meal	gp	Strong-Okumura58
Carcinops pumilio	medicine residue, Chinese traditional	res	Guilin et al99
Carcinops pumilio	palm kernel	os	Allotey88, Hinton44
Carcinops pumilio	peanut	os	Cornes73, Cotterell52
Carcinops pumilio	rice, broken	gp	Hinton44
Carcinops pumilio	root, dried cassava (manioc)	r	Delobel92
Carcinops pumilio	sheanut	n	Cornes73
Carcinops pumilio	soybean	p	Cornes73
Carcinops pumilio	wheat	g	Aitken75, Athanassiou et al01, Battu-Dhaliwal75, Trematerra-Gentile06
Carcinops pumilio	wheat bran (pollard)	gp	Buchelos-Athanassiou98
Carcinops pumilio	wheat flour	gp	Buchelos-Athanassiou98, Hinton44, Strong-Okumura58
Carcinops pumilio	wheat residue	res	Aitken75
Carpophilus dimidiatus	almond	n	Connell75, Dobson54, 60; Hedges-Lacey96
Carpophilus dimidiatus	almond, blanched	n	Dobson60
Carpophilus dimidiatus	animal feed	oc	Strong-Okumura58
Carpophilus dimidiatus	bambara groundnut	p	Forsyth66
Carpophilus dimidiatus	banana, dried	df	Delobel-Tran93, Hinton45, Patton31
Carpophilus dimidiatus	barley	g	Calderon-Donahaye64, Strong-Okumura58, Zimmerman90
Carpophilus dimidiatus	bead curtain	oc	Archibald-Chalmers83
Carpophilus dimidiatus	bean	p	Archibald-Chalmers83
Carpophilus dimidiatus	Brazil nut (para nut)	n	Delobel-Tran93, Dobson54, 60; Woodroffe-Halstead59
Carpophilus dimidiatus	cactus	v	Hinton45
Carpophilus dimidiatus	carob meal	dfp	Dobson60
Carpophilus dimidiatus	cashew	n	Archibald-Chalmers83, Nair et al79, Pinheiro68
Carpophilus dimidiatus	cassava root chip	rp	Gnonlonfin et al 08, Parker et al81

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus dimidiatus	castor bean	se	Delobel-Tran93, Dobson60, Kiritani59
Carpophilus dimidiatus	chestnut	n	Connell75
Carpophilus dimidiatus	chickpea (Bengal gram, garbanzo)	p	Haines74
Carpophilus dimidiatus	chocolate	bc	Archibald-Chalmers83
Carpophilus dimidiatus	cinnamon	sea	Delobel-Tran93
Carpophilus dimidiatus	citrus fruit	ffv	Davies60
Carpophilus dimidiatus	citrus fruit (rotting)	sp	Walker79
Carpophilus dimidiatus	cocoa	bc	Archibald-Chalmers83, Attia-Kamel66, Connell75, Cotton-Good37, Forsyth66, Hedges-Lacey96, Patton31, Richards-Herford30
Carpophilus dimidiatus	cocoa bean	bc	Aitken75, Connell75, Cornes73, Cotterell52, Dobson54, 60; Hinton45, McFarlane63
Carpophilus dimidiatus	coconut husk	osp	Archibald-Chalmers83
Carpophilus dimidiatus	coffee bean	bc	Connell75, Dobson54, Hedges-Lacey96, Hinton45
Carpophilus dimidiatus	copra	osp	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Bawalan04, Cornes73, Cotton-Good37, Dobson54, 60; Forsyth66, Haines81, Hinton45, McFarlane63, Patton31
Carpophilus dimidiatus	copra meal	osp	Bawalan04
Carpophilus dimidiatus	cotton boll	v	Connell75
Carpophilus dimidiatus	cotton gin trash	res	Strong-Okumura58
Carpophilus dimidiatus	cottonseed	os	Bissell36, Calderon-Donahaye64, Connell75, Cornes73, Delobel-Tran93, Hinton45, Kiritani59
Carpophilus dimidiatus	cottonseed meal	osp	Dobson54
Carpophilus dimidiatus	cowpea	p	Cornes73, Forsyth66, Haines81
Carpophilus dimidiatus	currant	df	Dobson54
Carpophilus dimidiatus	date	df	Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Delobel-Tran93, Dobson54, Donahaye-Calderon64, Hayhurst-Britten42, Hinton45, Patton31, Richards-Herford30
Carpophilus dimidiatus	dried fruit	df	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Cotton-Good37, Hayhurst-Britten42, Imura03, Patton31
Carpophilus dimidiatus	egg plant	ffv	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus dimidiatus	fig, dried	df	Delobel-Tran93, Hinton45
Carpophilus dimidiatus	food, decaying	sp	Cotton-Good37, Imura03
Carpophilus dimidiatus	garlic	sea	Connell75, Delobel-Tran93, Hedges-Lacey96
Carpophilus dimidiatus	ginger	sea	Connell75, Cornes73, Delobel-Tran93, Hayhurst-Britten42, Hinton45, Patton31, Richards-Herford30
Carpophilus dimidiatus	grain product	gp	Aitken75
Carpophilus dimidiatus	grain residue	res	Dobson60
Carpophilus dimidiatus	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Cotton-Good37, Yan et al10
Carpophilus dimidiatus	grapefruit	ffv	Forsyth66
Carpophilus dimidiatus	grass skirt	v	Archibald-Chalmers83
Carpophilus dimidiatus	hazel nut	n	Archibald-Chalmers83
Carpophilus dimidiatus	hide, pelt or skin	anv	Hayhurst-Britten42, Hinton45
Carpophilus dimidiatus	illipenut	os	Aitken75, Delobel-Tran93
Carpophilus dimidiatus	kapok seed	se	Kiritani59
Carpophilus dimidiatus	kola nut	n	Delobel-Tran93, McFarlane63
Carpophilus dimidiatus	lemon, decaying	sp	Patton31
Carpophilus dimidiatus	lentil (masur)	p	Archibald-Chalmers83
Carpophilus dimidiatus	lima bean	p	Forsyth66
Carpophilus dimidiatus	linseed	os	Dobson54
Carpophilus dimidiatus	litchi nut (lychee)	n	Archibald-Chalmers83
Carpophilus dimidiatus	macadamia nut	n	Archibald-Chalmers83
Carpophilus dimidiatus	maize	g	Archibald-Chalmers83, Attia-Kamel66, Caliboso et al86, Connell75, Cornes73, Cotton-Good37, Davies60, Delobel-Tran93, Dobson60, Forsyth66, Haines74, 81; Patton31, Pierrard62, Sedlacek et al98, Strong-Okumura58, Sukprakarn86, Tadesse96, Walker79
Carpophilus dimidiatus	maize cob	gp	Haines74, McFarlane63
Carpophilus dimidiatus	maize ear	g	Hedges-Lacey96
Carpophilus dimidiatus	maize meal	gp	Connell75, Delobel-Tran93, Dobson54, 60; Hayhurst-Britten42, Hinton45, Pierrard62
Carpophilus dimidiatus	malt	gp	Pierrard62
Carpophilus dimidiatus	medicine, Chinese traditional	me	Guilin et al99
Carpophilus dimidiatus	medicine, drug	me	Hayhurst-Britten42, Hinton45, Richards-Herford30
Carpophilus dimidiatus	medicine, hawthorn fruit	me	Guilin et al99

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus dimidiatus	millet	g	Delobel-Tran93, Forsyth66, Hinton45
Carpophilus dimidiatus	monkey pod	p	Connell75
Carpophilus dimidiatus	myrabolan	p	Dobson54
Carpophilus dimidiatus	nut	n	Aitken75, Archibald-Chalmers83, Hayhurst-Britten42, Patton31
Carpophilus dimidiatus	nut meat	np	Attia-Kamel66, Cotton-Good37
Carpophilus dimidiatus	nut, rotting	sp	Hinton45
Carpophilus dimidiatus	nutmeg (mace)	sea	Archibald-Chalmers83, Attia-Kamel66, Connell75, Cotton-Good37, Delobel-Tran93, Dobson54, Haines81, Hayhurst-Britten42, Hinton45, Patton31, Richards-Herford30
Carpophilus dimidiatus	nutmeg seed	se	Connell75
Carpophilus dimidiatus	oat	g	Haines81, Hinton45
Carpophilus dimidiatus	oilcake	osp	Aitken75, Dobson54, 60
Carpophilus dimidiatus	oilseed	os	Aitken75
Carpophilus dimidiatus	onion	ffv	Attia-Kamel66, Connell75, Delobel-Tran93, Strong-Okumura58
Carpophilus dimidiatus	onion, dried	v	Hedges-Lacey96, Ibrahim et al70
Carpophilus dimidiatus	orange (decaying)	sp	Patton31
Carpophilus dimidiatus	paddy	g	Pires et al07
Carpophilus dimidiatus	palm kernel	os	Allotey88, Cornes73, Cotterell52, Delobel-Tran93, Dobson54, Haines74
Carpophilus dimidiatus	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Carpophilus dimidiatus	papaw fruit	ffv	Archibald-Chalmers83
Carpophilus dimidiatus	pea meal	pp	Pierrard62
Carpophilus dimidiatus	peach	ffv	Archibald-Chalmers83, Hinton45, Strong-Okumura58
Carpophilus dimidiatus	peanut	os	Archibald-Chalmers83, Arthur56, Calderon-Donahaye64, Champ65, Connell75, Cornes73, Cotterell52, Delobel-Tran93, Dobson54, 50; Forsyth66, Hayhurst-Britten42, Kiritani59, LaHue et al59, Nayar et al76, Pierrard62, Redlinger-Davis82, Richards-Herford30, Zimmerman90
Carpophilus dimidiatus	peanut, shelled	osp	Davies60, Hinton45
Carpophilus dimidiatus	pear	ffv	Hinton45, Patton31
Carpophilus dimidiatus	pepper, bell or green	ffv	Archibald-Chalmers83, Strong-Okumura58
Carpophilus dimidiatus	pepper, chilli	sea	Haines74
Carpophilus dimidiatus	pigeonpea (arhar, red gram)	p	Delobel-Tran93, Singh90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus dimidiatus	pimento	sea	McFarlane63
Carpophilus dimidiatus	pineapple	ffv	Archibald-Chalmers83
Carpophilus dimidiatus	plum	ffv	Connell75, Patton31
Carpophilus dimidiatus	potato	r	Connell75, Hedges-Lacey96
Carpophilus dimidiatus	pumpkin seed	se	Zimmerman90
Carpophilus dimidiatus	raisin	df	Archibald-Chalmers83, Delobel-Tran93, Dobson60, Donohoe39, Hinton45
Carpophilus dimidiatus	rice	g	Archibald-Chalmers83, Attia-Kamel66, Connell75, Cotton-Good37, Delobel-Tran93, Dobson54, Douglas41, Forsyth66, Haines74, 81; Hedges-Lacey96, Hinton45, Patton31, Pierrard62, Stejskal-Kucerova93
Carpophilus dimidiatus	rice bran	gp	Dobson60
Carpophilus dimidiatus	rice flour	gp	Kiritani59
Carpophilus dimidiatus	rice meal	gp	Caliboso et al86
Carpophilus dimidiatus	root, dried cassava (manioc)	r	Davies60, Delobel92, Delobel-Tran93, Hinton45, Pierrard62
Carpophilus dimidiatus	root, ginger	r	Connell75
Carpophilus dimidiatus	root, lonchocarpus (rotenone)	r	Downes-Williams50
Carpophilus dimidiatus	sago	v	Delobel-Tran93
Carpophilus dimidiatus	sago flour	v	Aitken75, Dobson60
Carpophilus dimidiatus	seed	se	Archibald-Chalmers83
Carpophilus dimidiatus	sesame seed	os	Cornes73, Delobel-Tran93
Carpophilus dimidiatus	sesame seed oilcake	osp	Davies60
Carpophilus dimidiatus	sesame sweet	oc	Calderon-Donahaye64
Carpophilus dimidiatus	sheanut	n	Cornes73, Dobson60, Forsyth66
Carpophilus dimidiatus	sorghum (broomcorn)	g	Calderon-Donahaye64, Caliboso et al86, Connell75, Cornes73, Delobel-Tran93, Dobson60, Forsyth66, Giles64, Strong-Okumura58, Sukprakarn86
Carpophilus dimidiatus	soybean	p	Delobel-Tran93, Dobson54
Carpophilus dimidiatus	spangled fruit	ffv	Archibald-Chalmers83
Carpophilus dimidiatus	spice	sea	Haines74
Carpophilus dimidiatus	sugar	v	Archibald-Chalmers83
Carpophilus dimidiatus	sultana, dried	df	Hayhurst-Britten42, Patton31
Carpophilus dimidiatus	sunflower seed	os	Athanassov74, Delobel-Tran93, Haines81
Carpophilus dimidiatus	Tahitian chestnut	n	Archibald-Chalmers83
Carpophilus dimidiatus	tamarind	v	Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus dimidiatus	tobacco leaf	v	Delobel-Tran93
Carpophilus dimidiatus	turmeric	sea	Dobson60
Carpophilus dimidiatus	walnut	n	Archibald-Chalmers83
Carpophilus dimidiatus	wheat	g	Calderon-Donahaye64, Connell75, Delobel-Tran93, Haines74, Hayhurst-Britten42, Hinton45, Richards-Herford30, Strong-Okumura58
Carpophilus dimidiatus	wheat bran (pollard)	gp	Calderon-Donahaye64, Dobson60
Carpophilus dimidiatus	wheat flour	gp	Attia-Kamel66, Buchelos-Athanassiou98, Connell75, Cotton-Good37, Forsyth66, Hinton45, Pierrard62
Carpophilus dimidiatus	wheat germ	gp	Dobson60
Carpophilus dimidiatus	yam	r	Connell75, Delobel-Tran93, Sauphanor et al87
Carpophilus dimidiatus	yam chip	rp	Gnonlonfin et al 08
Carpophilus dimidiatus	yeast	v	Davies60
Carpophilus hemipterus	almond	n	Archibald-Chalmers83
Carpophilus hemipterus	almond hull and meal, wet	sp	Okumura-Savage74, Okumura-Strong65
Carpophilus hemipterus	almond hull meal	np	Calderon-Donahaye64
Carpophilus hemipterus	animal feed	oc	Okumura-Savage74, Strong-Okumura58
Carpophilus hemipterus	apple	ffv	Okumura-Savage74
Carpophilus hemipterus	apple, dried	df	Hinton45, Patton31
Carpophilus hemipterus	apricot	ffv	Delobel-Tran93, Okumura-Savage74, Patton31
Carpophilus hemipterus	apricot, dried	df	Archibald-Chalmers83, Hinton45
Carpophilus hemipterus	avocado seed	se	Hinton45
Carpophilus hemipterus	banana	ffv	Okumura-Savage74
Carpophilus hemipterus	banana, dried	df	Hinton45, Patton31
Carpophilus hemipterus	barley	g	Delobel-Tran93, Dobson54, Okumura-Savage74, Strong-Okumura58
Carpophilus hemipterus	BBQ sauce	oc	Zimmerman90
Carpophilus hemipterus	bean	p	Cotton-Good37, Okumura-Savage74, Patton31, Strong-Okumura58
Carpophilus hemipterus	bean cake	pp	Zimmerman90
Carpophilus hemipterus	bean sauce, yellow	oc	Zimmerman90
Carpophilus hemipterus	biscuit	bg	Patton31
Carpophilus hemipterus	blackberry	ffv	Okumura-Savage74
Carpophilus hemipterus	borassus seed	se	Davies60
Carpophilus hemipterus	bread	bg	Cotton-Good37, Patton31
Carpophilus hemipterus	brown sugar	v	Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus hemipterus	bulb, daffodil	r	Okumura-Strong65
Carpophilus hemipterus	carob (locust)	df	Aitken75
Carpophilus hemipterus	citrus fruit	ffv	Davies60
Carpophilus hemipterus	citrus pulp, dried	dfp	Archibald-Chalmers83, Zimmerman90
Carpophilus hemipterus	clove	sea	Patton31
Carpophilus hemipterus	cocoa	bc	Archibald-Chalmers83, Attia-Kamel66, Delobel-Tran93, Forsyth66
Carpophilus hemipterus	cocoa bean	bc	Aitken75, Cornes73, Dobson54
Carpophilus hemipterus	coconut	os	Okumura-Strong65
Carpophilus hemipterus	copra	osp	Aitken75, Attia-Kamel66, Cornes73, Cotton-Good37, Delobel-Tran93, Dobson54, Hinton45, Patton31
Carpophilus hemipterus	copra chip	osp	Zimmerman90
Carpophilus hemipterus	corn	ffv	Okumura-Savage74
Carpophilus hemipterus	cotton boll	v	Okumura-Savage74, Strong-Okumura58
Carpophilus hemipterus	cotton gin trash	res	Okumura-Savage74, Strong-Okumura58
Carpophilus hemipterus	cottonseed	os	Delobel-Tran93, Hinton45, Patton31
Carpophilus hemipterus	currant	df	Dobson60, Hill02, Patton31
Carpophilus hemipterus	date	df	Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Delobel-Tran93, Dobson54, Donahaye-Calderon64, Hedges-Lacey96, Hinton45, Okumura-Savage74, Patton31, Strong-Okumura58, Zimmerman90
Carpophilus hemipterus	dried fruit	df	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Cotton-Good37, Delobel-Tran93, Imura03, Hayhurst-Britten42, Hinton45, Patton31, Schmidt-Grabner87
Carpophilus hemipterus	fig	ffv	Archibald-Chalmers83, Delobel-Tran93, Dobson54, 60; Hayhurst-Britten42, Hedges-Lacey96, Hill02, Okumura-Savage74, Okumura-Strong65, Richards-Herford30
Carpophilus hemipterus	fig, dried	df	Hinton45, Patton31
Carpophilus hemipterus	fish, dried	anv	Zimmerman90
Carpophilus hemipterus	flower, cactus	v	Okumura-Savage74
Carpophilus hemipterus	flower, lily dried	v	Zimmerman90
Carpophilus hemipterus	food, decaying	sp	Imura03
Carpophilus hemipterus	garlic	sea	Archibald-Chalmers83, Okumura-Strong65
Carpophilus hemipterus	ginger	sea	Hayhurst-Britten42

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus hemipterus	grain product	gp	Aitken75
Carpophilus hemipterus	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Hayhurst-Britten42, Hinton45
Carpophilus hemipterus	grape	ffv	Okumura-Savage74
Carpophilus hemipterus	honeycomb (bee, wasp)	aninv	Okumura-Strong65
Carpophilus hemipterus	jujube	df	Guilin et al99
Carpophilus hemipterus	kapoc seed	se	Kiritani59
Carpophilus hemipterus	kidney bean	p	Delobel-Tran93
Carpophilus hemipterus	koji	oc	Imura03
Carpophilus hemipterus	kola nut	n	Delobel-Tran93
Carpophilus hemipterus	licorice apricot	rp	Zimmerman90
Carpophilus hemipterus	linseed	os	Dobson54, Okumura-Savage74
Carpophilus hemipterus	maize	g	Attia-Kamel66, Cornes73, Cotterell52, Cotton-Good37, Davies60, Delobel-Tran93, Haines81, Hinton45, Kiritani59, Patton31, Pierrard62, Sedlacek98, Strong-Okumura58, Walker79, Zimmerman90
Carpophilus hemipterus	maize cob	gp	Hinton45
Carpophilus hemipterus	maize husk	gp	Zimmerman90
Carpophilus hemipterus	maize meal	gp	Dobson60, Hinton45, Okumura-Savage74, Strong-Okumura58
Carpophilus hemipterus	maize, moldy	gs	Hill02
Carpophilus hemipterus	medicine, Chinese traditional	me	Guilin et al99
Carpophilus hemipterus	medicine, herbal	me	Cotton-Good37, Hinton45, Patton31
Carpophilus hemipterus	melon	ffv	Okumura-Savage74
Carpophilus hemipterus	millet	g	Delobel-Tran93
Carpophilus hemipterus	molasses meal	v	Archibald-Chalmers83
Carpophilus hemipterus	mussel, dried	aninv	Zimmerman90
Carpophilus hemipterus	nut	n	Cotton-Good37, Hinton45, Patton31, Zimmerman90
Carpophilus hemipterus	nut meat	np	Attia-Kamel66
Carpophilus hemipterus	nutmeg (mace)	sea	Attia-Kamel66
Carpophilus hemipterus	oat	g	Hinton45
Carpophilus hemipterus	oilcake	osp	Aitken75
Carpophilus hemipterus	oilseed	os	Aitken75
Carpophilus hemipterus	okra	ffv	Archibald-Chalmers83
Carpophilus hemipterus	onion	ffv	Archibald-Chalmers83, Attia-Kamel66, Delobel-Tran93, Dobson54, Okumura-Savage74, Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus hemipterus	onion, dried	v	Ibrahim et al70
Carpophilus hemipterus	orange	ffv	Archibald-Chalmers83, Okumura-Savage74
Carpophilus hemipterus	palm kernel	os	Calderon-Donahaye64, Cornes73, Cotterell52
Carpophilus hemipterus	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Carpophilus hemipterus	peach	ffv	Archibald-Chalmers83, Hinton45
Carpophilus hemipterus	peach, dried	df	Patton31
Carpophilus hemipterus	peanut	os	Calderon-Donahaye64, Champ65, Delobel-Tran93, Dobson54, Hayhurst-Britten42, Hinton45, Okumura-Savage74, Patton31
Carpophilus hemipterus	peanut product	osp	Zimmerman90
Carpophilus hemipterus	pear, dried	df	Hinton45, Patton31, Richards-Herford30
Carpophilus hemipterus	pepper, chilli	sea	Zimmerman90
Carpophilus hemipterus	pepper, chilli paste	sea	Zimmerman90
Carpophilus hemipterus	pineapple	ffv	Archibald-Chalmers83, Okumura-Savage74, Strong-Okumura58
Carpophilus hemipterus	plum	ffv	Hinton45, Zimmerman90
Carpophilus hemipterus	pork sauce	anv	Zimmerman90
Carpophilus hemipterus	potato	r	Okumura-Savage74
Carpophilus hemipterus	prune	df	Archibald-Chalmers83, Calderon-Donahaye64, Hinton45, Okumura-Strong65, Patton31
Carpophilus hemipterus	quince fruit	ffv	Olsen81
Carpophilus hemipterus	raisin	df	Archibald-Chalmers83, Delobel-Tran93, Donohoe39, Hill02, Hinton45, Okumura-Strong65
Carpophilus hemipterus	residue	res	Haines81
Carpophilus hemipterus	rice	g	Archibald-Chalmers83, Attia-Kamel66, Cotton-Good37, Hinton45, Patton31, Wohlgemuth-Reichmuth83
Carpophilus hemipterus	rice sheet	gp	Zimmerman90
Carpophilus hemipterus	root (tuber)	r	Archibald-Chalmers83
Carpophilus hemipterus	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93, Wohlgemuth-Reichmuth83
Carpophilus hemipterus	shallot, fried	v	Zimmerman90
Carpophilus hemipterus	sorghum (broomcorn)	g	Delobel-Tran93
Carpophilus hemipterus	soup mix, dried	oc	Zimmerman90
Carpophilus hemipterus	soybean paste	pp	Imura03

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus hemipterus	soybean product	pp	Zimmerman90
Carpophilus hemipterus	spice	sea	Archibald-Chalmers83, Hinton45
Carpophilus hemipterus	sugar	v	Archibald-Chalmers83, Hayhurst-Britten42, Hinton45
Carpophilus hemipterus	sultana, dried	df	Dobson54, 60; Okumura-Savage74
Carpophilus hemipterus	sunflower seed	os	Stojanovic-Kosovac74
Carpophilus hemipterus	sweet potato	r	Delobel-Tran93, Okumura-Strong65
Carpophilus hemipterus	tamarind	v	Olsen81, Zimmerman90
Carpophilus hemipterus	tobacco leaf	v	Haines81, Zimmerman90
Carpophilus hemipterus	tomato	ffv	Archibald-Chalmers83, Okumura-Savage74
Carpophilus hemipterus	tomato, dried	v	Zimmerman90
Carpophilus hemipterus	tree cucumber	v	Zimmerman90
Carpophilus hemipterus	vegetable, preserved	v	Zimmerman90
Carpophilus hemipterus	walnut	n	Okumura-Savage74, Strong-Okumura58
Carpophilus hemipterus	water chestnut	v	Patton31
Carpophilus hemipterus	watermelon	ffv	Okumura-Savage74
Carpophilus hemipterus	wheat	g	Attia-Kamel66, Cotton-Good37, Dobson54, Hinton45, Okumura-Savage74, Patton31, Strong-Okumura58
Carpophilus hemipterus	wheat bran (pollard)	gp	Okumura-Savage74, Strong-Okumura58
Carpophilus hemipterus	wheat flour	gp	Buchelos-Athanassiou98, Delobel-Tran93, Dobson54, Okumura-Savage74
Carpophilus hemipterus	yam	r	Cornes73, Delobel-Tran93, Okumura-Strong65
Carpophilus humeralis	apple	ffv	Okumura-Strong65
Carpophilus humeralis	apple, cull	sp	Okumura-Savage74
Carpophilus humeralis	apple, dried	df	Calderon-Donahaye64
Carpophilus humeralis	avocado	ffv	Okumura-Savage74
Carpophilus humeralis	barley	g	Aitken75, Delobel-Tran93
Carpophilus humeralis	bean	p	Aitken75
Carpophilus humeralis	cactus fruit	ffv	Okumura-Savage74
Carpophilus humeralis	carrot	r	Okumura-Savage74
Carpophilus humeralis	cherry, mummified	sp	Okumura-Savage74
Carpophilus humeralis	chestnut	n	Hinton45
Carpophilus humeralis	cocoa bean	bc	Imura03
Carpophilus humeralis	coconut	os	Aitken75
Carpophilus humeralis	coconut shell	osp	Aitken75
Carpophilus humeralis	coffee bean	bc	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus humeralis	copra	osp	Aitken75, Archibald-Chalmers83, Delobel-Tran93, Dobson54, Hinton45
Carpophilus humeralis	cotton	t	Okumura-Savage74
Carpophilus humeralis	cotton boll	v	Strong-Okumura58
Carpophilus humeralis	date	df	Calderon-Donahaye64, Delobel-Tran93, Donahaye-Calderon64, Hill02
Carpophilus humeralis	dried fruit	df	Hill02, Imura03
Carpophilus humeralis	fig	ffv	Delobel-Tran93, Okumura-Savage74
Carpophilus humeralis	grain, cereal	g	Hinton45, Imura03, Yan et al10
Carpophilus humeralis	grape	ffv	Okumura-Savage74
Carpophilus humeralis	kidney bean	p	Delobel-Tran93
Carpophilus humeralis	lemon, mummified	sp	Okumura-Savage74
Carpophilus humeralis	lime	ffv	USDA36-61
Carpophilus humeralis	litchi nut (lychee)	n	Archibald-Chalmers83
Carpophilus humeralis	maize	g	Connell75, Cotton-Good37, Delobel-Tran93, Haines81, Hill02, Hinton45,
Carpophilus humeralis	maize	g	Okumura-Savage74, USDA36-61, Walker79
Carpophilus humeralis	melon	ffv	Archibald-Chalmers83
Carpophilus humeralis	melon, Persian	ffv	Okumura-Savage74
Carpophilus humeralis	millet	g	Delobel-Tran93
Carpophilus humeralis	muskmelon	ffv	Okumura-Savage74
Carpophilus humeralis	nigerseed	se	Aitken75
Carpophilus humeralis	oilcake	osp	Aitken75
Carpophilus humeralis	oilseed	os	Aitken75
Carpophilus humeralis	onion, dried	v	Aitken75, Delobel-Tran93, Dobson54
Carpophilus humeralis	orange	ffv	Okumura-Strong65
Carpophilus humeralis	peach, cull	sp	Okumura-Savage74
Carpophilus humeralis	peanut	os	Calderon-Donahaye64, Strong-Okumura58
Carpophilus humeralis	pear	ffv	Okumura-Savage74
Carpophilus humeralis	pineapple	ffv	Archibald-Chalmers83, Cornes73, Strong-Okumura58, USDA36-61
Carpophilus humeralis	pomegranate	ffv	Okumura-Savage74
Carpophilus humeralis	potato	r	Okumura-Strong65, USDA36-61
Carpophilus humeralis	raisin	df	Delobel-Tran93, Okumura-Savage74, Okumura-Strong65
Carpophilus humeralis	root, dried cassava (manioc)	r	Archibald-Chalmers83, Delobel92
Carpophilus humeralis	sago	v	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus humeralis	sago flour	v	Aitken75
Carpophilus humeralis	sugar beet	r	Okumura-Savage74
Carpophilus humeralis	sugarcane	v	Okumura-Strong65
Carpophilus humeralis	sweet potato	r	Attia-Kamel66, Okumura-Savage74
Carpophilus humeralis	Tahitian chestnut	n	Archibald-Chalmers83
Carpophilus humeralis	taro	r	Archibald-Chalmers83
Carpophilus humeralis	walnut	n	Calderon-Donahaye64
Carpophilus humeralis	watermelon	ffv	Okumura-Savage74
Carpophilus humeralis	yam	r	Hinton45
Carpophilus marginellus	almond hull and meal, wet	sp	Okumura-Savage74, Okumura-Strong65
Carpophilus marginellus	almond hull meal	np	Okumura-Savage74
Carpophilus marginellus	apple	ffv	Okumura-Savage74, Okumura-Strong65
Carpophilus marginellus	banana	ffv	Okumura-Savage74, Okumura-Strong65
Carpophilus marginellus	carpet	t	Archibald-Chalmers83
Carpophilus marginellus	cocoa bean	bc	Aitken75, Delobel-Tran93, Dobson54
Carpophilus marginellus	coconut	os	Aitken75
Carpophilus marginellus	copra	osp	Aitken75, Delobel-Tran93
Carpophilus marginellus	corn	ffv	Archibald-Chalmers83, Okumura-Savage74, Okumura-Strong65
Carpophilus marginellus	dried fruit	df	Delobel-Tran93, Imura03
Carpophilus marginellus	fig	ffv	Delobel-Tran93
Carpophilus marginellus	flower, yucca	v	Okumura-Savage74
Carpophilus marginellus	food, decaying	sp	Imura03
Carpophilus marginellus	grain, cereal	g	Yan et al10
Carpophilus marginellus	lemon	ffv	Okumura-Savage74
Carpophilus marginellus	maize	g	Aitken75, Connell75, Haines81
Carpophilus marginellus	melon, rotting	sp	Okumura-Savage74
Carpophilus marginellus	orange	ffv	Okumura-Savage74, Okumura-Strong65
Carpophilus marginellus	peach	ffv	Okumura-Savage74
Carpophilus marginellus	pineapple	ffv	Archibald-Chalmers83, Okumura-Savage74, Okumura-Strong65
Carpophilus marginellus	potato	r	Okumura-Savage74, Okumura-Strong65
Carpophilus marginellus	prune	df	Okumura-Savage74
Carpophilus marginellus	raisin	df	Okumura-Savage74
Carpophilus marginellus	rice	g	Delobel-Tran93, Dobson60, Douglas41, Hinton45
Carpophilus marginellus	soybean	p	Aitken75
Carpophilus marginellus	tomato	ffv	Okumura-Savage74, Okumura-Strong65
Carpophilus marginellus	watermelon	ffv	Okumura-Savage74, Okumura-Strong65

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus marginellus	wheat	g	Aitken75, Delobel-Tran93, Dobson54
Carpophilus marginellus	wheat bran, wet	gs	Okumura-Savage74
Carpophilus marginellus	wheat flour	gp	Dobson60
Carpophilus mutilatus	apple	ffv	Okumura-Savage74, Okumura-Strong65
Carpophilus mutilatus	bean	p	Delobel-Tran93
Carpophilus mutilatus	betel nut (areca nut)	n	Delobel-Tran93
Carpophilus mutilatus	Brazil nut (para nut)	n	Aitken75
Carpophilus mutilatus	cassava root chip	rp	Parker et al81
Carpophilus mutilatus	cocoa	bc	Attia-Kamel66
Carpophilus mutilatus	cocoa bean	bc	Aitken75, Delobel-Tran93, Dobson60
Carpophilus mutilatus	copra	osp	Attia-Kamel66, Bawalan04, Delobel-Tran93, Dobson54
Carpophilus mutilatus	copra meal	osp	Bawalan04
Carpophilus mutilatus	date	df	Aitken75, Attia-Kamel66, Dobson54
Carpophilus mutilatus	dried fruit	df	Attia-Kamel66, Delobel-Tran93, Hayhurst-Britten42
Carpophilus mutilatus	fig	ffv	Okumura-Savage74
Carpophilus mutilatus	gallnut	aninv	Aitken75
Carpophilus mutilatus	ginger	sea	Aitken75
Carpophilus mutilatus	grain, cereal	g	Hayhurst-Britten42, Yan et al10
Carpophilus mutilatus	illipenut	os	Aitken75, Delobel-Tran93, Dobson60
Carpophilus mutilatus	maize	g	Aitken75, Attia-Kamel66, Caliboso et al86, Connell75, Delobel-Tran93, Haines81, Kiritani59, Walker79
Carpophilus mutilatus	maize meal	gp	Aitken75
Carpophilus mutilatus	muskmelon	ffv	Okumura-Savage74, Okumura-Strong65
Carpophilus mutilatus	nut	n	Archibald-Chalmers83, Hayhurst-Britten42
Carpophilus mutilatus	nut meat	np	Attia-Kamel66
Carpophilus mutilatus	nutmeg (mace)	sea	Attia-Kamel66
Carpophilus mutilatus	oilcake	osp	Aitken75
Carpophilus mutilatus	oilseed	os	Aitken75
Carpophilus mutilatus	onion	ffv	Attia-Kamel66
Carpophilus mutilatus	paddy residue	res	Winks69
Carpophilus mutilatus	palm kernel	os	Delobel-Tran93, Dobson60
Carpophilus mutilatus	pea	p	Hayhurst-Britten42
Carpophilus mutilatus	peach	ffv	Archibald-Chalmers83, Okumura-Savage74, Okumura-Strong65
Carpophilus mutilatus	peanut	os	Archibald-Chalmers83, Champ65, Delobel-Tran93, Dobson60

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus mutilatus	pear	ffv	Okumura-Savage74, Okumura-Strong65
Carpophilus mutilatus	pepper, pod dried chilli	sea	Zimmerman90
Carpophilus mutilatus	prune	df	Okumura-Savage74, Okumura-Strong65
Carpophilus mutilatus	rice	g	Aitken75, Delobel-Tran93
Carpophilus mutilatus	rice bran	gp	Aitken75, Imura03
Carpophilus mutilatus	rice flour	gp	Kiritani59
Carpophilus mutilatus	rice meal	gp	Caliboso et al86, McFarlane63
Carpophilus mutilatus	rice, decaying	gs	Imura03
Carpophilus mutilatus	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93
Carpophilus mutilatus	sorghum (broomcorn)	g	Cornes73, Giles64
Carpophilus mutilatus	soybean	p	Delobel-Tran93
Carpophilus mutilatus	sugar	v	Archibald-Chalmers83
Carpophilus mutilatus	sunflower seed	os	Stojanovic-Kosovac74
Carpophilus mutilatus	tomato	ffv	Okumura-Savage74, Okumura-Strong65
Carpophilus mutilatus	wheat flour	gp	Attia-Kamel66
Carpophilus obsoletus	almond	n	Archibald-Chalmers83
Carpophilus obsoletus	apple, dried	df	Patton31
Carpophilus obsoletus	betel nut (areca nut)	n	Patton31
Carpophilus obsoletus	bulb, garlic	r	Abul-Nasr74
Carpophilus obsoletus	cashew	n	Archibald-Chalmers83
Carpophilus obsoletus	cassava root chip	rp	Wohlgemuth-Reichmuth83
Carpophilus obsoletus	clove	sea	Okumura-Strong65
Carpophilus obsoletus	cocoa	bc	Archibald-Chalmers83
Carpophilus obsoletus	cocoa bean	bc	Aitken75, Cornes73, Delobel-Tran93, Dobson54, 60
Carpophilus obsoletus	coconut	os	Dobson60, Okumura-Strong65
Carpophilus obsoletus	copra	osp	Aitken75, Archibald-Chalmers83, Bawalan04, Dobson54, Haines81, Hinton45, McFarlane63, Patton31
Carpophilus obsoletus	copra meal	osp	Bawalan04
Carpophilus obsoletus	date	df	Dobson54, Okumura-Strong65
Carpophilus obsoletus	dried fruit	df	Aitken75, Hinton45, Imura03, McFarlane63
Carpophilus obsoletus	fig, dried	df	Dobson54, Okumura-Strong65
Carpophilus obsoletus	grain product	gp	Aitken75
Carpophilus obsoletus	grain, cereal	g	Aitken75, Yan et al10
Carpophilus obsoletus	illipenut	os	Aitken75, Delobel-Tran93, Dobson60
Carpophilus obsoletus	litchi nut (lychee)	n	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus obsoletus	maize	g	Connell75, Cotton-Good37, Delobel-Tran93, Haines81, Hinton45, Imura03
Carpophilus obsoletus	maize cob	gp	Hinton45
Carpophilus obsoletus	maize meal	gp	Haines81
Carpophilus obsoletus	medicine, Chinese traditional	me	Guilin et al99
Carpophilus obsoletus	nut	n	Aitken75
Carpophilus obsoletus	nutmeg (mace)	sea	Archibald-Chalmers83, Delobel-Tran93, Dobson60
Carpophilus obsoletus	oilcake	osp	Aitken75
Carpophilus obsoletus	oilseed	os	Aitken75
Carpophilus obsoletus	onion	ffv	Dobson54
Carpophilus obsoletus	paddy	g	Haines81
Carpophilus obsoletus	palm kernel	os	Cornes73, Delobel-Tran93, Dobson54, Kiritani59
Carpophilus obsoletus	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Carpophilus obsoletus	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Carpophilus obsoletus	papaw fruit	ffv	Archibald-Chalmers83
Carpophilus obsoletus	peanut	os	Archibald-Chalmers83, Cotton-Good37, Dobson54, Hinton45, Imura03
Carpophilus obsoletus	peanut meal	osp	Dobson60, Wohlgemuth-Reichmuth83
Carpophilus obsoletus	peanut oilcake	osp	Dobson60
Carpophilus obsoletus	peanut, shelled	osp	Davies60
Carpophilus obsoletus	persimmon, dried	df	Archibald-Chalmers83
Carpophilus obsoletus	pigeonpea (arhar, red gram)	p	Davies60
Carpophilus obsoletus	potato	r	Okumura-Strong65
Carpophilus obsoletus	raisin	df	Archibald-Chalmers83
Carpophilus obsoletus	rice	g	Cotton-Good37, Delobel-Tran93, Haines81, Hinton45, Imura03
Carpophilus obsoletus	rice flour	gp	Kiritani59
Carpophilus obsoletus	root, dried cassava (manioc)	r	Davies60, Delobel92, Ratti-Rampini77
Carpophilus obsoletus	root, lonchocarpus (rotenone)	r	Delobel-Tran93, Dobson54, Downes-Williams50
Carpophilus obsoletus	sago	v	Delobel-Tran93
Carpophilus obsoletus	sago flour	v	Aitken75, Dobson60
Carpophilus obsoletus	sesame seed	os	Cotton-Good37, Delobel-Tran93, Hinton45
Carpophilus obsoletus	sheanut	n	Dobson60
Carpophilus obsoletus	sugar	v	Hinton45
Carpophilus obsoletus	taro	r	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Carpophilus obsoletus	wheat	g	Cotton-Good37, Delobel-Tran93, Hinton45, Imura03
Carpophilus obsoletus	wheat bran (pollard)	gp	Dobson60
Carpophilus obsoletus	wheat residue	res	Dobson60
Carpophilus pallipennis	grain, cereal	g	Cotton-Good37, Delobel-Tran93, Hinton45
Carpophilus pallipennis	maize	g	Hinton45
Carpophilus pallipennis	yam	r	Cornes73
Cartodere constricta	cane	v	Archibald-Chalmers83
Cartodere constricta	cheese	anv	Hinton45
Cartodere constricta	coffee	bc	Haines74
Cartodere constricta	grain, cereal	g	Hinton45, Yan et al10
Cartodere constricta	maize	g	Sedlacek et al98
Cartodere constricta	medicine, Chinese traditional	me	Guilin et al99
Cartodere constricta	paddy	g	Pires et al07
Cartodere constricta	paddy residue	res	Winks69
Cartodere constricta	plum	ffv	Zimmerman90
Cartodere constricta	prune	df	Delobel-Tran93
Cartodere constricta	root, dried cassava (manioc)	r	Delobel92
Cartodere constricta	wheat	g	Haines74
Cartodere nodifer	almond	n	Aitken75
Cartodere nodifer	Brazil nut (para nut)	n	Woodroffe-Halstead59
Cartodere nodifer	cassava root meal	rp	Aitken75
Cartodere nodifer	cocksfood seed	se	Archibald-Chalmers83
Cartodere nodifer	dried fruit	df	Aitken75
Cartodere nodifer	grain, cereal	g	Archibald-Chalmers83
Cartodere nodifer	hay	v	Archibald-Chalmers83
Cartodere nodifer	leather	anv	Archibald-Chalmers83
Cartodere nodifer	maize	g	Aitken75
Cartodere nodifer	paddy	g	Pires et al07
Cartodere nodifer	walnut	n	Aitken75
Cartodere nodifer	wheat	g	Aitken75
Cartodere nodifer	wheat flour	gp	Aitken75
Cartodere nodifer	wheat flour, decaying	gs	Imura03
Cartodere nodifer	wheat residue	res	Aitken75
Caryedon pallidus	bambara groundnut	p	Cornes73
Caryedon pallidus	medicine, senna pod	me	Weidner73
Caryedon pallidus	peanut	os	Delobel-Tran93
Caryedon serratus	algarroba pod	p	Bridwell20, USDA36-61

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Caryedon serratus	bagaruwa seed (Gambia pod)	se	Cornes73
Caryedon serratus	cassia seed	se	Gorham91
Caryedon serratus	grain, cereal	g	Yan et al10
Caryedon serratus	kidney bean	p	Kingsolver04
Caryedon serratus	peanut	os	Aitken75, Anton et al97, Archibald-Chalmers83, Calderon-Donahaye64, Cornes73, Cotterell52, Forsyth66, Gorham91, Hedges-Lacey96. Hill02, Howe-Freeman55, Kingsolver04, Singh90, USDA36-61
Caryedon serratus	peanut oilcake	osp	Aitken75
Caryedon serratus	pigeonpea (arhar, red gram)	p	Kingsolver04, Singh90
Caryedon serratus	pulse	p	Gorham91
Caryedon serratus	sesame seed	os	Howe-Freeman55
Caryedon serratus	sunflower	os	Nayar et al76
Caryedon serratus	tamarind	v	Delobel-Tran93, Gorham91, Hedges-Lacey96, Hill02, Kingsolver04, McFarlane63, Nayar et al76, USDA36-61, Zimmerman90
Caryedon serratus	tamarind seed	v	Cornes73
Cathartus quadricollis	annatto seed	se	Halstead93
Cathartus quadricollis	barley, rolled	gp	Halstead93, Hill02
Cathartus quadricollis	bean	p	Wheeler21
Cathartus quadricollis	cassava root chip	rp	Gnonlonfin et al 08
Cathartus quadricollis	cassia fruit	v	Richards-Herford30
Cathartus quadricollis	cigar (cheroot, stogie)	v	Halstead93, Patton31
Cathartus quadricollis	cocoa bean	bc	Aitken75, Delobel-Tran93, Forsyth66, Halstead93, Hill02, Patton31
Cathartus quadricollis	coffee	bc	Delobel-Tran93
Cathartus quadricollis	copra	osp	Halstead93
Cathartus quadricollis	copra meal	osp	Wohlgemuth-Reichmuth83
Cathartus quadricollis	copra residue	res	Aitken75
Cathartus quadricollis	cottonseed	os	Wheeler21
Cathartus quadricollis	cowpea	p	Haines81
Cathartus quadricollis	dried fruit	df	Delobel-Tran93, Halstead93, Hill02
Cathartus quadricollis	fruit	ffv	Hill02
Cathartus quadricollis	grain product	gp	Cotton-Good37
Cathartus quadricollis	grain, cereal	g	Cotton-Good37
Cathartus quadricollis	kidney bean	p	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cathartus quadricollis	maize	g	Aitken75, Caliboso et al86, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Haines74, 81; Halstead93, Hill02, Patton31, Richards-Herford30, Sedlacek et al98, Wheeler21
Cathartus quadricollis	maize cob	gp	Calderon-Donahaye64
Cathartus quadricollis	millet	g	Delobel-Tran93, Forsyth66
Cathartus quadricollis	palm kernel	os	Delobel-Tran93, Hill02
Cathartus quadricollis	peanut	os	Arthur56, Halstead93, LaHue et al59
Cathartus quadricollis	pepper	sea	Delobel-Tran93
Cathartus quadricollis	pepper, pod dried chilli	sea	Zimmerman90
Cathartus quadricollis	pigeonpea (arhar, red gram)	p	Singh90
Cathartus quadricollis	rice	g	Delobel-Tran93, Douglas41, Halstead93, Hill02
Cathartus quadricollis	root (tuber)	r	Halstead93
Cathartus quadricollis	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93, Forsyth66
Cathartus quadricollis	sorghum (broomcorn)	g	Giles64
Cathartus quadricollis	tamarind	v	Olsen81, Zimmerman90
Cathartus quadricollis	tapioca root	r	Delobel-Tran93
Cathartus quadricollis	tobacco leaf	v	Delobel-Tran93, Halstead93, Hill02, Patton31, Wheeler21
Cathartus quadricollis	wheat	g	Delobel-Tran93, Halstead93, Hill02
Cathartus quadricollis	wheat flour	gp	Halstead93
Cathartus quadricollis	yam	r	Cornes73
Cathartus quadricollis	yam chip	rp	Gnonlonfin et al 08
Cephimallota colonella	wheat flour, decaying	gs	Imura03
Coccotrypes dactyliperda	date	df	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Donahaye-Calderon64, Hill02, USDA36-61
Coccotrypes dactyliperda	date seed	se	Archibald-Chalmers83, Attia-Kamel66
Coccotrypes dactyliperda	grain, cereal	g	Yan et al10
Coccotrypes dactyliperda	palm kernel	os	Aitken75, USDA36-61
Corcyra cephalonica	animal feed	oc	Allotey et al97, McFarlane63, Pierrard62, Stejskal06
Corcyra cephalonica	animal product	anv	Aitken84
Corcyra cephalonica	barley	g	Mookherjee et al68
Corcyra cephalonica	bean	p	Howe-Freeman55
Corcyra cephalonica	biscuit	bg	Ayyar34, Hodges79, Patton31, Richards-Herford30

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Corcyra cephalonica	cabbage seed	se	Mookherjee et al70
Corcyra cephalonica	carob (locust)	df	Carter84
Corcyra cephalonica	carob pod	v	Attia-Kamel66
Corcyra cephalonica	cassava root meal	rp	Pierrard62, Wohlgemuth-Reichmuth83
Corcyra cephalonica	cassia	v	Solis99
Corcyra cephalonica	castor bean	se	Howe-Freeman55
Corcyra cephalonica	cauliflower seed	se	Mookherjee et al70
Corcyra cephalonica	cereal (cereal product)	gp	Haines81, Hodges79, McFarlane63
Corcyra cephalonica	chickpea (Bengal gram, garbanzo)	p	Ayyar34, Hodges79
Corcyra cephalonica	chocolate	bc	Ayyar34, Cotton-Good37, Hodges79, Patton31, Richards-Herford30
Corcyra cephalonica	cocoa	bc	Carter84, Cotton-Good37, Forsyth66, Patton31, Richards-Herford30
Corcyra cephalonica	cocoa bean	bc	Aitken84, Cornes73, Cotterell52, Howe-Freeman55, Schulten-Roorda84, Solis99, USDA36-61
Corcyra cephalonica	coffee bean	bc	Howe-Freeman55, McFarlane63, Solis99
Corcyra cephalonica	copra	osp	Aitken84, Haines81, Hodges79, Howe-Freeman55, McFarlane63, USDA36-61
Corcyra cephalonica	coriander	sea	Tawfik et al85
Corcyra cephalonica	cotton	t	Nayar et al76, Patton31
Corcyra cephalonica	cottonseed	os	Ayyar34, Howe-Freeman55, Richards-Herford30, USDA36-61
Corcyra cephalonica	cottonseed meal	osp	Wohlgemuth-Reichmuth83
Corcyra cephalonica	cottonseed oilcake	osp	Pierrard62
Corcyra cephalonica	cowpea	p	Ayyar34, Forsyth66, Hodges79
Corcyra cephalonica	cumin	sea	Solis99
Corcyra cephalonica	currant	df	Ayyar34, Patton31, Richards-Herford30
Corcyra cephalonica	dried fruit	df	Aitken84, Ayyar34, Carter84, Corbet-Tams43, Hodges79, Imura03, Patton31
Corcyra cephalonica	egg plant seed	se	Mookherjee et al70
Corcyra cephalonica	flax seed	os	Hodges79
Corcyra cephalonica	ginger	sea	Ayyar34, Howe-Freeman55
Corcyra cephalonica	ginger cake	sea	Hodges79
Corcyra cephalonica	grain, cereal	g	Imura03, Yan et al10
Corcyra cephalonica	grass seed	se	USDA36-61
Corcyra cephalonica	gum dammar	v	Schulten-Roorda84

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Corcyra cephalonica	hide, pelt or skin	anv	Howe-Freeman55
Corcyra cephalonica	illipenut	os	Aitken84
Corcyra cephalonica	kidney bean	p	Solis99
Corcyra cephalonica	kola nut	n	Solis99
Corcyra cephalonica	linseed	os	Mookherjee et al70, Nayar et al76, Patton31
Corcyra cephalonica	maize	g	Aitken84, Attia-Kamel66, Ayyar34, Caliboso et al86, Carter84, Cotterell52, Haines81, Hodges79, McFarlane63, Mookherjee et al68, Patton31, Pierrard62, Stejskal06, Sukprakarn86
Corcyra cephalonica	maize cob	gp	Delobel-Tran93, Walker79
Corcyra cephalonica	maize meal	gp	Pierrard62
Corcyra cephalonica	maize product	gp	Aitken84
Corcyra cephalonica	malt	gp	Pierrard62
Corcyra cephalonica	millet	g	Ayyar34, Cornes73, Hodges79, Nayar et al76, Richards-Herford30, Stejskal06
Corcyra cephalonica	mung bean	p	Ayyar34, Hodges79, USDA36-61
Corcyra cephalonica	mustard seed	se	Mookherjee et al70
Corcyra cephalonica	nut	n	Aitken84, Carter84, Imura03, Schulten-Roorda84
Corcyra cephalonica	nut meat	np	Cotton-Good37
Corcyra cephalonica	nutmeg (mace)	sea	Patton31, Richards-Herford30
Corcyra cephalonica	oilcake	osp	Aitken84
Corcyra cephalonica	oilseed	os	Aitken84, Carter84, Schulten-Roorda84
Corcyra cephalonica	oilseed meal	osp	McFarlane63
Corcyra cephalonica	oilseed product	osp	Carter84
Corcyra cephalonica	paddy	g	Caliboso et al86, Haines81, Hodges79, Nayar et al76
Corcyra cephalonica	palm kernel	os	Cornes73, Howe-Freeman55
Corcyra cephalonica	peanut	os	Ayyar34, Carter84, Champ65, Cornes73, Cotterell52, Forsyth66, Hodges79, Howe-Freeman55, McFarlane63, Mookherjee et al70, Nayar et al76, Patton31, Pierrard62, Richards-Herford30, Schulten-Roorda84, Singh90, USDA36-61
Corcyra cephalonica	peanut oilcake	osp	Ayyar34, Hodges79, Howe-Freeman55
Corcyra cephalonica	peanut, shelled	osp	Wohlgemuth-Reichmuth83
Corcyra cephalonica	phane	aninv	Rajendran-Parveen05

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Corcyra cephalonica	pigeonpea (arhar, red gram)	p	Ayyar34, Hodges79, Singh90, USDA36-61
Corcyra cephalonica	poppy head	v	Patton31
Corcyra cephalonica	pulse	p	Aitken84, Imura03, McFarlane63, Schulten-Roorda84
Corcyra cephalonica	pulse product	pp	Aitken84
Corcyra cephalonica	radish seed	se	Attia-Kamel66, Mookherjee et al70
Corcyra cephalonica	rice	g	Aitken84, Ayyar34, Carter84, Corbet-Tams43, Cornes73, Cotterell52, Cotton-Good37, Douglas41, Forsyth66, Haines74, 81; Hodges79, Nayar et al76, Patton31, Pierrard62, Richards-Herford30, Solis99, Sukprakarn86, USDA36-61
Corcyra cephalonica	rice bran	gp	Ayyar34, Caliboso et al86, Hodges79
Corcyra cephalonica	rice meal	gp	Caliboso et al86, McFarlane63
Corcyra cephalonica	seed	se	Carter84, Corbet-Tams43, Patton31
Corcyra cephalonica	sesame seed	os	Attia-Kamel66, Ayyar34, Hodges79, Howe-Freeman55, Mookherjee et al70, Nayar et al76, Patton31, Richards-Herford30
Corcyra cephalonica	sheanut	n	Forsyth66, Howe-Freeman55
Corcyra cephalonica	sorghum (broomcorn)	g	Ayyar34, Cornes73, Hodges79, Mookherjee et al68, Pierrard62, Solis99, Stejskal06, Sukprakarn86, USDA36-61
Corcyra cephalonica	soybean	p	Howe-Freeman55
Corcyra cephalonica	spice	sea	Carter84, Hill02
Corcyra cephalonica	starch	v	Patton31
Corcyra cephalonica	tamarind	v	Nayar et al76
Corcyra cephalonica	tomato seed	se	Attia-Kamel66
Corcyra cephalonica	turnip seed	se	Mookherjee et al70
Corcyra cephalonica	wheat	g	Aitken84, Ayyar34, Hodges79, Solis99, USDA36-61
Corcyra cephalonica	wheat bran (pollard)	gp	Ayyar34, Hodges79, Pierrard62, Wohlgemuth-Reichmuth83
Corcyra cephalonica	wheat flour	gp	Haines81, Hodges79, Pierrard62
Corcyra cephalonica	wheat meal	gp	Patton31
Corcyra cephalonica	wheat product	gp	Aitken84
Corcyra cephalonica	yam	r	Sauphanor et al87

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Corticaria elongata	barley	g	Aitken75
Corticaria elongata	carob residue	res	Aitken75
Corticaria elongata	cocoa bean	bc	Cornes73
Corticaria elongata	cork	wp	Aitken75
Corticaria elongata	maize	g	Aitken75
Corticaria elongata	rice	g	Aitken75
Corticaria elongata	sorghum, moldy	gs	Aitken75
Corticaria elongata	sunflower seed	os	Stojanovic-Kosovac74
Corticaria elongata	vegetable material, decaying	sp	Hayhurst-Britten42
Corticaria elongata	wheat	g	Aitken75, Hinton45
Corticaria elongata	wheat, damp moldy	gs	Aitken75
Corticaria pubescens	almond	n	Aitken75
Corticaria pubescens	illipenut	os	Aitken75
Corticaria pubescens	maize	g	Sedlacek et al98
Corticaria pubescens	medicine, herbal	me	Delobel-Tran93
Corticaria pubescens	sorghum (broomcorn)	g	Aitken75
Corticaria pubescens	tobacco leaf	v	Hinton45
Corticaria pubescens	wheat	g	Aitken75
Corticaria pubescens	wheat flour	gp	Aitken75
Corticaria serrata	almond	n	Aitken75
Corticaria serrata	barley	g	Delobel-Tran93
Corticaria serrata	carob (locust)	df	Aitken75
Corticaria serrata	carob meal	dfp	Aitken75
Corticaria serrata	coffee	bc	Aitken75
Corticaria serrata	dried fruit	df	Aitken75
Corticaria serrata	lentil (masur)	p	Aitken75
Corticaria serrata	paper	wp	Archibald-Chalmers83
Corticaria serrata	peanut oilcake	osp	Aitken75
Corticaria serrata	walnut	n	Aitken75
Corticaria serrata	wheat	g	Aitken75
Corticaria serrata	wheat flour	gp	Archibald-Chalmers83
Cortinicara gibbosa	cottonseed oilcake	osp	Haines74
Cortinicara gibbosa	millet and rice	g	Haines81
Creophilus maxillosus	bone	anv	Campbell89
Creophilus maxillosus	wool	anv	Campbell89
Cryptolestes ferrugineus	achuete spice	sea	Olsen81
Cryptolestes ferrugineus	animal feed	oc	Hayhurst-Britten42, Stejskal06
Cryptolestes ferrugineus	apricot	ffv	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes ferrugineus	bamboo, dried leaf or shoot	v	Zimmerman90
Cryptolestes ferrugineus	barley	g	Athanassiou et al10, Buchelos-Katopodis95, Campbell89, Delobel-Tran93, Haines81, Howe-Lefkovitch57, Imura03, Sinha-Watters85, Strong-Okumura58, Zimmerman90
Cryptolestes ferrugineus	bean	p	Howe-Lefkovitch57
Cryptolestes ferrugineus	bean cake	pp	Davies49, Okumura-Strong65
Cryptolestes ferrugineus	bean, salted	pp	Olsen81
Cryptolestes ferrugineus	cashew	n	Nair et al79
Cryptolestes ferrugineus	cassava root meal	rp	Delobel-Tran93
Cryptolestes ferrugineus	cereal (cereal product)	gp	Sinha-Watters85
Cryptolestes ferrugineus	cigar (cheroot, stogie)	v	Patton31
Cryptolestes ferrugineus	cocoa	bc	Delobel-Tran93, Hayhurst-Britten42, Richards-Herford30, Sinha-Watters85
Cryptolestes ferrugineus	cocoa bean	bc	Aitken75, Cornes73, Cotterell52, Howe-Lefkovitch57, McFarlane63, Olsen81
Cryptolestes ferrugineus	coffee bean	bc	Delobel-Tran93, Zimmerman90
Cryptolestes ferrugineus	copra	osp	Aitken75, Bawalan04, Delobel-Tran93
Cryptolestes ferrugineus	copra meal	osp	Bawalan04
Cryptolestes ferrugineus	cottonseed	os	Cornes73, Cotterell52, Delobel-Tran93
Cryptolestes ferrugineus	cottonseed product	osp	Howe-Lefkovitch57
Cryptolestes ferrugineus	currant	df	Hayhurst-Britten42, Patton31, Richards-Herford30
Cryptolestes ferrugineus	date	df	Archibald-Chalmers83, Calderon-Donahaye64, Delobel-Tran93, Donahaye-Calderon64
Cryptolestes ferrugineus	dried fruit	df	Aitken75, Attia-Kamel66, Davies49, Hill02, Imura03
Cryptolestes ferrugineus	fennel seed	se	Zimmerman90
Cryptolestes ferrugineus	fishmeal	anv	Haines81
Cryptolestes ferrugineus	flax	v	Campbell89, Sinha-Watters85
Cryptolestes ferrugineus	flower, chrysanthemum dried (pyrethrum)	v	Guilin et al99
Cryptolestes ferrugineus	fungus, dried	v	Olsen81
Cryptolestes ferrugineus	ginger	sea	McFarlane63
Cryptolestes ferrugineus	grain product	gp	Aitken75, Cotton-Good37

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes ferrugineus	grain, cereal	g	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Buchelos-Athanassiou98, Cotton-Good37, Hill02, Patton31, Yan et al10
Cryptolestes ferrugineus	gum dammar	v	Davies49, Hayhurst-Britten42, Patton31
Cryptolestes ferrugineus	hay	v	Buchelos-Athanassiou98
Cryptolestes ferrugineus	hemp (marijuana)	v	Arnaud74
Cryptolestes ferrugineus	herb	v	Archibald-Chalmers83
Cryptolestes ferrugineus	licorice apricot	rp	Zimmerman90
Cryptolestes ferrugineus	maize	g	Allotey et al97, Archibald-Chalmers83, Buchelos-Katopodis95, Caliboso et al86, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Haines74, 81; Hayhurst-Britten42, Howe-Lefkovitch57, McFarlane63, Sinha-Watters85
Cryptolestes ferrugineus	maize starch	gp	Schmidt-Grabner87
Cryptolestes ferrugineus	medicine, Chinese traditional	me	Guilin et al99
Cryptolestes ferrugineus	medicine, hawthorn fruit	me	Guilin et al99
Cryptolestes ferrugineus	millet	g	Delobel-Tran93, Sinha-Watters85
Cryptolestes ferrugineus	mungbean	p	Caliboso et al86
Cryptolestes ferrugineus	mushroom, dried	v	Archibald-Chalmers83, Delobel-Tran93
Cryptolestes ferrugineus	nut	n	Hill02, Imura03
Cryptolestes ferrugineus	nutmeg (mace)	sea	Archibald-Chalmers83
Cryptolestes ferrugineus	oat	g	Archibald-Chalmers83, Campbell89, Hayhurst-Britten42
Cryptolestes ferrugineus	oat, rolled	gp	Hayhurst-Britten42
Cryptolestes ferrugineus	oilcake	osp	Aitken75, Hill02, Imura03
Cryptolestes ferrugineus	oilseed	os	Davies49
Cryptolestes ferrugineus	oilseed product	osp	Howe-Lefkovitch57
Cryptolestes ferrugineus	paddy	g	Caliboso et al86, Haines81
Cryptolestes ferrugineus	palm kernel	os	Allotey88, Delobel-Tran93, Howe-Lefkovitch57
Cryptolestes ferrugineus	peanut	os	Archibald-Chalmers83, Champ65, Cornes73, Cotterell52, Delobel-Tran93, Howe-Lefkovitch57
Cryptolestes ferrugineus	peanut product	osp	Zimmerman90
Cryptolestes ferrugineus	pepper, chilli	sea	Archibald-Chalmers83, Davies49, Hayhurst-Britten42, Olsen81, Patton31, Richards-Herford30, Zimmerman87

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes ferrugineus	pepper, pod dried chilli	sea	Zimmerman90
Cryptolestes ferrugineus	potato	r	Archibald-Chalmers83
Cryptolestes ferrugineus	potato flake	rp	Schmidt-Grabner87
Cryptolestes ferrugineus	pulse	p	Delobel-Tran93, Sinha-Watters85
Cryptolestes ferrugineus	pulse product	pp	Sinha-Watters85
Cryptolestes ferrugineus	raisin	df	Donohoe39, Okumura-Strong65
Cryptolestes ferrugineus	residue	res	Haines81
Cryptolestes ferrugineus	rice	g	Archibald-Chalmers83, Attia-Kamel66, Delobel-Tran93, Haines74, 81; Howe-Lefkovitch57, Kim et al88, Patton31, Pires et al07, Rao et al73, Sinha-Watters85, Stejskal-Kucerova93, Wheeler21, Zimmerman90
Cryptolestes ferrugineus	rice bran	gp	Caliboso et al86, Sinha-Watters85
Cryptolestes ferrugineus	rice meal	gp	Caliboso et al86
Cryptolestes ferrugineus	rice sprout	gp	Guilin et al99
Cryptolestes ferrugineus	root, dried cassava (manioc)	r	Davies49, Delobel92, Hill02, Howe-Lefkovitch57, Ratti-Rampini77
Cryptolestes ferrugineus	rye	g	Campbell89, Sinha-Watters85
Cryptolestes ferrugineus	sago	v	Delobel-Tran93
Cryptolestes ferrugineus	sheanut	n	Delobel-Tran93
Cryptolestes ferrugineus	sorghum (broomcorn)	g	Caliboso et al86, Casteels et al96, Davies60, Delobel-Tran93, Howe-Lefkovitch57, Haines74, 81, Okumura-Strong65, Peng98
Cryptolestes ferrugineus	soybean	p	Archibald-Chalmers83, Caliboso et al86, Cornes73, Delobel-Tran93, Sinha-Watters85
Cryptolestes ferrugineus	soybean meal	pp	Caliboso et al86
Cryptolestes ferrugineus	soybean paste	pp	Zimmerman90
Cryptolestes ferrugineus	sunflower	os	Delobel-Tran93, Howe-Lefkovitch57, Sinha-Watters85
Cryptolestes ferrugineus	sunflower seed	os	Stojanovic-Kosovac74, Weidner73
Cryptolestes ferrugineus	tomato, dried	v	Zimmerman90
Cryptolestes ferrugineus	triticale	g	Campbell89
Cryptolestes ferrugineus	vegetable, preserved	v	Zimmerman90
Cryptolestes ferrugineus	weed seed	se	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes ferrugineus	wheat	g	Archibald-Chalmers83, Athanassiou et al01, 05; Calderon-Donahaye64, Campbell89, Casteels et al96, Davies49, Haines74, 81; Hayhurst-Britten42, Howe-Lefkovitch57, Imura03, Patton31, Richards-Herford30, Sinha-Watters85, Trematerra-Gentile06
Cryptolestes ferrugineus	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Calderon-Donahaye64, Haines81, Hayhurst-Britten42, Howe-Lefkovitch57, Patton31, Wheeler21
Cryptolestes ferrugineus	wheat flour	gp	Buchelos-Athanassiou98, Calderon-Donahaye64, Davies49, Delobel-Tran93, Hill02, Howe-Lefkovitch57, Imura03, Patton31
Cryptolestes ferrugineus	wheat meal	gp	Patton31, Wheeler21
Cryptolestes ferrugineus	yam	r	Cornes73
Cryptolestes pusilloides	almond	n	Aitken75, Halstead93, Lefkovitch64
Cryptolestes pusilloides	aniseed (anise spice)	sea	Zimmerman90
Cryptolestes pusilloides	barley	g	Delobel-Tran93, Halstead93, Howe-Lefkovitch57, Imura03, Lefkovitch64
Cryptolestes pusilloides	basketware, wicker	v	Archibald-Chalmers83
Cryptolestes pusilloides	bean	p	Haines81
Cryptolestes pusilloides	betel nut (areca nut)	n	Archibald-Chalmers83
Cryptolestes pusilloides	carob	df	Lefkovitch64
Cryptolestes pusilloides	carob meal	dfp	Delobel-Tran93
Cryptolestes pusilloides	cashew	n	Halstead93
Cryptolestes pusilloides	cereal (cereal product)	gp	Haines81
Cryptolestes pusilloides	coffee bean	bc	Halstead93, Zimmerman90
Cryptolestes pusilloides	date	df	Aitken75
Cryptolestes pusilloides	grain product	gp	Hill02
Cryptolestes pusilloides	grain, cereal	g	Hill02
Cryptolestes pusilloides	maize	g	Aitken75, Davies60, Delobel-Tran93, Haines81, Halstead93, Howe-Lefkovitch57, Imura03, Lefkovitch64
Cryptolestes pusilloides	maize cob	gp	Delobel-Tran93, Walker79
Cryptolestes pusilloides	maize meal	gp	Aitken75, Pierrard62
Cryptolestes pusilloides	mushroom, dried	v	Archibald-Chalmers83, Delobel-Tran93, Halstead93, Imura03, Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes pusilloides	oilseed	os	Lefkovitch64
Cryptolestes pusilloides	oilseed product	osp	Howe-Lefkovitch57
Cryptolestes pusilloides	peanut	os	Aitken75, Champ65, Delobel-Tran93, Halstead93
Cryptolestes pusilloides	pepper, pod dried chilli	sea	Zimmerman87, 90
Cryptolestes pusilloides	plum	ffv	Delobel-Tran93
Cryptolestes pusilloides	rice	g	Aitken75, Archibald-Chalmers83, Delobel-Tran93, Halstead93, Howe-Lefkovitch57, Imura03, Lefkovitch64
Cryptolestes pusilloides	seafood, dried	aninv	Archibald-Chalmers83
Cryptolestes pusilloides	seaweed, dried	v	Archibald-Chalmers83, Delobel-Tran93, Halstead93, Zimmerman90
Cryptolestes pusilloides	sorghum (broomcorn)	g	Aitken75, Delobel-Tran93, Haines81, Howe-Lefkovitch57, Lefkovitch64, Walker79
Cryptolestes pusilloides	spice	sea	Delobel-Tran93
Cryptolestes pusilloides	wheat	g	Aitken75, Delobel-Tran93, Haines74, Halstead93, Howe-Lefkovitch57, Imura03, Lefkovitch64
Cryptolestes pusilloides	wheat bran (pollard)	gp	Aitken75, Howe-Lefkovitch57
Cryptolestes pusilloides	wheat flour	gp	Delobel-Tran93
Cryptolestes pusilloides	wheat product	gp	Imura03
Cryptolestes pusillus	achuete spice	sea	Olsen81
Cryptolestes pusillus	alfalfa meal	v	Delobel-Tran93
Cryptolestes pusillus	animal feed	oc	Strong-Okumura58
Cryptolestes pusillus	annatto seed	se	Zimmerman90
Cryptolestes pusillus	bamboo, dried leaf or shoot	v	Zimmerman90
Cryptolestes pusillus	banana, dried	df	Campbell89, Currie67, Delobel-Tran93, Sinha-Watters85, Zimmerman90
Cryptolestes pusillus	barley	g	Athanassiou et al10, Campbell89, Currie67, Davies49, Delobel-Tran93, Howe-Lefkovitch57, Sinha-Watters85, Strong-Okumura58
Cryptolestes pusillus	bean	p	Campbell89, Howe-Lefkovitch57, Zimmerman90
Cryptolestes pusillus	bean curd	pp	Zimmerman90
Cryptolestes pusillus	bean sauce, yellow	oc	Zimmerman90
Cryptolestes pusillus	bean, salted	pp	Olsen81
Cryptolestes pusillus	biscuit	bg	Calderon-Donahaye64, Patton31
Cryptolestes pusillus	Brazil nut (para nut)	n	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes pusillus	bulb	r	Campbell89, Currie67, Davies49, Hill02, Patton31, Richards-Herford30, Sinha-Watters85
Cryptolestes pusillus	cashew	n	Nair et al79, Pinheiro68
Cryptolestes pusillus	cassava root chip	rp	Parker et al81
Cryptolestes pusillus	cassava root meal	rp	Pierrard62
Cryptolestes pusillus	cereal (cereal product)	gp	Campbell89, Haines81, McFarlane63, Sinha-Watters85, Wheeler21
Cryptolestes pusillus	citrus pulp, dried	dfp	Campbell89, Currie67, Laudani et al59, Sinha-Watters85
Cryptolestes pusillus	cocoa	bc	Campbell89, Forsyth66, Howe-Lefkovitch57, Patton31
Cryptolestes pusillus	cocoa bean	bc	Aitken75, Cornes73, Delobel-Tran93, Halstead93, Howe-Freeman55, Howe-Lefkovitch57, McFarlane63, Olsen81, Sinha-Watters85
Cryptolestes pusillus	coffee bean	bc	Campbell89, Currie67, Davies49, Delobel-Tran93, Hill02, Olsen81, Patton31, Richards-Herford30, Sinha-Watters85, Zimmerman90
Cryptolestes pusillus	copra	osp	Archibald-Chalmers83, Campbell89, Currie67, Davies49, Delobel-Tran93, Hill02, Patton31, Sinha-Watters85
Cryptolestes pusillus	cottonseed	os	Bissell36, Campbell89, Currie67, Davies49, 60; Delobel-Tran93, Hill02, Richards-Herford30, Sinha-Watters85
Cryptolestes pusillus	cottonseed product	osp	Howe-Lefkovitch57
Cryptolestes pusillus	cowpea	p	Campbell89, Howe-Lefkovitch57, Sinha-Watters85
Cryptolestes pusillus	date	df	Archibald-Chalmers83, Patton31
Cryptolestes pusillus	dried fruit	df	Aitken75, Attia-Kamel66
Cryptolestes pusillus	filbert	n	Campbell89, Currie67, Richards-Herford30, Sinha-Watters85
Cryptolestes pusillus	fungus, dried	v	Olsen81, Zimmerman90
Cryptolestes pusillus	ginger	sea	McFarlane63
Cryptolestes pusillus	grain product	gp	Aitken75, Cotton-Good37
Cryptolestes pusillus	grain, cereal	g	Aitken75, Attia-Kamel66, Buchelos-Athanassiou98, Cotton-Good37, Imura03, Patton31, Wheeler21, Yan et al10
Cryptolestes pusillus	grass seed	se	Archibald-Chalmers83
Cryptolestes pusillus	gum dammar	v	Campbell89, Currie67, Davies49, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes pusillus	hemp (marijuana)	v	Arnaud74
Cryptolestes pusillus	kidney bean	p	Delobel-Tran93
Cryptolestes pusillus	licorice apricot	rp	Zimmerman90
Cryptolestes pusillus	maize	g	Caliboso et al86, Campbell89, Davies49, 60; Delobel-Tran93, Forsyth66, Haines74, 81; Halstead93, Howe-Lefkovitch57, McFarlane63, Patton31, Pierrard62, Richards-Herford30, Sinha-Watters85, Strong-Okumura58, Tadesse96, Walker79
Cryptolestes pusillus	maize meal	gp	Calderon-Donahaye64, Davies60, Pierrard62
Cryptolestes pusillus	medicine, Chinese traditional	me	Guilin et al99
Cryptolestes pusillus	millet	g	Cornes73
Cryptolestes pusillus	mungbean	p	Caliboso et al86
Cryptolestes pusillus	nutmeg (mace)	sea	Campbell89, Currie67, Davies49, Delobel-Tran93, Hill02, Patton31, Richards-Herford30, Sinha-Watters85
Cryptolestes pusillus	oat	g	Haines81
Cryptolestes pusillus	oilcake	osp	Aitken75
Cryptolestes pusillus	oilseed	os	Aitken75
Cryptolestes pusillus	oilseed product	osp	Howe-Lefkovitch57
Cryptolestes pusillus	paddy	g	Caliboso et al86, Haines74, 81; Halstead93, McFarlane63, Nayar et al76, Sukprakarn86
Cryptolestes pusillus	palm kernel	os	Campbell89, Delobel-Tran93, Howe-Freeman55, Howe-Lefkovitch57, Sinha-Watters85
Cryptolestes pusillus	pastry	bg	Zimmerman90
Cryptolestes pusillus	peach	ffv	Campbell89, Currie67, Sinha-Watters85
Cryptolestes pusillus	peanut	os	Arthur56, Champ65, Delobel-Tran93, Forsyth66, Halstead93, Howe-Lefkovitch57, LaHue et al59, Nayar et al76, Pierrard62, Redlinger-Davis82, Sinha-Watters85
Cryptolestes pusillus	peanut product	osp	Zimmerman90
Cryptolestes pusillus	pepper, black	sea	White57
Cryptolestes pusillus	pepper, chilli	sea	Zimmerman90
Cryptolestes pusillus	pepper, chilli with black bean	oc	Zimmerman90
Cryptolestes pusillus	pepper, dried	sea	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes pusillus	pepper, pod dried chilli	sea	Olsen81, Zimmerman87
Cryptolestes pusillus	plum	ffv	Zimmerman90
Cryptolestes pusillus	rice	g	Archibald-Chalmers83, Attia-Kamel66, Campbell89, Davies49, 60; Delobel-Tran93, Douglas41, Forsyth66, Haines74, 81; Halstead93, Howe-Lefkovitch57, Nayar et al76, Patton31, Sinha-Watters85, Stejskal-Kucerova93, Sukprakarn86, Wheeler21, Yao-Lo62
Cryptolestes pusillus	rice bran	gp	Caliboso et al86, Haines81
Cryptolestes pusillus	rice meal	gp	Caliboso et al86, McFarlane63
Cryptolestes pusillus	root, dried cassava (manioc)	r	Campbell89, Davies60, Delobel92, Delobel-Tran93, Forsyth66, Halstead93, Howe-Lefkovitch57, Pierrard62, Ratti-Rampini77, Sinha-Watters85
Cryptolestes pusillus	root, lonchocarpus (rotenone)	r	Downes-Williams50
Cryptolestes pusillus	safflower	os	Strong-Okumura58
Cryptolestes pusillus	sago	v	Campbell89, Currie67, Delobel-Tran93, Sinha-Watters85
Cryptolestes pusillus	seaweed, dried	v	Currie67, Delobel-Tran93, Sinha-Watters85, Zimmerman90
Cryptolestes pusillus	seed	se	Archibald-Chalmers83
Cryptolestes pusillus	sesame seed	os	Cornes73, Currie67, Delobel-Tran93, Sinha-Watters85, Zimmerman90
Cryptolestes pusillus	sorghum (broomcorn)	g	Caliboso et al86, Campbell89, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Giles64, Haines81, Halstead93, Howe-Lefkovitch57, McFarlane63, Mookherjee et al68, Sinha-Watters85, Strong-Okumura58
Cryptolestes pusillus	sorghum meal	gp	Pierrard62
Cryptolestes pusillus	soup mix, dried	oc	Zimmerman90
Cryptolestes pusillus	soybean	p	Archibald-Chalmers83, Caliboso et al86, Campbell89, Currie67, Delobel-Tran93, Zimmerman90
Cryptolestes pusillus	soybean meal	pp	Caliboso et al86
Cryptolestes pusillus	sunflower seed	os	Delobel-Tran93, Stojanovic-Kosovac74, Weidner73
Cryptolestes pusillus	sunflower seed oilcake	osp	Campbell89, Currie67, Sinha-Watters85
Cryptolestes pusillus	sweet potato flour	rp	Zimmerman90
Cryptolestes pusillus	tamarind product	v	Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes pusillus	tomato, dried	v	Zimmerman90
Cryptolestes pusillus	water chestnut powder	v	Zimmerman90
Cryptolestes pusillus	watermelon seed	se	Zimmerman90
Cryptolestes pusillus	wheat	g	Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Delobel-Tran93, Haines81, Halstead93, Howe-Lefkovitch57, Patton31, Sinha-Watters85, Strong-Okumura58
Cryptolestes pusillus	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Howe-Lefkovitch57, Pierrard62
Cryptolestes pusillus	wheat flour	gp	Buchelos-Athanassiou98, Calderon-Donahaye64, Cornes73, Davies49, Patton31, Pierrard62
Cryptolestes pusillus	yam	r	Cornes73
Cryptolestes spartii	wheat flour	gp	Delobel-Tran93
Cryptolestes turcicus	cereal (cereal product)	gp	Halstead93
Cryptolestes turcicus	cocoa	bc	Campbell89, Cotton-Good37, Davies49, Hill02, Imura03, Patton31, Richards-Herford30
Cryptolestes turcicus	copra	osp	Campbell89, Cotton-Good37, Davies49, Hill02
Cryptolestes turcicus	dried fruit	df	Attia-Kamel66, Campbell89, Cotton-Good37, Imura03, Wheeler21
Cryptolestes turcicus	fig, dried	df	Richards-Herford30
Cryptolestes turcicus	grain residue	res	Aitken75, Campbell89, Cotton-Good37
Cryptolestes turcicus	grain, cereal	g	Attia-Kamel66, Buchelos-Athanassiou98, Imura03, Halstead93, Hill02, Yan et al10
Cryptolestes turcicus	licorice apricot	rp	Zimmerman90
Cryptolestes turcicus	maize	g	Aitken75
Cryptolestes turcicus	malt	gp	Guilin et al99
Cryptolestes turcicus	medicine, Chinese traditional	me	Guilin et al99
Cryptolestes turcicus	millet	g	Guilin et al99
Cryptolestes turcicus	nutmeg (mace)	sea	Davies49, Hill02, Patton31, Richards-Herford30
Cryptolestes turcicus	paddy	g	Pires et al07
Cryptolestes turcicus	pepper, chilli	sea	Davies49, Hill02, Patton31, Richards-Herford30
Cryptolestes turcicus	prune	df	Halstead93, Patton31, Wheeler21
Cryptolestes turcicus	pulse	p	Delobel-Tran93
Cryptolestes turcicus	rice	g	Attia-Kamel66

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptolestes turcicus	sorghum (broomcorn)	g	Aitken75
Cryptolestes turcicus	spice	sea	Campbell89, Cotton-Good37, Imura03
Cryptolestes turcicus	vegetable material, dried	v	Zimmerman90
Cryptolestes turcicus	wheat	g	Aitken75, Delobel-Tran93, Imura03
Cryptolestes turcicus	wheat bran (pollard)	gp	Aitken75, Buchelos-Athanassiou98
Cryptolestes turcicus	wheat flour	gp	Buchelos-Athanassiou98, Delobel-Tran93, Haines81
Cryptolestes turcicus	wheat flour residue	res	Halstead93
Cryptolestes turcicus	wheat germ	gp	Aitken75
Cryptolestes turcicus	wheat germ meal	gp	Davies60
Cryptophagus acutangulus	almond	n	Aitken75
Cryptophagus acutangulus	cereal (cereal product)	gp	Hinton45
Cryptophagus acutangulus	currant	df	Aitken75
Cryptophagus acutangulus	esparto grass, moldy	sp	Aitken75
Cryptophagus acutangulus	furniture	oc	Cotton-Good37
Cryptophagus acutangulus	grain, cereal	g	Yan et al10
Cryptophagus acutangulus	hide, pelt or skin	anv	Cotton-Good37
Cryptophagus acutangulus	raisin	df	Aitken75
Cryptophagus acutangulus	soybean meal	pp	Aitken75
Cryptophagus acutangulus	straw	v	Cotton-Good37
Cryptophagus acutangulus	sultana, dried	df	Aitken75
Cryptophagus acutangulus	tobacco leaf	v	Cotton-Good37
Cryptophagus acutangulus	vegetable refuse	v	Cotton-Good37, Hayhurst-Britten42, Patton31, Richards-Herford30
Cryptophagus acutangulus	walnut	n	Aitken75
Cryptophagus acutangulus	wheat	g	Aitken75
Cryptophagus acutangulus	wheat flour	gp	Aitken75
Cryptophagus cellaris	almond	n	Aitken75
Cryptophagus cellaris	animal feed	oc	Hayhurst-Britten42
Cryptophagus cellaris	apricot, dried	df	Aitken75
Cryptophagus cellaris	barley	g	Delobel-Tran93, Hayhurst-Britten42, Hinton45
Cryptophagus cellaris	barley meal	gp	Hayhurst-Britten42
Cryptophagus cellaris	bean	p	Aitken75
Cryptophagus cellaris	bread	bg	Cotton-Good37, Hayhurst-Britten42, Richards-Herford30
Cryptophagus cellaris	bread roll, moldy	sp	Hinton45
Cryptophagus cellaris	cereal (cereal product)	gp	Hinton45
Cryptophagus cellaris	cheese	anv	Hinton45

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptophagus cellaris	cork	wp	Hinton45
Cryptophagus cellaris	currant	df	Aitken75
Cryptophagus cellaris	dried fruit	df	Aitken75, Cotton-Good37, Delobel-Tran93
Cryptophagus cellaris	esparto grass, moldy	sp	Aitken75
Cryptophagus cellaris	fig	ffv	Aitken75
Cryptophagus cellaris	grain residue	res	Aitken75
Cryptophagus cellaris	grain, cereal	g	Buchelos-Athanassiou98, Yan et al10
Cryptophagus cellaris	hay	v	Buchelos-Athanassiou98
Cryptophagus cellaris	illipenut	os	Aitken75
Cryptophagus cellaris	insect, dried	aninv	Delobel-Tran93, Hinton45
Cryptophagus cellaris	linseed oilcake	osp	Hayhurst-Britten42, Hinton45
Cryptophagus cellaris	maize	g	Hayhurst-Britten42
Cryptophagus cellaris	oat	g	Aitken75, Hayhurst-Britten42, Hinton45
Cryptophagus cellaris	oat, rolled	gp	Hayhurst-Britten42
Cryptophagus cellaris	oilcake	osp	Aitken75
Cryptophagus cellaris	paddy	g	Pires et al07
Cryptophagus cellaris	palm kernel	os	Aitken75
Cryptophagus cellaris	pea meal	pp	Hinton45
Cryptophagus cellaris	raisin	df	Aitken75
Cryptophagus cellaris	rice	g	Cotton-Good37, Delobel-Tran93
Cryptophagus cellaris	rye	g	Aitken75
Cryptophagus cellaris	soybean meal	pp	Aitken75
Cryptophagus cellaris	sultana, dried	df	Aitken75, Hayhurst-Britten42, Hinton45, Patton31, Richards-Herford30
Cryptophagus cellaris	vegetable refuse	v	Cotton-Good37, Richards-Herford30
Cryptophagus cellaris	walnut	n	Aitken75
Cryptophagus cellaris	wheat	g	Aitken75, Athanassiou et al06, 10, Delobel-Tran93, Hayhurst-Britten42, Hinton45
Cryptophagus cellaris	wheat bran (pollard)	gp	Hayhurst-Britten42, Hinton45
Cryptophagus cellaris	wheat chaff	gp	Hayhurst-Britten42
Cryptophagus cellaris	wheat flour	gp	Aitken75, Buchelos-Athanassiou98, Hayhurst-Britten42, Hinton45
Cryptophagus dentatus	dried fruit	df	Attia-Kamel66, Cotton-Good37, Delobel-Tran93
Cryptophagus dentatus	grain, cereal	g	Buchelos-Athanassiou98, Yan et al10
Cryptophagus dentatus	jujube	df	Guilin et al99
Cryptophagus dentatus	licorice	rp	Hinton45
Cryptophagus dentatus	medicine, Chinese traditional	me	Guilin et al99

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptophagus dentatus	millet	g	Guilin et al99
Cryptophagus dentatus	oat	g	Hinton45
Cryptophagus dentatus	peanut	os	Hinton45
Cryptophagus dentatus	sultana, dried	df	Richards-Herford30
Cryptophagus dentatus	vegetable refuse	v	Attia-Kamel66, Cotton-Good37, Richards-Herford30
Cryptophagus dentatus	wheat flour	gp	Attia-Kamel66, Cotton-Good37, Delobel-Tran93, Hinton45
Cryptophagus pilosus	bean curd	pp	Olsen81
Cryptophagus pilosus	Brazil nut (para nut)	n	Woodroffe-Halstead59
Cryptophagus pilosus	fig, dried	df	Hinton45
Cryptophagus pilosus	grain, cereal	g	Buchelos-Athanassiou98, Yan et al10
Cryptophagus pilosus	hay	v	Buchelos-Athanassiou98
Cryptophagus pilosus	maize, decaying	gs	Hinton45
Cryptophagus pilosus	wheat bran (pollard)	gp	Buchelos-Athanassiou98
Cryptophagus pilosus	wheat flour	gp	Buchelos-Athanassiou98, Hinton45
Cryptophagus saginatus	barley	g	Aitken75
Cryptophagus saginatus	grain, cereal	g	Buchelos-Athanassiou98
Cryptophagus saginatus	hay	v	Buchelos-Athanassiou98, Hinton45
Cryptophagus saginatus	hop	v	Hayhurst-Britten42
Cryptophagus saginatus	maize	g	Aitken75
Cryptophagus saginatus	paddy	g	Pires et al07
Cryptophagus saginatus	soybean meal, moldy	gs	Aitken75
Cryptophagus saginatus	sultana, dried	df	Hinton45, Patton31, Richards-Herford30
Cryptophagus saginatus	vegetable refuse	v	Richards-Herford30
Cryptophagus saginatus	walnut	n	Aitken75
Cryptophagus saginatus	wheat	g	Aitken75
Cryptophagus saginatus	wheat flour	gp	Buchelos-Athanassiou98
Cryptophagus scanicus	Brazil nut (para nut)	n	Woodroffe-Halstead59
Cryptophagus scanicus	cereal (cereal product)	gp	Hinton45
Cryptophagus scanicus	dried fruit	df	Cotton-Good37, Delobel-Tran93, Patton31
Cryptophagus scanicus	fig	ffv	Hinton45, Patton31, Richards-Herford30
Cryptophagus scanicus	grain, cereal	g	Cotton-Good37, Delobel-Tran93
Cryptophagus scanicus	pear, dried	df	Hinton45, Richards-Herford30
Cryptophagus scanicus	sultana, dried	df	Hayhurst-Britten42, Hinton45, Patton31, Richards-Herford30
Cryptophagus scanicus	vegetable refuse	v	Cotton-Good37, Richards-Herford30
Cryptophagus scanicus	walnut	n	Aitken75
Cryptophagus scutellatus	grain, cereal	g	Yan et al10

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cryptophagus subfumatus	beehive	aninv	Hinton45
Cryptophagus subfumatus	currant	df	Aitken75
Cryptophagus subfumatus	dried fruit	df	Delobel-Tran93, Hinton45
Cryptophagus subfumatus	ginger cake	sea	Hinton45
Cryptophagus subfumatus	nut	n	Delobel-Tran93
Cryptophagus subfumatus	sultana, dried	df	Aitken75
Cryptophagus subfumatus	walnut	n	Aitken75, Haines74, Halstead93, Imura03
Cryptophagus subfumatus	wheat	g	Aitken75
Cryptophilus integer	bean paste	pp	Delobel-Tran93, Zimmerman90
Cryptophilus integer	bean spillage	res	Aitken75
Cryptophilus integer	dried fruit	df	Attia-Kamel66
Cryptophilus integer	fig, dried	df	Hinton45
Cryptophilus integer	food, decaying	sp	Imura03
Cryptophilus integer	grain, cereal	g	Yan et al10
Cryptophilus integer	medicine, Chinese traditional	me	Guilin et al99
Cryptophilus integer	millet	g	Guilin et al99
Cryptophilus integer	paddy residue	res	Winks69
Cryptophilus integer	rice	g	Aitken75
Cryptophilus integer	sago flour	v	Aitken75
Cryptophilus integer	vegetable refuse	v	Attia-Kamel66
Cryptophilus integer	wheat flour	gp	Attia-Kamel66
Cydia pomonella	apple	ffv	Corbet-Tams43, Gorham91
Cydia pomonella	chestnut	n	Gorham91
Cydia pomonella	pear	ffv	Gorham91
Cydia pomonella	quince fruit	ffv	Gorham91
Cydia pomonella	walnut	n	Gorham91, Strong-Okumura58
Cylas formicarius	sweet potato	r	Nayar et al76, USDA36-61, Wolfe91
Cynaeus angustus	animal feed	oc	Dunkel et al82
Cynaeus angustus	barley	g	Campbell89, Dunkel et al82, Gorham91
Cynaeus angustus	cereal (cereal product)	gp	Gorham91
Cynaeus angustus	dried fruit	df	Dunkel et al82
Cynaeus angustus	fig, dried	df	Gorham91, Okumura-Strong65
Cynaeus angustus	grain, cereal	g	Gorham91
Cynaeus angustus	maize	g	Campbell89, Dunkel et al82, Gorham91, Hill02
Cynaeus angustus	maize cob	gp	Campbell89, Dunkel et al82, Gorham91
Cynaeus angustus	oat	g	Campbell89, Dunkel et al82, Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Cynaeus angustus	oat, rolled	gp	Gorham91
Cynaeus angustus	sorghum (broomcorn)	g	Dunkel et al82, Gorham91
Cynaeus angustus	soybean flour	pp	Dunkel et al82
Cynaeus angustus	soybean, moldy	gs	Dunkel et al82
Cynaeus angustus	tobacco leaf	v	Aitken75, Dunkel et al82
Cynaeus angustus	wheat	g	Campbell89, Dunkel et al82, Gorham91
Cynaeus angustus	wheat flour	gp	Dunkel et al82, Gorham91
Dermestes ater	animal feed	oc	McFarlane63, Strong-Okumura58, Walker79
Dermestes ater	animal product	anv	Aitken75, Hill02
Dermestes ater	apricot	ffv	Archibald-Chalmers83
Dermestes ater	bacon, smoked	anv	Archibald-Chalmers83
Dermestes ater	basketware, wicker	v	Archibald-Chalmers83
Dermestes ater	biscuit	bg	Calderon-Donahaye64
Dermestes ater	bone	anv	Cornes73, Peacock93
Dermestes ater	carob (locust)	df	Aitken75
Dermestes ater	cashew	n	Archibald-Chalmers83, Delobel-Tran93
Dermestes ater	castor bean	se	Kiritani59
Dermestes ater	cheese	anv	Archibald-Chalmers83, Beal03, Campbell89, Delobel-Tran93, Gorham91, Peacock93
Dermestes ater	cocoa	bc	Archibald-Chalmers83, Forsyth66, Peacock93, Richards-Herford30
Dermestes ater	cocoa bean	bc	Aitken75, Cornes73
Dermestes ater	coffee	bc	Archibald-Chalmers83
Dermestes ater	copra	osp	Aitken75, Archibald-Chalmers83, Bawalan04, Campbell89, Cornes73, Delobel-Tran93, Forsyth66, Haines81, Hill02, McFarlane63, Patton31, Peacock93
Dermestes ater	copra meal	osp	Bawalan04
Dermestes ater	cottonseed	os	Cornes73
Dermestes ater	custard powder	oc	Campbell89
Dermestes ater	date	df	Archibald-Chalmers83
Dermestes ater	dried fruit	df	Aitken75
Dermestes ater	egg albumin	anv	Peacock93
Dermestes ater	fenugreek	ffv	Archibald-Chalmers83
Dermestes ater	fig, dried	df	Okumura-Strong65

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes ater	fish, dried	anv	Archibald-Chalmers83, Beal03, Campbell89, Cornes73, Gorham91, Haines74, 81; Haines-Rees89, Imura03,Patton31, Peacock93, Rajendran-Parveen05, Richards-Herford30
Dermestes ater	fishmeal	anv	McFarlane63, Okumura-Strong65, Rajendran-Parveen05
Dermestes ater	fur	anv	Imura03
Dermestes ater	ginger	sea	Richards-Herford30
Dermestes ater	grain product	gp	Aitken75
Dermestes ater	grain, cereal	g	Aitken75, Yan et al10
Dermestes ater	herb	v	Archibald-Chalmers83
Dermestes ater	herbarium specimen	v	Archibald-Chalmers83
Dermestes ater	hide, pelt or skin	anv	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Knoche57, McFarlane63, Peacock93
Dermestes ater	honeycomb (bee, wasp)	aninv	Okumura-Strong65
Dermestes ater	horn	anv	Cornes73
Dermestes ater	insect, dried	aninv	Campbell89, Richards-Herford30
Dermestes ater	kapok seed	se	Kiritani59
Dermestes ater	leather	anv	Campbell89
Dermestes ater	lima bean	p	Peacock93
Dermestes ater	litchi nut (lychee)	n	Archibald-Chalmers83
Dermestes ater	maize	g	Archibald-Chalmers83, Caliboso et al86, Kiritani59, McFarlane63
Dermestes ater	maize meal	gp	Davies60
Dermestes ater	meat scrap	anv	Strong-Okumura58
Dermestes ater	meat, cured, dried or smoked	anv	Cornes73, Delobel-Tran93, Peacock93
Dermestes ater	medicine, Chinese traditional	me	Guilin et al99
Dermestes ater	medicine, henbane leaf	me	Campbell89
Dermestes ater	milk, dried	anv	Rajendran-Parveen05
Dermestes ater	mushroom, dried	v	Beal03, Campbell89, Delobel-Tran93, Gorham91, Patton31, Richards-Herford30
Dermestes ater	nut	n	Aitken75, Archibald-Chalmers83
Dermestes ater	nut, rotting	sp	Campbell89
Dermestes ater	oilcake	osp	Aitken75, Patton31
Dermestes ater	oilseed	os	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes ater	oilseed meal	osp	McFarlane63
Dermestes ater	paddy	g	McFarlane63
Dermestes ater	palm kernel	os	Calderon-Donahaye64, Cornes73
Dermestes ater	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Dermestes ater	peanut	os	Archibald-Chalmers83, Cornes73, Cotterell52, Delobel-Tran93, Kiritani59
Dermestes ater	peanut, shelled	osp	Wohlgemuth-Reichmuth83
Dermestes ater	rattan	v	Patton31
Dermestes ater	rice flour	gp	Kiritani59
Dermestes ater	seafood, dried	aninv	Archibald-Chalmers83
Dermestes ater	sesame seed	os	Kiritani59
Dermestes ater	shark fin, dried	anv	Olsen81
Dermestes ater	shrimp, dried	aninv	Cornes73
Dermestes ater	silk	aninv	Campbell89, VijayVeer et al96
Dermestes ater	silkworm cocoon	aninv	Delobel-Tran93, Kim et al99, Patton31, Rajendran-Parveen05, VijayVeer et al96
Dermestes ater	soup mix, dried	oc	Strong-Okumura58
Dermestes ater	soybean	p	Archibald-Chalmers83
Dermestes ater	soybean flour	pp	Delobel-Tran93
Dermestes ater	spice	sea	Kiritani59
Dermestes ater	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Dermestes ater	sweet potato	r	Archibald-Chalmers83
Dermestes ater	taro	r	Archibald-Chalmers83
Dermestes ater	tea leaf	bc	Archibald-Chalmers83
Dermestes ater	tobacco leaf	v	Peacock93
Dermestes ater	wheat flour	gp	Campbell89
Dermestes ater	wool	anv	Archibald-Chalmers83, Campbell89
Dermestes ater	yarn, synthetic	oc	Archibald-Chalmers83
Dermestes caninus	peanut	os	Arthur56
Dermestes carnivorus	animal product	anv	Archibald-Chalmers83
Dermestes carnivorus	basketware, wicker	v	Archibald-Chalmers83
Dermestes carnivorus	bone	anv	Aitken75, Peacock93
Dermestes carnivorus	Brazil nut (para nut)	n	Aitken75, Peacock93
Dermestes carnivorus	cocoa	bc	Richards-Herford30
Dermestes carnivorus	cottonseed	os	Kiritani59
Dermestes carnivorus	fertilizer	oc	Archibald-Chalmers83
Dermestes carnivorus	fish, dried	anv	Archibald-Chalmers83, Delobel-Tran93, Haines-Rees89, Peacock93, Rajendran-Parveen05

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes carnivorus	fishmeal	anv	Aitken75, Peacock93, Rajendran-Parveen05
Dermestes carnivorus	grain residue	res	Aitken75, Peacock93
Dermestes carnivorus	grain, cereal	g	Yan et al10
Dermestes carnivorus	hide, pelt or skin	anv	Beal03, Delobel-Tran93, Knoche57, Peacock93, Richards-Herford30
Dermestes carnivorus	kapok seed	se	Kiritani59
Dermestes carnivorus	medicine, Chinese traditional	me	Guilin et al99
Dermestes carnivorus	museum collection, mummy	oc	Attia-Kamel66
Dermestes carnivorus	oilcake	osp	Aitken75, Peacock93
Dermestes carnivorus	peanut oilcake	osp	Aitken75, Peacock93
Dermestes carnivorus	seafood, dried	aninv	Archibald-Chalmers83
Dermestes carnivorus	sesame seed	os	Kiritani59
Dermestes carnivorus	shark fin, dried	anv	Olsen81
Dermestes carnivorus	tobacco leaf	v	Patton31, Peacock93
Dermestes carnivorus	turtle shell	anv	Archibald-Chalmers83
Dermestes frischii	animal feed	oc	Strong-Okumura58
Dermestes frischii	animal product	anv	Aitken75
Dermestes frischii	bacon, smoked	anv	Attia-Kamel66
Dermestes frischii	beehive	aninv	Beal03
Dermestes frischii	bone	anv	Peacock93
Dermestes frischii	bone meal	anv	Peacock93, Rao et al73
Dermestes frischii	carob (locust)	df	Aitken75
Dermestes frischii	cheese	anv	Attia-Kamel66, Delobel-Tran93
Dermestes frischii	cocoa bean	bc	Aitken75, Imura03, Peacock93
Dermestes frischii	copra	osp	Aitken75, Cornes73
Dermestes frischii	cork	wp	Peacock93
Dermestes frischii	cottonseed	os	Kiritani59
Dermestes frischii	cowpea	p	Cornes73
Dermestes frischii	cowrie	aninv	Hayhurst-Britten42, Richards-Herford30
Dermestes frischii	cuttle fish, dried	aninv	Peacock93
Dermestes frischii	dog biscuit	bg	Campbell89, Hayhurst-Britten42, Peacock93
Dermestes frischii	dried fruit	df	Aitken75
Dermestes frischii	fish, dried	anv	Beal03, Campbell89, Delobel-Tran93, Forsyth66, Gorham91, Haines81, Haines-Rees89. Hayhurst-Britten42, Hill02, Patton31, Peacock93, Rajendran-Parveen05, Richards-Herford30

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes frischii	fish, preserved	anv	Calderon-Donahaye64, Zimmerman90
Dermestes frischii	fishmeal	anv	Haines81
Dermestes frischii	grain product	gp	Aitken75
Dermestes frischii	grain, cereal	g	Aitken75, Yan et al10
Dermestes frischii	ham	anv	Attia-Kamel66
Dermestes frischii	hide, pelt or skin	anv	Aitken75, Attia-Kamel66, Campbell89, Knoche57, Peacock93, Rajendran-Parveen05
Dermestes frischii	insect, dried	aninv	Campbell89, Delobel-Tran93
Dermestes frischii	meat, cured, dried or smoked	anv	Delobel-Tran93, Peacock93
Dermestes frischii	medicine, Chinese traditional	me	Guilin et al99
Dermestes frischii	nut	n	Aitken75
Dermestes frischii	sesame seed	os	Kiritani59
Dermestes frischii	shark fin, dried	anv	Olsen81
Dermestes frischii	silk	aninv	VijayVeer et al96
Dermestes frischii	silkworm cocoon	aninv	Campbell89, Kim et al99, Patton31, Rajendran-Parveen05, VijayVeer et al96
Dermestes frischii	sponge, bath	oc	Campbell89
Dermestes frischii	turmeric	sea	Guilin et al99
Dermestes frischii	wheat	g	Strong-Okumura58
Dermestes frischii	wheat flour	gp	Calderon-Donahaye64
Dermestes frischii	wool	anv	Hayhurst-Britten42
Dermestes haemorrhoidalis	bone meal	anv	Aitken75, Peacock93
Dermestes haemorrhoidalis	fish, dried	anv	Delobel-Tran93, Haines-Rees89
Dermestes haemorrhoidalis	fishmeal	anv	Aitken75, Peacock93, Rajendran-Parveen05
Dermestes haemorrhoidalis	hide, pelt or skin	anv	Delobel-Tran93, Knoche57, Peacock93
Dermestes lardarius	animal feed	oc	Hayhurst-Britten42, Hedges-Lacey96
Dermestes lardarius	animal product	anv	Aitken75
Dermestes lardarius	animal specimen	anv	Campbell89, Imura03, Patton31, Peacock93, Rajendran-Parveen05
Dermestes lardarius	bacon, smoked	anv	Archibald-Chalmers83, Campbell89, Gorham91, Hayhurst-Britten42, Hedges-Lacey96, Hill02, Patton31, Peacock93
Dermestes lardarius	beehive	aninv	Beal03
Dermestes lardarius	betel nut (areca nut)	n	Richards-Herford30
Dermestes lardarius	biscuit	bg	Patton31
Dermestes lardarius	bone	anv	Hedges-Lacey96, Hill02, Peacock93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes lardarius	bread, rye	bg	Hill02
Dermestes lardarius	carob (locust)	df	Aitken75
Dermestes lardarius	cheese	anv	Beal03, Hedges-Lacey96
Dermestes lardarius	cheese, moldy	sp	Campbell89, Gorham91, Hill02, Patton31, Peacock93
Dermestes lardarius	cocoa	bc	Hayhurst-Britten42, Richards-Herford30
Dermestes lardarius	cocoa bean	bc	Aitken75
Dermestes lardarius	copra	osp	Aitken75
Dermestes lardarius	cottonseed oilcake	osp	Hayhurst-Britten42
Dermestes lardarius	dog biscuit	bg	Hayhurst-Britten42, Peacock93
Dermestes lardarius	dried fruit	df	Aitken75
Dermestes lardarius	feather	anv	Archibald-Chalmers83, Campbell89, Patton31, Peacock93
Dermestes lardarius	fish, dried	anv	Beal03, Delobel-Tran93, Gorham91, Haines-Rees89, Hayhurst-Britten42, Hedges-Lacey96, Imura03, Patton31, Peacock93, Rajendran-Parveen05, Richards-Herford30
Dermestes lardarius	fish, preserved	anv	Hill02, Zimmerman90
Dermestes lardarius	fishmeal	anv	Peacock93, Rajendran-Parveen05
Dermestes lardarius	fur	anv	Hill02, Imura03, Peacock93
Dermestes lardarius	grain, cereal	g	Aitken75, Yan et al10
Dermestes lardarius	gum dammar	v	Hayhurst-Britten42
Dermestes lardarius	hair	anv	Campbell89, Hill02, Peacock93
Dermestes lardarius	ham	anv	Campbell89, Gorham91, Hayhurst-Britten42, Hedges-Lacey96, Patton31, Peacock93
Dermestes lardarius	hide, pelt or skin	anv	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Hayhurst-Britten42, Hedges-Lacey96, Hill02, Peacock93, Rajendran-Parveen05
Dermestes lardarius	horn	anv	Peacock93
Dermestes lardarius	insect, dried	aninv	Campbell89, Delobel-Tran93, Hedges-Lacey96, Hill02, Peacock93
Dermestes lardarius	leather	anv	Hayhurst-Britten42, Peacock93
Dermestes lardarius	maize flake	gp	Hayhurst-Britten42
Dermestes lardarius	meat, cured, dried or smoked	anv	Beal03, Campbell89, Delobel-Tran93, Hedges-Lacey96, Patton31
Dermestes lardarius	meat, decaying	sp	Campbell89
Dermestes lardarius	nut	n	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes lardarius	nutmeg (mace)	sea	Hayhurst-Britten42, Richards-Herford30
Dermestes lardarius	orchard grass seed	se	Archibald-Chalmers83
Dermestes lardarius	palm kernel meal	osp	Hayhurst-Britten42
Dermestes lardarius	pea	p	Hayhurst-Britten42
Dermestes lardarius	peanut flake	osp	Hayhurst-Britten42
Dermestes lardarius	pear, dried	df	Richards-Herford30
Dermestes lardarius	sausage	anv	Gorham91, Hill02, Peacock93
Dermestes lardarius	seafood, dried	aninv	Archibald-Chalmers83
Dermestes lardarius	silk	aninv	Hayhurst-Britten42, Imura03
Dermestes lardarius	silkworm cocoon	aninv	Delobel-Tran93, Kim et al99, Peacock93, Rajendran-Parveen05, VijayVeer et al 96
Dermestes lardarius	soybean meal	pp	Hayhurst-Britten42
Dermestes lardarius	tobacco leaf	v	Hayhurst-Britten42, Hedges-Lacey96, Patton31, Richards-Herford30
Dermestes lardarius	wheat	g	Campbell89
Dermestes lardarius	wheat bran (pollard)	gp	Hayhurst-Britten42
Dermestes lardarius	wool	anv	Archibald-Chalmers83, Campbell89
Dermestes maculatus	ammonium nitrate	oc	Archibald-Chalmers83
Dermestes maculatus	animal feed	oc	Strong-Okumura58
Dermestes maculatus	animal product	anv	Aitken75
Dermestes maculatus	animal specimen	anv	Imura03, Rajendran-Parveen05
Dermestes maculatus	animal specimen, hunting trophy	anv	Archibald-Chalmers83
Dermestes maculatus	apricot	ffv	Archibald-Chalmers83
Dermestes maculatus	bacon, smoked	anv	Attia-Kamel66, Hill02, Peacock93
Dermestes maculatus	basketware, wicker	v	Archibald-Chalmers83
Dermestes maculatus	bean	p	Kiritani59
Dermestes maculatus	bird feed	se	Strong-Okumura58
Dermestes maculatus	blood, dried	anv	Archibald-Chalmers83, Delobel-Tran93
Dermestes maculatus	bone	anv	Archibald-Chalmers83, Cornes73, Patton31, Peacock93
Dermestes maculatus	bone meal	anv	Strong-Okumura58
Dermestes maculatus	carpet	t	Archibald-Chalmers83, Hayhurst-Britten42
Dermestes maculatus	cashew	n	Archibald-Chalmers83
Dermestes maculatus	castor bean	se	Kiritani59
Dermestes maculatus	cheese	anv	Attia-Kamel66, Delobel-Tran93, Hill02, Peacock93, Rajendran-Parveen05
Dermestes maculatus	cloth	t	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes maculatus	cocoa	bc	Archibald-Chalmers83, Hayhurst-Britten42, Richards-Herford30
Dermestes maculatus	cocoa bean	bc	Aitken75, Cornes73, Hill02
Dermestes maculatus	coffee	bc	Archibald-Chalmers83
Dermestes maculatus	copra	osp	Aitken75, Archibald-Chalmers83, Cornes73
Dermestes maculatus	cork	wp	Patton31
Dermestes maculatus	cotton	t	Archibald-Chalmers83
Dermestes maculatus	cottonseed	os	Kiritani59
Dermestes maculatus	cottonseed oilcake	osp	Pierrard62
Dermestes maculatus	cowpea	p	Cornes73
Dermestes maculatus	cowrie	aninv	Hayhurst-Britten42, Richards-Herford30
Dermestes maculatus	cuttle fish, dried	aninv	Archibald-Chalmers83
Dermestes maculatus	dog biscuit	bg	Archibald-Chalmers83, Hill02, Patton31, Peacock93
Dermestes maculatus	egg albumen	anv	Peacock93
Dermestes maculatus	feather	anv	Archibald-Chalmers83
Dermestes maculatus	fertilizer	oc	Archibald-Chalmers83
Dermestes maculatus	fish food	oc	Archibald-Chalmers83
Dermestes maculatus	fish, dried	anv	Allotey et al97, Archibald-Chalmers83, Campbell89, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Haines74, 81; Haines-Rees89, Hayhurst-Britten42, Hill02, Imura03, Patton31, Peacock93, Rajendran-Parveen05, Richards-Herford30
Dermestes maculatus	fish, preserved	anv	Zimmerman90
Dermestes maculatus	fishmeal	anv	Delobel-Tran93, Hill02, Rajendran-Parveen05, Strong-Okumura58
Dermestes maculatus	fur	anv	Imura03, Hayhurst-Britten42, Peacock93
Dermestes maculatus	grain product	gp	Aitken75
Dermestes maculatus	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Yan et al10
Dermestes maculatus	ham	anv	Attia-Kamel66, Davies60, Hill02, Patton31, Peacock93
Dermestes maculatus	hazel nut	n	Archibald-Chalmers83
Dermestes maculatus	herb	v	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes maculatus	hide, pelt or skin	anv	Archibald-Chalmers83, Attia-Kamel66, Beal03, Campbell89, Cornes73, Davies60, Delobel-Tran93, Gorham91, Haines74, 81; Hayhurst-Britten42, Hedges-Lacey96, Hill02, Knoche57, Patton31, Peacock93, Pierrard62, Rajendran-Parveen05, Richards-Herford30, Walker79
Dermestes maculatus	horn	anv	Archibald-Chalmers83, Cornes73
Dermestes maculatus	insect, dried	aninv	Delobel-Tran93
Dermestes maculatus	kapok seed	se	Kiritani59
Dermestes maculatus	leather	anv	Patton31
Dermestes maculatus	lentil (masur)	p	Archibald-Chalmers83
Dermestes maculatus	maize	g	Caliboso et al86, Cornes73, Kiritani59
Dermestes maculatus	meat meal	anv	Awadallah et al90
Dermestes maculatus	meat scrap	anv	Strong-Okumura58
Dermestes maculatus	meat, cured, dried or smoked	anv	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Imura03, Walker79
Dermestes maculatus	medicine, Chinese traditional	me	Guilin et al99
Dermestes maculatus	milk, dried	anv	Rajendran-Parveen05
Dermestes maculatus	museum collection, mummy	oc	Patton31
Dermestes maculatus	mushroom, dried	v	Archibald-Chalmers83
Dermestes maculatus	noodle	gp	Archibald-Chalmers83
Dermestes maculatus	nut	n	Archibald-Chalmers83
Dermestes maculatus	oilcake	osp	Aitken75
Dermestes maculatus	oilseed	os	Aitken75
Dermestes maculatus	palm kernel	os	Cornes73
Dermestes maculatus	peanut	os	Archibald-Chalmers83, Cornes73, Kiritani59
Dermestes maculatus	pepper, chilli	sea	Archibald-Chalmers83
Dermestes maculatus	phane (edible caterpillar)	aninv	Rajendran-Parveen05
Dermestes maculatus	rice	g	Archibald-Chalmers83
Dermestes maculatus	root, dried cassava (manioc)	r	Ratti-Rampini77
Dermestes maculatus	sausage rusk	oc	Rajendran-Parveen05
Dermestes maculatus	seafood, dried	aninv	Archibald-Chalmers83
Dermestes maculatus	seed	se	Archibald-Chalmers83
Dermestes maculatus	sesame seed	os	Archibald-Chalmers83, Kiritani59
Dermestes maculatus	shark fin, dried	anv	Olsen81
Dermestes maculatus	shrimp, dried	aninv	Allotey et al97, Archibald-Chalmers83, Cornes73

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes maculatus	silk	aninv	Imura03, VijayVeer et al96
Dermestes maculatus	silkworm cocoon	aninv	Campbell89, Kim et al99, Rajendran-Parveen05, VijayVeer et al96
Dermestes maculatus	sisal	v	Archibald-Chalmers83
Dermestes maculatus	sodium sulfate	oc	Archibald-Chalmers83
Dermestes maculatus	squid, dried	aninv	Archibald-Chalmers83
Dermestes maculatus	tea leaf	bc	Archibald-Chalmers83, Patton31
Dermestes maculatus	tobacco leaf	v	Cornes73, Hayhurst-Britten42, Livingstone-Reed36, Patton31, Richards-Herford30
Dermestes maculatus	turtle shell	anv	Archibald-Chalmers83
Dermestes maculatus	wheat flour	gp	Archibald-Chalmers83, Buchelos-Athanassiou98, Pierrard62
Dermestes maculatus	wool	anv	Archibald-Chalmers83, Calderon-Donahaye64, Hayhurst-Britten42, Patton31
Dermestes marmoratus	animal feed	oc	Strong-Okumura58
Dermestes murinus	fur	anv	Hinton45
Dermestes murinus	hide, pelt or skin	anv	Hinton45
Dermestes murinus	silk fabric	aninv	VijayVeer et al96
Dermestes murinus	silkworm cocoon	aninv	Hinton45, Rajendran-Parveen05, VijayVeer et al 96
Dermestes peruvianus	copra oilcake	osp	Wohlgemuth-Reichmuth83
Dermestes peruvianus	cottonseed oilcake	osp	Aitken75
Dermestes peruvianus	fish, dried	anv	Delobel-Tran93, Haines-Rees89
Dermestes peruvianus	fishmeal	anv	Aitken75, Rajendran-Parveen05
Dermestes peruvianus	ham	anv	Gorham91
Dermestes peruvianus	hide, pelt or skin	anv	Beal03, Delobel-Tran93, Hayhurst-Britten42, Knoche57
Dermestes peruvianus	meat, cured, dried or smoked	anv	Gorham91
Dermestes peruvianus	rice	g	Stejskal-Kucerova93
Dermestes peruvianus	sausage	anv	Gorham91
Dermestes peruvianus	silk	aninv	Hayhurst-Britten42, VijayVeer et al96
Dermestes peruvianus	sisal	v	Hayhurst-Britten42
Dermestes tessellatocollis	fish, dried	anv	Imura03, Rajendran-Parveen05
Dermestes tessellatocollis	fur	anv	Imura03
Dermestes tessellatocollis	grain, cereal	g	Yan et al10
Dermestes tessellatocollis	medicine, Chinese traditional	me	Guilin et al99
Dermestes tessellatocollis	peanut	os	Imura03, Kiritani59
Dermestes tessellatocollis	rape oilcake	osp	Imura03

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dermestes tessellatocollis	silkworm cocoon	aninv	Kim et al99, Rajendran-Parveen05
Dermestes undulatus	fish, dried	anv	Imura03
Dermestes undulatus	fur	anv	Imura03
Dermestes undulatus	grain, cereal	g	Yan et al10
Dermestes undulatus	medicine, herbal	me	Imura03
Dermestes undulatus	silk	aninv	VijayVeer et al96
Dermestes undulatus	silkworm cocoon	aninv	Rajendran-Parveen05, VijayVeer et al96
Dermestes vorax	fur	anv	Imura03
Dermestes vorax	grain, cereal	g	Yan et al10
Dermestes vorax	medicine, herbal	me	Imura03
Dermestes vorax	silk	aninv	Imura03
Dermestes vorax	silkworm cocoon	aninv	Kim et al99
Dienerella agra	grain, cereal	g	Imura03, Yan et al10
Dienerella agra	hemp (marijuana)	v	Arnaud74
Dienerella arga	cereal (cereal product)	gp	Hinton45
Dienerella arga	maize residue	res	Aitken75
Dienerella arga	oilcake	osp	Aitken75
Dienerella filiformis	bread, fermenting, moldy	sp	Hinton45
Dienerella filiformis	grain, cereal	g	Cotton-Good37, Yan et al10
Dienerella filiformis	lactose pellet	anv	Archibald-Chalmers83
Dienerella filiformis	leaf, dried	v	Zimmerman90
Dienerella filiformis	medicine, drug	me	Cotton-Good37, Hinton45
Dienerella filiformis	vegetable matter, moldy	sp	Cotton-Good37
Dienerella filiformis	walnut	n	Aitken75
Dienerella filiformis	wheat	g	Aitken75
Dienerella filiformis	whey, dried	anv	Archibald-Chalmers83
Dienerella filiformis	yeast	v	Cotton-Good37
Dienerella filum	cereal (cereal product)	gp	Cotton-Good37
Dienerella filum	dried fruit	df	Aitken75
Dienerella filum	grain, cereal	g	Imura03
Dienerella filum	herbarium specimen	v	Hinton45
Dienerella filum	maize	g	Cotton-Good37, Hinton45
Dienerella filum	medicine, herbal	me	Imura03
Dienerella filum	rye	g	Cotton-Good37, Hinton45
Dienerella filum	wheat	g	Cotton-Good37, Hinton45
Dienerella filum	yeast	v	Cotton-Good37, Hinton45, Stejskal95
Dinoderus bifoveolatus	bamboo	v	Cotton-Good37, USDA36-61
Dinoderus bifoveolatus	bamboo basket	v	USDA36-61

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dinoderus bifoveolatus	bamboo carving	v	USDA36-61
Dinoderus bifoveolatus	calamus for basket	v	Fisher50
Dinoderus bifoveolatus	caneware	v	Fisher50
Dinoderus bifoveolatus	cassava root chip	rp	Delobel-Tran93, Schafer et al00
Dinoderus bifoveolatus	cassava root meal	rp	Aitken75
Dinoderus bifoveolatus	cocoa bean	bc	Aitken75
Dinoderus bifoveolatus	date	df	USDA36-61
Dinoderus bifoveolatus	ginger	sea	USDA36-61
Dinoderus bifoveolatus	grain, cereal	g	Cotton-Good37, Fisher50
Dinoderus bifoveolatus	maize	g	Haines81
Dinoderus bifoveolatus	palm kernel meal	osp	Fisher50
Dinoderus bifoveolatus	palm leaf basket	v	Fisher50
Dinoderus bifoveolatus	palm leaf mat	v	USDA36-61
Dinoderus bifoveolatus	rattan	v	USDA36-61
Dinoderus bifoveolatus	root, derris (rotenone)	r	Archibald-Chalmers83, Cotton-Good37, Delobel-Tran93, Downes-Williams50, Jones38, USDA36-61
Dinoderus bifoveolatus	root, dried cassava (manioc)	r	Aitken75, Delobel92, Fisher50,
Dinoderus bifoveolatus	root, lonchocarpus (rotenone)	r	Delobel-Tran93, Downes-Williams50, USDA36-61
Dinoderus bifoveolatus	sago flour	v	Aitken75
Dinoderus bifoveolatus	sweet potato, dried	r	Delobel-Tran93
Dinoderus bifoveolatus	tapioca root	r	Aitken75
Dinoderus bifoveolatus	wheat flour	gp	Cotton-Good37, Delobel-Tran93
Dinoderus bifoveolatus	wheat meal	gp	Fisher50
Dinoderus bifoveolatus	yam	r	Fisher50
Dinoderus bifoveolatus	yam chip	rp	Schafer et al00
Dinoderus bifoveolatus	yam flour	rp	Aitken75
Dinoderus bifoveolatus	yam meal	rp	Fisher50
Dinoderus brevis	bamboo	v	Aitken75, Fisher50, Haines81, USDA36-61
Dinoderus brevis	caneware	v	Fisher50
Dinoderus brevis	grain, cereal	g	USDA36-61
Dinoderus brevis	rice	g	USDA36-61
Dinoderus brevis	root, dried cassava (manioc)	r	Delobel92
Dinoderus brevis	sago flour	v	Aitken75
Dinoderus brevis	tobacco leaf	v	Livingstone-Reed36
Dinoderus japonicus	bamboo	v	Fisher50
Dinoderus japonicus	grain, cereal	g	Yan et al10

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dinoderus minutus	avocado seed	se	Delobel-Tran93
Dinoderus minutus	bamboo	v	Aitken75, Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Cotton-Good37, Delobel-Tran93, Fisher50, Imura03. Plank48, Schafer et al00, USDA36-61
Dinoderus minutus	banana, dried	df	Campbell89, Cotton-Good37, Delobel-Tran93, Imura03, Plank48
Dinoderus minutus	barley	g	Imura03
Dinoderus minutus	basketware, wicker	v	Archibald-Chalmers83
Dinoderus minutus	bulb, lily	r	Plank48
Dinoderus minutus	cane	v	Plank48
Dinoderus minutus	caneware	v	Archibald-Chalmers83, Fisher50
Dinoderus minutus	cashew	n	Delobel-Tran93, Fisher50
Dinoderus minutus	cassava root chip	rp	Delobel-Tran93, Schafer et al00, Wohlgemuth-Reichmuth83
Dinoderus minutus	cassava root meal	rp	Cotterell52
Dinoderus minutus	chestnut	n	Campbell89, Cotton-Good37, Plank48
Dinoderus minutus	chocolate	bc	Plank48
Dinoderus minutus	cinnamon	sea	Delobel-Tran93, Fisher50
Dinoderus minutus	cocoa	bc	Campbell89, Cotton-Good37, Delobel-Tran93
Dinoderus minutus	copra	osp	Archibald-Chalmers83
Dinoderus minutus	corn	ffv	Plank48
Dinoderus minutus	cotton	t	Plank48, Richards-Herford30
Dinoderus minutus	dried fruit	df	Archibald-Chalmers83
Dinoderus minutus	ginger	sea	Delobel-Tran93, Richards-Herford30
Dinoderus minutus	grain, cereal	g	Yan et al10
Dinoderus minutus	guava	ffv	Fisher50
Dinoderus minutus	maize	g	Campbell89, Cotton-Good37, Davies60, Delobel-Tran93, Fisher50, Forsyth66, Haines81, Hill02, Imura03, Plank48, Richards-Herford30, Schafer et al00
Dinoderus minutus	medicine, herbal	me	Attia-Kamel66, Campbell89, Cotton-Good37, Kamel58
Dinoderus minutus	mung bean	p	Davies60
Dinoderus minutus	okra	ffv	Archibald-Chalmers83
Dinoderus minutus	palm kernel	os	Cornes73
Dinoderus minutus	paper	wp	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Dinoderus minutus	rattan	v	Archibald-Chalmers83, Fisher50, Plank48
Dinoderus minutus	rice	g	Campbell89, Cotton-Good37, Delobel-Tran93, Fisher50, Plank48
Dinoderus minutus	root, derris (rotenone)	r	Delobel-Tran93, Downes-Williams50, Jones38, Plank48
Dinoderus minutus	root, dried (tuber)	r	Richards-Herford30
Dinoderus minutus	root, dried cassava (manioc)	r	Davies60, Delobel92, Forsyth66, Haines81, Hill02, Walker79
Dinoderus minutus	root, ginger	r	Aitken75
Dinoderus minutus	rubber	oc	Fisher50
Dinoderus minutus	sago flour	v	Aitken75
Dinoderus minutus	sorghum (broomcorn)	g	Davies60
Dinoderus minutus	soybean	p	Hill02
Dinoderus minutus	spice	sea	Archibald-Chalmers83, Cotton-Good37
Dinoderus minutus	sugarcane	v	Fisher50, Plank48
Dinoderus minutus	sweet potato	r	Davies60, Delobel-Tran93, Fisher50, Plank48
Dinoderus minutus	tobacco leaf	v	Campbell89, Cotton-Good37, Haines81, Plank48
Dinoderus minutus	tobacco, fermenting	sp	Delobel-Tran93, Fisher50
Dinoderus minutus	wheat	g	Imura03
Dinoderus minutus	wheat flour	gp	Campbell89, Pierrard62, Plank48
Dinoderus minutus	wood	w	Aitken75
Dinoderus minutus	wooden basket	wp	USDA36-61
Dinoderus minutus	yam	r	Plank48
Dinoderus minutus	yam chip	rp	Schafer et al00
Dinoderus ocellaris	bamboo	v	Aitken75, Fisher50, USDA36-61
Dinoderus ocellaris	cassava root starch	rp	Aitken75
Dinoderus ocellaris	root, dried cassava (manioc)	r	Aitken75, Delobel92
Dinoderus ocellaris	starch	v	Aitken75
Endrosis sarcitrella	animal feed	oc	Cotton-Good37, Haines81, Strong-Okumura58
Endrosis sarcitrella	animal product	anv	Aitken84
Endrosis sarcitrella	barley	g	Hayhurst-Britten42, Okumura-Strong65
Endrosis sarcitrella	barley meal	gp	Hayhurst-Britten42
Endrosis sarcitrella	bean	p	Hayhurst-Britten42, Okumura-Strong65
Endrosis sarcitrella	bean	ffv	Hayhurst-Britten42
Endrosis sarcitrella	bean meal	pp	Hayhurst-Britten42
Endrosis sarcitrella	bulb	r	Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Endrosis sarcitrella	casein, dried	anv	Rajendran-Parveen05
Endrosis sarcitrella	cereal (cereal product)	gp	Corbet-Tams43
Endrosis sarcitrella	cheese	anv	Carter84
Endrosis sarcitrella	cocoa	bc	Carter84
Endrosis sarcitrella	cottonseed meal	osp	Hayhurst-Britten42
Endrosis sarcitrella	dried fruit	df	Aitken84, Carter84, Corbet-Tams43
Endrosis sarcitrella	feather	anv	Hill02
Endrosis sarcitrella	food, decaying	sp	Gorham91
Endrosis sarcitrella	grain product	gp	Aitken84
Endrosis sarcitrella	grain, cereal	g	Aitken84, Carter84, Cotton-Good37, Hill02, Patton31
Endrosis sarcitrella	insect, dried	aninv	Carter84
Endrosis sarcitrella	linseed meal	osp	Hayhurst-Britten42
Endrosis sarcitrella	maize	g	Strong-Okumura58
Endrosis sarcitrella	maize flake	gp	Hayhurst-Britten42
Endrosis sarcitrella	maize meal	gp	Hayhurst-Britten42
Endrosis sarcitrella	maize, split	gp	Hayhurst-Britten42
Endrosis sarcitrella	maple pea	p	Hayhurst-Britten42
Endrosis sarcitrella	nut	n	Aitken84
Endrosis sarcitrella	oat	g	Hayhurst-Britten42
Endrosis sarcitrella	oatmeal	gp	Hayhurst-Britten42
Endrosis sarcitrella	oilcake	osp	Aitken84
Endrosis sarcitrella	oilseed	os	Aitken84
Endrosis sarcitrella	pea	p	Hayhurst-Britten42
Endrosis sarcitrella	pulse	p	Aitken84
Endrosis sarcitrella	pulse product	pp	Aitken84
Endrosis sarcitrella	rye flour paste	gp	Hayhurst-Britten42
Endrosis sarcitrella	seed	se	Carter84, Cotton-Good37
Endrosis sarcitrella	vegetable refuse	v	Richards-Herford30
Endrosis sarcitrella	wheat	g	Haines81, Hayhurst-Britten42
Endrosis sarcitrella	wheat bran (pollard)	gp	Strong-Okumura58
Endrosis sarcitrella	wheat chaff	gp	Hayhurst-Britten42
Endrosis sarcitrella	wheat flour	gp	Hayhurst-Britten42
Endrosis sarcitrella	wheat meal	gp	Hill02
Endrosis sarcitrella	wool	anv	Hill02
Enicmus histrio	wheat	g	Hinton45
Epauloecus unicolor	grain, cereal	g	Campbell89, Hinton41, Papp62, Yan et al10

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Epauloecus unicolor	hide, pelt or skin	anv	Campbell89, Cotton-Good37, Hinton41, Papp62
Epauloecus unicolor	medicine, Chinese traditional	me	Guilin et al99
Ephestia elutella	almond	n	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	animal feed	oc	Strong-Okumura58
Ephestia elutella	apple, dried	df	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	banana, dried	df	Wise55
Ephestia elutella	barley	g	Patton31, Strong-Okumura58
Ephestia elutella	biscuit	bg	Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia elutella	blueberry	df	Weidner73
Ephestia elutella	bread	bg	Richards-Thomson32
Ephestia elutella	carob (locust)	df	Aitken84, Hill02, Richards-Herford30
Ephestia elutella	cereal (cereal product)	gp	Cotton-Good37, Patton31, Solis99, Wise55
Ephestia elutella	cherry, dried	df	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	chestnut	n	Solis99
Ephestia elutella	chicory	sea	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	chocolate	bc	Carter84, Cotton-Good37, Patton31, Roesler73, Wise55
Ephestia elutella	citrus pulp, dried	dfp	Hill02
Ephestia elutella	cocoa	bc	Carter84, Corbet-Tams43, Cotton-Good37, Hayhurst-Britten42, Richards-Herford30, Richards-Thomson32, Roesler73
Ephestia elutella	cocoa bean	bc	Aitken84, Hill02, Patton31, Schmidt-Grabner87, Wise55
Ephestia elutella	coffee	bc	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	cotton boll	v	Attia-Kamel66
Ephestia elutella	cottonseed	os	Strong-Okumura58
Ephestia elutella	cottonseed meal	osp	Strong-Okumura58
Ephestia elutella	currant	df	Richards-Thomson32
Ephestia elutella	date	df	Calderon-Donahaye64, Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	dried fruit	df	Aitken84, Carter84, Corbet-Tams43, Cotton-Good37, Hill02, Patton31, Richards-Thomson32, Roesler73, Schmidt-Grabner87, Strong-Okumura58
Ephestia elutella	fig	ffv	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	garlic	sea	Patton31, Strong-Okumura58
Ephestia elutella	grain product	gp	Aitken84, Roesler73

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ephestia elutella	grain, cereal	g	Aitken84, Carter84, Corbet-Tams43, Hayhurst-Britten42, Imura03, Richards-Herford30, Richards-Thomson32, Roesler73, Yan et al10
Ephestia elutella	hay	v	Hayhurst-Britten42, Hill02, Schmidt-Grabner87
Ephestia elutella	herb, dried	v	Roesler73
Ephestia elutella	honeycomb (bee, wasp)	aninv	Richards-Thomson32
Ephestia elutella	insect, dried	aninv	Richards-Thomson32, Roesler73
Ephestia elutella	kidney bean	p	Haines81
Ephestia elutella	linseed	os	Patton31
Ephestia elutella	maize	g	Caliboso et al86
Ephestia elutella	marzipan	v	Patton31, Roesler73
Ephestia elutella	medicine, angelica root	me	Weidner73
Ephestia elutella	medicine, drug	me	Hayhurst-Britten42, Imura03, Richards-Thomson32
Ephestia elutella	medicine, lime blossom tea	me	Weidner73
Ephestia elutella	mushroom, dried	v	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	nougat	oc	Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia elutella	nut	n	Aitken84, Carter84, Corbet-Tams43, Cotton-Good37, Hill02
Ephestia elutella	nutmeg (mace)	sea	Richards-Herford30
Ephestia elutella	oat	g	Strong-Okumura58
Ephestia elutella	oatmeal	gp	Wise55
Ephestia elutella	oilcake	osp	Aitken84
Ephestia elutella	oilseed	os	Aitken84, Carter84
Ephestia elutella	orange	ffv	Attia-Kamel66
Ephestia elutella	paddy	g	Caliboso et al86
Ephestia elutella	pea	p	Strong-Okumura58
Ephestia elutella	peanut	os	Hayhurst-Britten42, Patton31, Richards-Herford30, Richards-Thomson32, Wohlgemuth-Reichmuth83
Ephestia elutella	peanut, shelled	osp	Wohlgemuth-Reichmuth83
Ephestia elutella	pepper, cayenne	sea	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	pepper, chilli	sea	Solis99
Ephestia elutella	potato	r	Solis99
Ephestia elutella	potato flour	rp	Schmidt-Grabner87

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ephestia elutella	prune	df	Richards-Herford30, Richards-Thomson32
Ephestia elutella	pulse	p	Hill02, Imura03
Ephestia elutella	raisin	df	Solis99, Wise55
Ephestia elutella	rice	g	Hayhurst-Britten42, Kim et al88, Richards-Thomson32, Solis99, Stejskal-Kucerova93
Ephestia elutella	rice meal	gp	Caliboso et al86
Ephestia elutella	root, dried pomegranate	r	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	rose petal, dried	v	Hayhurst-Britten42, Richards-Thomson32
Ephestia elutella	rosebud, dried	v	Olsen81
Ephestia elutella	seed	se	Cotton-Good37, Hill02, Patton31, Schmidt-Grabner87
Ephestia elutella	sorghum (broomcorn)	g	Strong-Okumura58
Ephestia elutella	spice	sea	Schmidt-Grabner87
Ephestia elutella	sugar	v	Roesler73
Ephestia elutella	sugar beet seed	se	Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia elutella	sultana, dried	df	Richards-Herford30, Wise55
Ephestia elutella	tobacco leaf	v	Attia-Kamel66, Carter84, Cotton-Good37, Imura03, Hayhurst-Britten42, Hill02, Richards-Thomson32, Roesler73, Wise61
Ephestia elutella	vegetable material, dried	v	Corbet-Tams43, Hayhurst-Britten42, Hill02, Richards-Thomson32, Schmidt-Grabner87, Solis99
Ephestia elutella	walnut meat	np	Patton31, Richards-Thomson32, Solis99
Ephestia elutella	wheat	g	Trematerra-Gentile06
Ephestia elutella	wheat bran (pollard)	gp	Wise55, Wohlgemuth-Reichmuth83
Ephestia elutella	wheat flour	gp	Hill02, Patton31, Richards-Herford30, Richards-Thomson32, Wise55
Ephestia elutella	wheat meal	gp	Hill02
Ephestia kuehniella	acorn	n	Carter84, Hayhurst-Britten42, Patton31, Richards-Thomson32, Strong-Okumura58
Ephestia kuehniella	alfalfa hay	v	Strong-Okumura58
Ephestia kuehniella	almond	n	Carter84, Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia kuehniella	almond hull	np	Strong-Okumura58
Ephestia kuehniella	almond paste	np	Patton31
Ephestia kuehniella	animal feed	oc	Strong-Okumura58, Wise55, 61

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ephestia kuehniella	baby food	oc	Richards-Thomson32
Ephestia kuehniella	banana, dried	df	Patton31
Ephestia kuehniella	barley	g	Athanassiou et al10, Attia-Kamel66, Carter84, Patton31, Richards-Thomson32, Strong-Okumura58, Wise55
Ephestia kuehniella	barley meal	gp	Hayhurst-Britten42
Ephestia kuehniella	bean	p	Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia kuehniella	biscuit	bg	Carter84, Hayhurst-Britten42, Patton31, Richards-Herford30, Richards-Thomson32
Ephestia kuehniella	broad bean (fava bean, horsebean)	p	Patton31
Ephestia kuehniella	buckwheat flour	gp	Hayhurst-Britten42, Richards-Thomson32
Ephestia kuehniella	cake	bg	Carter84, Richards-Thomson32
Ephestia kuehniella	carob pod	v	Attia-Kamel66
Ephestia kuehniella	cereal (cereal product)	gp	Haines81, Hayhurst-Britten42, Richards-Herford30
Ephestia kuehniella	chestnut	n	Hayhurst-Britten42, Patton31
Ephestia kuehniella	chestnut flour	np	Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia kuehniella	chickpea (Bengal gram, garbanzo)	p	Okumura-Strong65
Ephestia kuehniella	chocolate	bc	Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia kuehniella	citrus pulp, dried	dfp	Hill02, Laudani et al59
Ephestia kuehniella	cocoa	bc	Carter84, Hayhurst-Britten42, Richards-Herford30, Richards-Thomson32
Ephestia kuehniella	cottonseed	os	Hayhurst-Britten42, Richards-Thomson32, Strong-Okumura58
Ephestia kuehniella	cottonseed meal	osp	Strong-Okumura58
Ephestia kuehniella	dried fruit	df	Hill02, Imura03, Patton31
Ephestia kuehniella	garlic	sea	Strong-Okumura58
Ephestia kuehniella	grain product	gp	Aitken84, Roesler73
Ephestia kuehniella	grain, cereal	g	Aitken84, Roesler73, Solis99, Yan et al10
Ephestia kuehniella	hemp seed	se	Carter84, Hayhurst-Britten42, Richards-Thomson32
Ephestia kuehniella	herb, dried	v	Roesler73
Ephestia kuehniella	hoba bean	p	Olsen81

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ephestia kuehniella	insect, dried	aninv	Corbet-Tams43, Hayhurst-Britten42, Richards-Thomson32
Ephestia kuehniella	jelly	oc	Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia kuehniella	linseed	os	Patton31
Ephestia kuehniella	linseed meal	osp	Richards-Thomson32
Ephestia kuehniella	maize	g	Caliboso et al86, Haines81, Patton31, Richards-Thomson32, Strong-Okumura58, Walker79
Ephestia kuehniella	maize flour	gp	Patton31
Ephestia kuehniella	maize germ meal	gp	Wohlgemuth-Reichmuth83
Ephestia kuehniella	maize meal	gp	Hayhurst-Britten42, Richards-Thomson32, Strong-Okumura58
Ephestia kuehniella	mushroom, dried	v	Carter84, Hayhurst-Britten42, Richards-Thomson32
Ephestia kuehniella	noodle	gp	Carter84, Hayhurst-Britten42, Richards-Thomson32
Ephestia kuehniella	nut	n	Corbet-Tams43, Roesler73
Ephestia kuehniella	nut meat	np	Patton31
Ephestia kuehniella	oat	g	Strong-Okumura58
Ephestia kuehniella	oatmeal	gp	Carter84, Hayhurst-Britten42, Richards-Thomson32, Wise55, 61
Ephestia kuehniella	oilcake	osp	Aitken84
Ephestia kuehniella	oilseed	os	Aitken84, Hill02
Ephestia kuehniella	onion, dried	v	Ibrahim et al70
Ephestia kuehniella	paddy	g	Pires et al07, Wise55
Ephestia kuehniella	pea	p	Carter84, Hayhurst-Britten42, Richards-Thomson32, Wise55
Ephestia kuehniella	peanut	os	Carter84, Hayhurst-Britten42, Okumura-Strong65, Richards-Thomson32, Wohlgemuth-Reichmuth83
Ephestia kuehniella	pepper, chilli	sea	Carter84, Hayhurst-Britten42, Olsen81, Patton31, Richards-Thomson32
Ephestia kuehniella	potato	r	Carter84, Hayhurst-Britten42, Patton31, Richards-Herford30, Richards-Thomson32
Ephestia kuehniella	potato flour	rp	Patton31
Ephestia kuehniella	pulse	p	Aitken84

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ephestia kuehniella	pulse product	pp	Aitken84
Ephestia kuehniella	raisin	df	Roesler73
Ephestia kuehniella	rice	g	Attia-Kamel66, Carter84, Forsyth66, Imura03, Patton31, Richards-Thomson32, Strong-Okumura58
Ephestia kuehniella	rice cone	gp	Richards-Thomson32
Ephestia kuehniella	rice flour	gp	Hayhurst-Britten42, Richards-Thomson32
Ephestia kuehniella	rice meal	gp	Richards-Thomson32
Ephestia kuehniella	root, dried	r	Roesler73
Ephestia kuehniella	rye	g	Carter84, Hayhurst-Britten42, Patton31, Richards-Thomson32, Wise55
Ephestia kuehniella	rye flour paste	gp	Hayhurst-Britten42
Ephestia kuehniella	rye meal	gp	Hayhurst-Britten42, Richards-Thomson32
Ephestia kuehniella	seed	se	Roesler73
Ephestia kuehniella	sesame seed	os	Carter84, Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia kuehniella	sorghum (broomcorn)	g	Strong-Okumura58
Ephestia kuehniella	soup mix, dried	oc	Wise55
Ephestia kuehniella	soybean	p	Carter84, Hayhurst-Britten42, Patton31, Richards-Thomson32
Ephestia kuehniella	soybean bran	pp	Wise55
Ephestia kuehniella	sugar beet seed	se	Patton31
Ephestia kuehniella	sunflower seed	os	Strong-Okumura58
Ephestia kuehniella	tobacco leaf	v	Attia-Kamel66
Ephestia kuehniella	vegetable material, dried	v	Hill02, Roesler73, Solis99
Ephestia kuehniella	vetch seed	se	Strong-Okumura58
Ephestia kuehniella	walnut	n	Carter84, Hayhurst-Britten42, Patton31, Richards-Thomson32, Roesler73, Wise55
Ephestia kuehniella	wheat	g	Athanassiou et al01, 03, 05, 06; Carter84, Strong-Okumura58, Trematerra-Gentile06, Wise55
Ephestia kuehniella	wheat bran (pollard)	gp	Hayhurst-Britten42, Richards-Thomson32, Strong-Okumura58, Wohlgemuth-Reichmuth83
Ephestia kuehniella	wheat flour	gp	Attia-Kamel66, Carter84, Corbet-Tams43, Cornes73, Hayhurst-Britten42, Hill02, Imura03, Patton31, Richards-Thomson32, Strong-Okumura58, Wise55

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ephestia kuehniella	wheat germ	gp	Strong-Okumura58
Ephestia kuehniella	wheat meal	gp	Corbet-Tams43, Wise55
Ephestia kuehniella	wheat semolina	gp	Patton31, Wise55
Epuraea luteolus	apple	ffv	Okumura-Savage74, Okumura-Strong65
Epuraea luteolus	banana	ffv	Okumura-Strong65
Epuraea luteolus	Brazil nut (para nut)	n	Hinton45
Epuraea luteolus	cactus fruit	ffv	Okumura-Savage74
Epuraea luteolus	cassava root chip	rp	Delobel-Tran93
Epuraea luteolus	coconut	os	Okumura-Strong65
Epuraea luteolus	corn	ffv	Okumura-Savage74, Okumura-Strong65
Epuraea luteolus	cotton boll	v	Strong-Okumura58
Epuraea luteolus	date	df	Okumura-Savage74, Okumura-Strong65
Epuraea luteolus	fig, dried	df	Delobel-Tran93, Okumura-Savage74, Okumura-Strong65
Epuraea luteolus	fruit, cull	sp	Okumura-Savage74
Epuraea luteolus	grain residue	res	Okumura-Savage74
Epuraea luteolus	grape	ffv	Okumura-Savage74
Epuraea luteolus	grapefruit	ffv	Okumura-Savage74
Epuraea luteolus	mango	ffv	Okumura-Strong65
Epuraea luteolus	nectarine	ffv	Okumura-Savage74
Epuraea luteolus	orange	ffv	Okumura-Savage74, Okumura-Strong65
Epuraea luteolus	pea	ffv	Okumura-Strong65
Epuraea luteolus	peach, dried	df	Strong-Okumura58
Epuraea luteolus	pepper	sea	Okumura-Savage74, Okumura-Strong65
Epuraea luteolus	persimmon	ffv	Okumura-Savage74
Epuraea luteolus	pomegranate	ffv	Okumura-Savage74
Epuraea luteolus	quince fruit	ffv	Okumura-Savage74
Epuraea luteolus	raisin	df	Okumura-Savage74, Okumura-Strong65
Epuraea luteolus	root, dried cassava (manioc)	r	Delobel92
Epuraea luteolus	rose	v	Okumura-Savage74
Epuraea luteolus	sorghum (broomcorn)	g	Okumura-Savage74
Epuraea luteolus	tomato	ffv	Okumura-Savage74
Epuraea luteolus	watermelon	ffv	Okumura-Savage74
Etiella zinckenella	bean	p	Singh90, Strong-Okumura58
Etiella zinckenella	cactus, Opuntia	v	Solis99
Etiella zinckenella	chestnut	n	Solis99
Etiella zinckenella	chickpea (Bengal gram, garbanzo)	p	Solis99

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Etiella zinckenella	cowpea	p	Attia-Kamel66, Nayar et al76, Singh90
Etiella zinckenella	gourd (squash)	ffv	Solis99
Etiella zinckenella	horsegram	p	Nayar et al76
Etiella zinckenella	hyaciath bean	p	Nayar et al76, Solis99
Etiella zinckenella	kidney bean	p	Solis99
Etiella zinckenella	lima bean	p	Solis99
Etiella zinckenella	maize	g	Solis99
Etiella zinckenella	pea	p	Hill02, Nayar et al76, Solis99, USDA36-61
Etiella zinckenella	pepper, bell or green	ffv	Solis99
Etiella zinckenella	pigeonpea (arhar, red gram)	p	Nayar et al76, Singh90, Solis99
Etiella zinckenella	pulse	p	Corbet-Tams43, Hill02
Etiella zinckenella	quince fruit	ffv	Solis99
Etiella zinckenella	soybean	p	Singh90
Galleria mellonella	beewax	aninv	Attia-Kamel66, Strong-Okumura58
Galleria mellonella	date	df	Okumura-Strong65
Galleria mellonella	honeycomb (bee, wasp)	aninv	Carter84, Corbet-Tams43, Imura03, Rajendran-Parveen05
Gibbium aeguinoctiale	medicine, Chinese traditional	me	Guilin et al99
Gibbium aequinoctiale	cotton	t	Delobel-Tran93
Gibbium aequinoctiale	food, decaying	sp	Imura03
Gibbium aequinoctiale	grain, cereal	g	Yan et al10
Gibbium aequinoctiale	maize	g	Delobel-Tran93
Gibbium aequinoctiale	opium cake	v	Delobel-Tran93
Gibbium aequinoctiale	rice	g	Delobel-Tran93
Gibbium aequinoctiale	spice	sea	Delobel-Tran93
Gibbium psylloides	animal feed	oc	Strong-Okumura58
Gibbium psylloides	animal product	anv	Aitken75, Campbell89, Cotton-Good37
Gibbium psylloides	bari (sundried pulse cake)	pp	Joshi-Srivastava64
Gibbium psylloides	bean	p	Archibald-Chalmers83
Gibbium psylloides	bread	bg	Attia-Kamel66, Campbell89, Cotton-Good37, Hinton41
Gibbium psylloides	cereal (cereal product)	gp	Campbell89, Cotton-Good37, Hedges-Lacey96
Gibbium psylloides	chamomile	v	Tawfik et al85
Gibbium psylloides	cloth towel, bathmat	t	Hinton41
Gibbium psylloides	cocoa bean	bc	Aitken75, Cornes73, Cotterell52
Gibbium psylloides	copra	osp	Aitken75
Gibbium psylloides	coriander	sea	Tawfik et al85

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Gibbium psylloides	cottonseed	os	Davies60
Gibbium psylloides	dallisgrass seed	se	Archibald-Chalmers83
Gibbium psylloides	dog biscuit	bg	Hedges-Lacey96
Gibbium psylloides	fennel	sea	Tawfik et al85
Gibbium psylloides	fish, dried	anv	Cornes73
Gibbium psylloides	flower, chrysanthemum dried (pyrethrum)	v	Tawfik et al85
Gibbium psylloides	flower, dried	v	Attia-Kamel66
Gibbium psylloides	ginger	sea	Tawfik et al85
Gibbium psylloides	grain product	gp	Aitken75
Gibbium psylloides	grain, cereal	g	Aitken75, Imura03, Yan et al10
Gibbium psylloides	hay	v	Attia-Kamel66, Campbell89, Cotton-Good37
Gibbium psylloides	hay residue	res	Hayhurst-Britten42
Gibbium psylloides	leather	anv	Hinton41
Gibbium psylloides	maize	g	Davies60, Haines81
Gibbium psylloides	meat meal	anv	Awadallah et al90
Gibbium psylloides	medicine, belladonna	me	Tawfik et al85
Gibbium psylloides	medicine, henbane	me	Tawfik et al85
Gibbium psylloides	medicine, herbal	me	Attia-Kamel66, Kamel58
Gibbium psylloides	medicine, jimson weed	me	Tawfik et al85
Gibbium psylloides	milk, dried	anv	Archibald-Chalmers83
Gibbium psylloides	oilcake	osp	Aitken75
Gibbium psylloides	oilseed	os	Aitken75
Gibbium psylloides	opium cake	v	Attia-Kamel66, Campbell89, Cotton-Good37, Hinton41, Patton31
Gibbium psylloides	paper	wp	Patton31
Gibbium psylloides	paste	oc	Cotton-Good37, Hinton41, Patton31
Gibbium psylloides	peanut	os	Cornes73
Gibbium psylloides	pepper, cayenne	sea	Attia-Kamel66, Campbell89, Cotton-Good37, Hedges-Lacey96, Hinton41, Patton31, Richards-Herford30
Gibbium psylloides	rapeseed meal	osp	Wohlgemuth-Reichmuth83
Gibbium psylloides	rye, perennial	v	Archibald-Chalmers83
Gibbium psylloides	seafood, dried	aninv	Archibald-Chalmers83
Gibbium psylloides	seed	se	Archibald-Chalmers83, Hedges-Lacey96, Hinton41
Gibbium psylloides	spearmint	sea	Archibald-Chalmers83
Gibbium psylloides	spice	sea	Imura03

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Gibbium psylloides	sponge, rubber	oc	Hinton41
Gibbium psylloides	tallow	anv	Hinton41
Gibbium psylloides	turmeric	sea	Okumura-Strong65
Gibbium psylloides	vegetable refuse	v	Hayhurst-Britten42, Hinton41
Gibbium psylloides	wheat	g	Campbell89, Davies60, Hedges-Lacey96, Hinton41, Patton31
Gibbium psylloides	wheat bran (pollard)	gp	Hedges-Lacey96, Hinton41
Gibbium psylloides	wheat flour	gp	Hayhurst-Britten42
Gibbium psylloides	wool	anv	Hinton41
Gnatocerus cornutus	animal feed	oc	Calderon-Donahaye64, Gorham91, Pierrard62, Strong-Okumura58
Gnatocerus cornutus	animal product	anv	Gorham91
Gnatocerus cornutus	barley	g	Archibald-Chalmers83, Haines81, Imura03
Gnatocerus cornutus	barley, rolled	gp	Chittenden96, Gorham91
Gnatocerus cornutus	beet seed	se	Gorham91, Strong-Okumura58
Gnatocerus cornutus	biscuit	bg	Calderon-Donahaye64, Chittenden96, Gorham91
Gnatocerus cornutus	bone meal	anv	Gorham91
Gnatocerus cornutus	bread	bg	Archibald-Chalmers83, Chittenden96, Gorham91, Hayhurst-Britten42, Patton31, Richards-Herford30
Gnatocerus cornutus	cassava root chip	rp	Delobel-Tran93
Gnatocerus cornutus	cassava root meal	rp	Delobel-Tran93, Pierrard62
Gnatocerus cornutus	cereal (cereal product)	gp	Chittenden96, Delobel-Tran93, Gorham91, Haines81, Hayhurst-Britten42
Gnatocerus cornutus	chocolate	bc	Archibald-Chalmers83
Gnatocerus cornutus	cocoa	bc	Delobel-Tran93, Gorham91, Imura03, Richards-Herford30
Gnatocerus cornutus	copra	osp	Delobel-Tran93, Forsyth66
Gnatocerus cornutus	cotton gin trash	res	Gorham91, Strong-Okumura58
Gnatocerus cornutus	cottonseed	os	Attia-Kamel66
Gnatocerus cornutus	cottonseed meal cake	osp	Gorham91, Strong-Okumura58
Gnatocerus cornutus	cottonseed oilcake	osp	Hayhurst-Britten42
Gnatocerus cornutus	dog biscuit	bg	Gorham91, Hedges-Lacey96, Shepherd 24
Gnatocerus cornutus	dried fruit	df	Attia-Kamel66
Gnatocerus cornutus	flower, chrysanthemum dried (pyrethrum)	v	Gorham91
Gnatocerus cornutus	fungus, dried	v	Olsen81

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Gnatocerus cornutus	ginger	sea	Delobel-Tran93, Gorham91, Hayhurst-Britten42, Imura03, McFarlane63, Richards-Herford30
Gnatocerus cornutus	grain product	gp	Aitken75
Gnatocerus cornutus	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Campbell89, Cotton-Good37, Delobel-Tran93, Yan et al10
Gnatocerus cornutus	hay	v	Archibald-Chalmers83
Gnatocerus cornutus	herb	v	Archibald-Chalmers83
Gnatocerus cornutus	herbarium specimen	v	Davies60
Gnatocerus cornutus	lentil (masur)	p	Attia-Kamel66
Gnatocerus cornutus	linseed meal	osp	Wohlgemuth-Reichmuth83
Gnatocerus cornutus	maize	g	Chittenden96, Cornes73, Forsyth66, Gorham91, Haines74, 81; Hedges-Lacey96, Patton31, Shepherd24,Tadesse96
Gnatocerus cornutus	maize flour	gp	Delobel-Tran93, Walker79
Gnatocerus cornutus	maize meal	gp	Davies60, Gorham91, Hedges-Lacey96, Shepherd 24, Strong-Okumura58
Gnatocerus cornutus	malt	gp	Attia-Kamel66
Gnatocerus cornutus	medicine, Chinese traditional	me	Guilin et al99
Gnatocerus cornutus	mung bean	p	Davies60
Gnatocerus cornutus	mushroom, dried	v	Delobel-Tran93
Gnatocerus cornutus	oat	g	Strong-Okumura58
Gnatocerus cornutus	oatmeal	gp	Archibald-Chalmers83, Gorham91
Gnatocerus cornutus	oilseed	os	Aitken75, Imura03
Gnatocerus cornutus	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Gnatocerus cornutus	pancake flour	gp	Shepherd 24
Gnatocerus cornutus	peanut	os	Attia-Kamel66, Champ65, LaHue et al59
Gnatocerus cornutus	rat poison	oc	Archibald-Chalmers83
Gnatocerus cornutus	residue	res	Haines81
Gnatocerus cornutus	rice	g	Attia-Kamel66, Chittenden96, Douglas41, Gorham91
Gnatocerus cornutus	rice meal	gp	Hayhurst-Britten42
Gnatocerus cornutus	rice, flaked	gp	Gorham91
Gnatocerus cornutus	root, dried cassava (manioc)	r	Davies60, Delobel92, Ratti-Rampini77
Gnatocerus cornutus	root, lonchocarpus (rotenone)	r	Delobel-Tran93
Gnatocerus cornutus	rotenone powder	rp	Gorham91
Gnatocerus cornutus	sorghum (broomcorn)	g	Davies60, Gorham91, Okumura-Strong65
Gnatocerus cornutus	spice	sea	Delobel-Tran93, Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Gnatocerus cornutus	sugarcane	v	Hedges-Lacey96, Patton31
Gnatocerus cornutus	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Gnatocerus cornutus	tapioca	r	Delobel-Tran93
Gnatocerus cornutus	wheat	g	Archibald-Chalmers83, Chittenden96, Hayhurst-Britten42
Gnatocerus cornutus	wheat bran (pollard)	gp	Attia-Kamel66, Calderon-Donahaye64, Gorham91, Hayhurst-Britten42, Hedges-Lacey96, Pierrard62, Shepherd24
Gnatocerus cornutus	wheat farina	gp	Gorham91, Hedges-Lacey96, Shepherd 24
Gnatocerus cornutus	wheat flour	gp	Archibald-Chalmers83, Attia-Kamel66, Buchelos-Athanassiou98, Campbell89, Chittenden96, Cotton-Good37, Delobel-Tran93, Gorham91, Hayhurst-Britten42, Hedges-Lacey96, Imura03, Patton31, Pierrard62, Richards-Herford30, Shepherd 24, Strong-Okumura58
Gnatocerus cornutus	wheat germ	gp	Archibald-Chalmers83
Gnatocerus cornutus	wheat meal	gp	Attia-Kamel66, Campbell89, Chittenden96, Cotton-Good37, Hayhurst-Britten42, Richards-Herford30
Gnatocerus cornutus	wheat pancake flour	gp	Gorham91
Gnatocerus cornutus	wheat semolina	gp	Gorham91
Gnatocerus cornutus	yeast	v	Chittenden96, Gorham91, Hedges-Lacey96, Shepherd24
Gnatocerus maxillosus	animal feed	oc	Gorham91, Strong-Okumura58
Gnatocerus maxillosus	arrowroot	r	Patton31
Gnatocerus maxillosus	bean	p	Delobel-Tran93
Gnatocerus maxillosus	cashew	n	Nair et al79, Pinheiro68
Gnatocerus maxillosus	cereal (cereal product)	gp	Patton31
Gnatocerus maxillosus	cocoa bean	bc	Aitken75, Delobel-Tran93, Forsyth66
Gnatocerus maxillosus	grain, cereal	g	Cotton-Good37, Hill02
Gnatocerus maxillosus	kidney bean	p	Delobel-Tran93
Gnatocerus maxillosus	maize	g	Aitken75, Caliboso et al86, Cornes73, Delobel-Tran93, Forsyth66, Gorham91, Haines74, 81; Hill02, Patton31, Pierrard62, Richards-Herford30, Sedlacek et al98, Walker79
Gnatocerus maxillosus	maize cob	gp	McFarlane63

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Gnatocerus maxillosus	maize meal	gp	Aitken75, Davies60, Gorham91
Gnatocerus maxillosus	maize screening	gp	Aitken75
Gnatocerus maxillosus	malt	gp	Pierrard62
Gnatocerus maxillosus	millet	g	Delobel-Tran93, Forsyth66
Gnatocerus maxillosus	nut	n	Hill02
Gnatocerus maxillosus	nutmeg (mace)	sea	Delobel-Tran93, Gorham91, Richards-Herford30
Gnatocerus maxillosus	palm kernel	os	Aitken75
Gnatocerus maxillosus	peanut	os	Aitken75, Delobel-Tran93, Forsyth66, Gorham91
Gnatocerus maxillosus	pulse	p	Hill02
Gnatocerus maxillosus	pumpkin seed	se	Gorham91, Richards-Herford30
Gnatocerus maxillosus	rice	g	Delobel-Tran93, Forsyth66, Gorham91, Yao-Lo62
Gnatocerus maxillosus	rice meal	gp	Caliboso et al86
Gnatocerus maxillosus	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93, Forsyth66, Pierrard62, Ratti-Rampini77
Gnatocerus maxillosus	sorghum (broomcorn)	g	Delobel-Tran93
Gnatocerus maxillosus	tamarind seed	v	Delobel-Tran93, Gorham91, Richards-Herford30
Gnatocerus maxillosus	wheat	g	Delobel-Tran93, Gorham91, Hill02
Gnatocerus maxillosus	wheat flour	gp	Cotton-Good37, Delobel-Tran93, Patton31, Pierrard62
Gnatocerus maxillosus	wheat meal	gp	Cotton-Good37
Gonocephalum prolixum	cocoa bean	bc	Cornes73
Gonocephalum prolixum	maize	g	Aitken75, Delobel-Tran93
Gonocephalum prolixum	palm kernel	os	Aitken75
Gonocephalum prolixum	peanut	os	Cornes73, Hinton47
Hadrobregmus pertinax	wood	w	Nawrot-Klejdysz09
Hofmannophila pseudospretella	animal feed	oc	Hayhurst-Britten42, Strong-Okumura58
Hofmannophila pseudospretella	animal product	anv	Aitken84
Hofmannophila pseudospretella	bean	p	Hayhurst-Britten42
Hofmannophila pseudospretella	bean meal	pp	Hayhurst-Britten42
Hofmannophila pseudospretella	book	oc	Cotton-Good37, Hill02
Hofmannophila pseudospretella	bulb	r	Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Hofmannophila pseudospretella	cantaloupe seed (casaba)	se	Strong-Okumura58
Hofmannophila pseudospretella	carpet	t	Cotton-Good37, Hill02, Patton31
Hofmannophila pseudospretella	celery seed	se	Strong-Okumura58
Hofmannophila pseudospretella	cereal (cereal product)	gp	Corbet-Tams43, Hill02
Hofmannophila pseudospretella	cloth	t	Carter84, Cotton-Good37, Patton31
Hofmannophila pseudospretella	cork	wp	Hill02
Hofmannophila pseudospretella	cottonseed meal	osp	Hayhurst-Britten42
Hofmannophila pseudospretella	dried fruit	df	Aitken84, Carter84, Corbet-Tams43, Hill02
Hofmannophila pseudospretella	feather	anv	Hill02
Hofmannophila pseudospretella	fishmeal	anv	Strong-Okumura58
Hofmannophila pseudospretella	fur	anv	Carter84, Hill02
Hofmannophila pseudospretella	grain product	gp	Aitken84, Patton31
Hofmannophila pseudospretella	grain, cereal	g	Aitken84, Carter84, Cotton-Good37, Strong-Okumura58
Hofmannophila pseudospretella	herbarium specimen	v	Hayhurst-Britten42, Hill02
Hofmannophila pseudospretella	hide, pelt or skin	anv	Cotton-Good37, Hayhurst-Britten42, Richards-Herford30
Hofmannophila pseudospretella	insect, dried	aninv	Richards-Herford30
Hofmannophila pseudospretella	leather	anv	Hill02
Hofmannophila pseudospretella	lima bean	p	Okumura-Strong65
Hofmannophila pseudospretella	linseed	os	Hayhurst-Britten42
Hofmannophila pseudospretella	maize	g	Hayhurst-Britten42
Hofmannophila pseudospretella	maize flake	gp	Hayhurst-Britten42

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Hofmannophila pseudospretella	maize meal	gp	Hayhurst-Britten42
Hofmannophila pseudospretella	maize, split	gp	Hayhurst-Britten42
Hofmannophila pseudospretella	nut	n	Aitken84
Hofmannophila pseudospretella	oat, rolled	gp	Hayhurst-Britten42
Hofmannophila pseudospretella	oatmeal	gp	Hayhurst-Britten42
Hofmannophila pseudospretella	oilcake	osp	Aitken84
Hofmannophila pseudospretella	oilseed	os	Aitken84
Hofmannophila pseudospretella	paper	wp	Hill02
Hofmannophila pseudospretella	poppy head	v	Patton31
Hofmannophila pseudospretella	pulse	p	Aitken84, Hill02
Hofmannophila pseudospretella	pulse product	pp	Aitken84
Hofmannophila pseudospretella	rice	g	Hayhurst-Britten42
Hofmannophila pseudospretella	root, valerian	r	Patton31
Hofmannophila pseudospretella	seaweed, dried	v	Hill02
Hofmannophila pseudospretella	seed	se	Carter84, Cotton-Good37, Hayhurst-Britten42, Hill02, Richards-Herford30
Hofmannophila pseudospretella	sorghum (broomcorn)	g	Okumura-Strong65
Hofmannophila pseudospretella	starch	v	Patton31
Hofmannophila pseudospretella	vegetable material, dried	v	Corbet-Tams43, Gorham91, Richards-Herford30
Hofmannophila pseudospretella	wheat	g	Hayhurst-Britten42
Hofmannophila pseudospretella	wheat bran (pollard)	gp	Hayhurst-Britten42

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Hofmannophila pseudospretella	wheat flour	gp	Hayhurst-Britten42, Patton31
Hofmannophila pseudospretella	wool	anv	Hill02
Holoparamecus caularum	barley	g	Attia-Kamel66
Holoparamecus caularum	grain, cereal	g	Hinton45
Holoparamecus caularum	paddy residue	res	Winks69
Holoparamecus caularum	rice	g	Aitken75, Hinton45
Holoparamecus caularum	seed	se	Strong-Okumura58
Holoparamecus caularum	wheat flour	gp	Attia-Kamel66
Holoparamecus signatus	cocoa	bc	Imura03
Holoparamecus signatus	ginger	sea	Imura03
Holoparamecus signatus	grain, cereal	g	Yan et al10
Holoparamecus signatus	paddy	g	Imura03
Holoparamecus signatus	wheat flour	gp	Imura03
Hypothenemus eruditus	book	oc	Delobel-Tran93
Hypothenemus eruditus	cassava root chip	rp	Delobel-Tran93
Hypothenemus eruditus	coffee bean	bc	Delobel-Tran93
Hypothenemus eruditus	cowpea	p	Forsyth66
Hypothenemus eruditus	lima bean	p	Forsyth66
Hypothenemus eruditus	maize	g	Delobel-Tran93
Hypothenemus eruditus	mushroom, dried	v	Delobel-Tran93
Hypothenemus eruditus	root, derris (rotenone)	r	Downes-Williams50
Hypothenemus eruditus	root, dried cassava (manioc)	r	Delobel92
Hypothenemus hampei	BBQ sauce	oc	Zimmerman90
Hypothenemus hampei	cabbage, dried	v	Zimmerman90
Hypothenemus hampei	cocoa bean	bc	Aitken75
Hypothenemus hampei	coffee	bc	Archibald-Chalmers83, Delobel-Tran93
Hypothenemus hampei	coffee bean	bc	Aitken75, Hill02, Zimmerman90
Hypothenemus hampei	kola nut	n	Delobel-Tran93
Hypothenemus hampei	maize	g	Delobel-Tran93
Hypothenemus hampei	mung bean	p	Delobel-Tran93
Hypothenemus hampei	mushroom, dried	v	Zimmerman90
Hypothenemus hampei	tamarind product	v	Zimmerman90
Hypsopygia costalis	alfalfa	v	Carter84
Hypsopygia costalis	clover	v	Carter84, Corbet-Tams43, Cotton-Good37
Hypsopygia costalis	grain, cereal	g	Cotton-Good37
Hypsopygia costalis	hay	v	Carter84
Hypsopygia costalis	lupine	v	Carter84

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Idea inquinata	chamomile	v	Limonta et al10
Idea inquinata	hay	v	Limonta et al10
Idea inquinata	medicine, herbal	me	Limonta et al10
Idea inquinata	plant, dried	v	Nawrot-Klejdysz09
Idea inquinata	pulse	p	Limonta et al10
Lachesilla pedicularia	barley	g	Kalinovic95
Lachesilla pedicularia	coriander	sea	Tawfik et al85
Lachesilla pedicularia	maize	g	Kalinovic95, Kalinovic-Ivezic96
Lachesilla pedicularia	medicine, jimson weed	me	Tawfik et al85
Lachesilla pedicularia	sugar beet	r	Kalinovic95
Lachesilla pedicularia	sultana, dried	df	Aitken84
Lachesilla pedicularia	wheat	g	Kalinovic95
Lasioderma serricorne	alfalfa seed (lucerne)	se	Strong-Okumura58
Lasioderma serricorne	allspice	sea	Archibald-Chalmers83
Lasioderma serricorne	almond hull	np	Strong-Okumura58
Lasioderma serricorne	animal feed	oc	Hedges-Lacey96, McFarlane63, Strong-Okumura58
Lasioderma serricorne	animal product	anv	Aitken75, Hill02
Lasioderma serricorne	aniseed (anise spice)	sea	Abdelghany et al10, Campbell89, Howe57, Richards-Herford30, Zimmerman90
Lasioderma serricorne	apricot	ffv	Archibald-Chalmers83
Lasioderma serricorne	apricot seed	se	Guilin et al99
Lasioderma serricorne	arrowroot	r	Archibald-Chalmers83
Lasioderma serricorne	asparagus, dried	v	Calderon-Donahaye64
Lasioderma serricorne	bagaruwa seed (Gambia pod)	se	Tawfik et al85
Lasioderma serricorne	bambara groundnut	p	Cornes73, Forsyth66
Lasioderma serricorne	bamboo	v	Campbell89, Howe57, Zimmerman90
Lasioderma serricorne	banana, dried	df	Campbell89, Delobel-Tran93, Forsyth66, Howe57
Lasioderma serricorne	bari (sundried pulse cake)	pp	Joshi-Srivastava64
Lasioderma serricorne	barley	g	Athanassiou et al10, Gupta et al02, Strong-Okumura58
Lasioderma serricorne	basil leaf	sea	Archibald-Chalmers83, Zimmerman90
Lasioderma serricorne	basketware, wicker	v	Archibald-Chalmers83
Lasioderma serricorne	bean	p	Archibald-Chalmers83, Campbell89, Howe57, Howe-Freeman55, Patton31, Strong-Okumura58,
Lasioderma serricorne	bean paste, chili	oc	Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lasioderma serricorne	bean with ginger	v	Zimmerman90
Lasioderma serricorne	bean, dried black	p	Zimmerman90
Lasioderma serricorne	betel nut (areca nut)	n	Campbell89, Delobel-Tran93, Howe57, Srivastava-Saxena75
Lasioderma serricorne	biscuit	bg	Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Delobel-Tran93, Howe57, Imura03, Patton31
Lasioderma serricorne	book	oc	Campbell89, Delobel-Tran93, Forsyth66, Howe57, Patton31
Lasioderma serricorne	bulb, garlic	r	Abul-Nasr74
Lasioderma serricorne	bulb, lily	r	Zimmerman90
Lasioderma serricorne	cabbage, dried	v	Campbell89, Howe57
Lasioderma serricorne	cake	bg	Campbell89
Lasioderma serricorne	calamus	v	Srivastava-Saxena75
Lasioderma serricorne	cane	v	Archibald-Chalmers83, Patton31
Lasioderma serricorne	caraway seed	se	Richards-Herford30
Lasioderma serricorne	cardamom	sea	Archibald-Chalmers83, Zimmerman90
Lasioderma serricorne	carob (locust)	df	Aitken75, Delobel-Tran93
Lasioderma serricorne	carrot	r	Campbell89, Howe57
Lasioderma serricorne	carrot seed	se	Cornes73, Mookherjee et al70
Lasioderma serricorne	cashew	n	Nair et al79, Pinheiro68
Lasioderma serricorne	cassava root chip	rp	Parker et al81
Lasioderma serricorne	castor bean	se	Howe-Freeman55
Lasioderma serricorne	cauliflower seed	se	Mookherjee et al70
Lasioderma serricorne	cereal (cereal product)	gp	Hedges-Lacey96, Hill02, Campbell89
Lasioderma serricorne	chamomile flower	v	Abdelghany et al10
Lasioderma serricorne	chamomile seed	se	Campbell89
Lasioderma serricorne	cheese	anv	Rajendran-Parveen05
Lasioderma serricorne	chickpea (Bengal gram, garbanzo)	p	Campbell89, Howe57, Patton31
Lasioderma serricorne	cigar (cheroot, stogie)	v	Archibald-Chalmers83, Chittenden96, Forsyth66, Hayhurst-Britten42
Lasioderma serricorne	cigarette	v	Archibald-Chalmers83, Chittenden96, Hayhurst-Britten42, Hill02, Strong-Okumura58
Lasioderma serricorne	cinnamon	sea	Campbell89
Lasioderma serricorne	citrus pulp, dried	dfp	Archibald-Chalmers83, Laudani et al59
Lasioderma serricorne	cloth	t	Archibald-Chalmers83, Campbell89

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lasioderma serricorne	cocoa bean	bc	Archibald-Chalmers83, Cornes73, Cotterell52, Delobel-Tran93, Forsyth66, Hill02, Howe57, Howe-Freeman55, Imura03, McFarlane63, Richards-Herford30, Schulten-Roorda84, Srivastava-Saxena75
Lasioderma serricorne	cocoa powder	bc	McFarlane63
Lasioderma serricorne	coffee	bc	Archibald-Chalmers83, Delobel-Tran93
Lasioderma serricorne	coffee bean	bc	Campbell89, Forsyth66, Howe57, Howe-Freeman55, Imura03, McFarlane63, Olsen81, Zimmerman90
Lasioderma serricorne	cole, dried	v	Zimmerman90
Lasioderma serricorne	copra	osp	Archibald-Chalmers83, Campbell89, Cornes73, Howe57, Howe-Freeman55, Patton31, Srivastava-Saxena75, Strong-Okumura58
Lasioderma serricorne	copra meal	osp	Strong-Okumura58
Lasioderma serricorne	copra oilcake	osp	Haines74, 81; Patton31
Lasioderma serricorne	coriander	sea	Abdelghany et al10, Archibald-Chalmers83, Campbell89, Howe57, Richards-Herford30, Tawfik et al85
Lasioderma serricorne	coriander seed	se	Abdelghany et al10
Lasioderma serricorne	cottonseed	os	Calderon-Donahaye64, Campbell89, Cornes73, Delobel-Tran93, Howe57, Howe-Freeman55
Lasioderma serricorne	cottonseed meal	osp	Campbell89, Strong-Okumura58, Howe57
Lasioderma serricorne	cowpea	p	Campbell89, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Howe57
Lasioderma serricorne	cumin seed	se	Archibald-Chalmers83, Campbell89, Howe57, Patton31
Lasioderma serricorne	curry powder	sea	Archibald-Chalmers83, Zimmerman90
Lasioderma serricorne	date	df	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Donahaye-Calderon64, Howe57, Patton31
Lasioderma serricorne	dill seed	se	Zimmerman90
Lasioderma serricorne	dog biscuit	bg	Archibald-Chalmers83
Lasioderma serricorne	dried fruit	df	Aitken75, Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Delobel-Tran93, Hill02, Howe57, Imura03
Lasioderma serricorne	egg plant seed	se	Mookherjee et al70

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lasioderma serricorne	fennel seed	se	Zimmerman90
Lasioderma serricorne	fenugreek	v	Tawfik et al85
Lasioderma serricorne	fig	ffv	Campbell89, Chittenden96, Delobel-Tran93
Lasioderma serricorne	fish food	oc	Archibald-Chalmers83, Chittenden96
Lasioderma serricorne	fish, dried	anv	Campbell89, Delobel-Tran93, Howe57, Patton31
Lasioderma serricorne	fishmeal	anv	Campbell89, Haines81, Howe57, McFarlane63, Strong-Okumura58
Lasioderma serricorne	flower seed	se	Archibald-Chalmers83
Lasioderma serricorne	flower, chrysanthemum dried (pyrethrum)	v	Campbell89, Guilin et al99, Howe57, Patton31, Tawfik et al85, Zimmerman90
Lasioderma serricorne	flower, dried	v	Archibald-Chalmers83
Lasioderma serricorne	flower, lily dried	v	Zimmerman90
Lasioderma serricorne	fungus, dried	v	Zimmerman90
Lasioderma serricorne	furniture, upholstered	oc	Campbell89, Chittenden96, Hedges-Lacey96, Howe57
Lasioderma serricorne	garlic	sea	Archibald-Chalmers83
Lasioderma serricorne	ginger	sea	Abraham75, Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Chittenden96, Cornes73, Guilin et al99, Hayhurst-Britten42, Howe57, Howe-Freeman55, McFarlane63, Patton31, Richards-Herford30, Srivastava-Saxena75, Tawfik et al85, Weidner73
Lasioderma serricorne	grain product	gp	Aitken75, Cotton-Good37
Lasioderma serricorne	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Calderon-Donahaye64, Campbell89, Cotton-Good37, Howe57, Imura03, Yan et al10
Lasioderma serricorne	grass seed	se	Archibald-Chalmers83
Lasioderma serricorne	gum dammar	v	Schulten-Roorda84
Lasioderma serricorne	hair	anv	Delobel-Tran93
Lasioderma serricorne	hay	v	Buchelos-Athanassiou98, Strong-Okumura58
Lasioderma serricorne	herb	v	Archibald-Chalmers83, Campbell89, Howe57, Zimmerman90
Lasioderma serricorne	herbarium specimen	v	Campbell89, Chittenden96, Howe57, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lasioderma serricorne	insect, dried	aninv	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Howe57
Lasioderma serricorne	iris powder	v	Tawfik et al85
Lasioderma serricorne	juniper seed	se	Campbell89, Howe57
Lasioderma serricorne	kapok seed	se	Archibald-Chalmers83
Lasioderma serricorne	kidney bean	p	Archibald-Chalmers83, Delobel-Tran93
Lasioderma serricorne	kola nut	n	Archibald-Chalmers83
Lasioderma serricorne	leaf, dried	v	Campbell89, Zimmerman90
Lasioderma serricorne	leather	anv	Attia-Kamel66, Howe57, Patton31
Lasioderma serricorne	lentil (masur)	p	Archibald-Chalmers83
Lasioderma serricorne	lettuce seed	se	Strong-Okumura58
Lasioderma serricorne	licorice	rp	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Hayhurst-Britten42, Patton31, Richards-Herford30
Lasioderma serricorne	lima bean	p	Delobel-Tran93, Forsyth66
Lasioderma serricorne	litchi nut (lychee)	n	Archibald-Chalmers83
Lasioderma serricorne	lotus	v	Archibald-Chalmers83
Lasioderma serricorne	maize	g	Archibald-Chalmers83, Caliboso et al86, Cornes73, Davies60, Forsyth66, Haines81, Walker79
Lasioderma serricorne	maize meal	gp	Davies60, Haines81, Pierrard62, Strong-Okumura58
Lasioderma serricorne	malt	gp	Guilin et al99
Lasioderma serricorne	mango	ffv	Archibald-Chalmers83
Lasioderma serricorne	mango seed	se	Cornes73
Lasioderma serricorne	meat meal	anv	Awadallah et al90, Campbell89, Howe57
Lasioderma serricorne	meat, cured, dried or smoked	anv	Campbell89
Lasioderma serricorne	medicine, belladonna	me	Campbell89, Patton31
Lasioderma serricorne	medicine, chamomile tea	me	Weidner73
Lasioderma serricorne	medicine, Chinese angelica	me	Guilin et al99
Lasioderma serricorne	medicine, Chinese traditional	me	Guilin et al99
Lasioderma serricorne	medicine, dandelion root	me	Archibald-Chalmers83
Lasioderma serricorne	medicine, drug	me	Chittenden96, Srivastava-Saxena75
Lasioderma serricorne	medicine, hawthorn fruit	me	Guilin et al99
Lasioderma serricorne	medicine, henbane	me	Tawfik et al85
Lasioderma serricorne	medicine, herbal	me	Basak91, Campbell89, Howe57, Kamel58, Patton31
Lasioderma serricorne	medicine, Indian colchicum	me	Srivastava-Saxena75
Lasioderma serricorne	medicine, rhubarb root	me	Weidner73
Lasioderma serricorne	medicine, senna	me	Tawfik et al85

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lasioderma serricorne	melon	ffv	Archibald-Chalmers83
Lasioderma serricorne	milk, dried	anv	Archibald-Chalmers83, Rajendran-Parveen05
Lasioderma serricorne	millet	g	Cornes73, Delobel-Tran93, Forsyth66, Guilin et al99
Lasioderma serricorne	mint leaf, flower	v	Tawfik et al85
Lasioderma serricorne	mung bean	p	Archibald-Chalmers83, Rao et al73
Lasioderma serricorne	museum collection	oc	Rajendran-Parveen05
Lasioderma serricorne	mushroom, dried	v	Archibald-Chalmers83
Lasioderma serricorne	mustard seed	se	Mookherjee et al70
Lasioderma serricorne	noodle	gp	Archibald-Chalmers83, Imura03
Lasioderma serricorne	nut	n	Archibald-Chalmers83, Imura03, Srivastava-Saxena75
Lasioderma serricorne	nutmeg (mace)	sea	Archibald-Chalmers83, Campbell89, Richards-Herford30, Schulten-Roorda84
Lasioderma serricorne	oat	g	Haines81
Lasioderma serricorne	oilcake	osp	Aitken75
Lasioderma serricorne	oilseed	os	Aitken75, Haines74, Hill02, Schulten-Roorda84
Lasioderma serricorne	oilseed meal	osp	McFarlane63
Lasioderma serricorne	onion, dried	v	Calderon-Donahaye64, Ibrahim et al70
Lasioderma serricorne	oregano (marjoram)	sea	Abdelghany et al10
Lasioderma serricorne	paddy	g	Caliboso et al86
Lasioderma serricorne	palm kernel	os	Allotey88
Lasioderma serricorne	palm kernel meal	osp	Howe-Freeman55
Lasioderma serricorne	paper	wp	Campbell89, Howe57, Patton31
Lasioderma serricorne	pea	p	Archibald-Chalmers83, Calderon-Donahaye64
Lasioderma serricorne	peanut	os	Archibald-Chalmers83, Arthur56, Bissell-DuPree46, Campbell89, Champ65, Cornes73, Delobel-Tran93, Forsyth66, Howe57, Howe-Freeman55, LaHue et al59, Redlinger-Davis82, Singh90
Lasioderma serricorne	peanut oilcake	osp	Rao et al73
Lasioderma serricorne	peanut, shelled	osp	Davies60
Lasioderma serricorne	pepper seed	se	Mookherjee et al70
Lasioderma serricorne	pepper, bell or green	ffv	Calderon-Donahaye64
Lasioderma serricorne	pepper, black	sea	Archibald-Chalmers83, Campbell89, White57, Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lasioderma serricorne	pepper, cayenne	sea	Archibald-Chalmers83, Campbell89, Chittenden96, Patton31
Lasioderma serricorne	pepper, chilli	sea	Archibald-Chalmers83, Tawfik et al85
Lasioderma serricorne	pepper, chilli sauce	oc	Zimmerman90
Lasioderma serricorne	pepper, paprika	sea	Weidner73
Lasioderma serricorne	pepper, pod dried chilli	sea	Archibald-Chalmers83, Howe-Freeman55, Zimmerman87
Lasioderma serricorne	pepper, red	sea	Campbell89
Lasioderma serricorne	pepper, white	sea	Weidner73
Lasioderma serricorne	phane (edible caterpillar)	aninv	Rajendran-Parveen05
Lasioderma serricorne	pigeonpea (arhar, red gram)	p	Delobel-Tran93, Rao et al73
Lasioderma serricorne	pimento	sea	McFarlane63
Lasioderma serricorne	plum, preserved	v	Zimmerman90
Lasioderma serricorne	potato	r	Archibald-Chalmers83
Lasioderma serricorne	pulse	p	Aitken75, Archibald-Chalmers83, Haines81, Hill02, Imura03, McFarlane63, Patton31, Schulten-Roorda84
Lasioderma serricorne	pulse product	pp	Aitken75
Lasioderma serricorne	pumpkin seed	se	Richards-Herford30
Lasioderma serricorne	quince fruit	ffv	Archibald-Chalmers83, Basak91
Lasioderma serricorne	raisin	df	Campbell89, Delobel-Tran93, Hedges-Lacey96, Howe57, Patton31
Lasioderma serricorne	rhubarb	ffv	Campbell89, Chittenden96, Howe57, Patton31
Lasioderma serricorne	rice	g	Archibald-Chalmers83, Campbell89, Chittenden96, Delobel-Tran93, Haines81, Howe57, Patton31, Zimmerman90
Lasioderma serricorne	rice meal	gp	Caliboso et al86, Okumura-Strong65
Lasioderma serricorne	root, dried (rhizome)	r	Zimmerman90
Lasioderma serricorne	root, dried (tuber)	r	Archibald-Chalmers83
Lasioderma serricorne	root, dried cassava (manioc)	r	Campbell89, Delobel92, Delobel-Tran93, Howe57, Pierrard62, Ratti-Rampini77, Sukprakarn86
Lasioderma serricorne	root, dried lotus	r	Zimmerman90
Lasioderma serricorne	root, ginger	r	Campbell89
Lasioderma serricorne	root, ginseng	r	Archibald-Chalmers83
Lasioderma serricorne	root, licorice	r	Campbell89, Howe57
Lasioderma serricorne	root, moghat	r	Abdelghany et al10

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lasioderma serricorne	roselle (sorrel)	v	Abdelghany et al10, Campbell89
Lasioderma serricorne	safflower meal	osp	Strong-Okumura58
Lasioderma serricorne	safflower meal cake	osp	Strong-Okumura58
Lasioderma serricorne	saffron	sea	Archibald-Chalmers83, Patton31, Srivastava-Saxena75, Zimmerman90
Lasioderma serricorne	sago flour	v	Aitken75
Lasioderma serricorne	seafood, dried	aninv	Archibald-Chalmers83
Lasioderma serricorne	seed	se	Archibald-Chalmers83, Campbell89, Cotton-Good37, Davies60, Hedges-Lacey96, Howe57, Patton31
Lasioderma serricorne	sesame seed	os	Cornes73, Howe-Freeman55
Lasioderma serricorne	shallot, fried	v	Zimmerman90
Lasioderma serricorne	sheanut	n	Archibald-Chalmers83, Cornes73, Davies60, Howe-Freeman55
Lasioderma serricorne	sorghum (broomcorn)	g	Cornes73, Forsyth66, Giles64, Haines81, Strong-Okumura58
Lasioderma serricorne	soup mix, dried	oc	Imura03, Olsen81, Zimmerman90
Lasioderma serricorne	soybean	p	Archibald-Chalmers83, Cornes73, Howe-Freeman55
Lasioderma serricorne	soybean flour	pp	Singh90
Lasioderma serricorne	soybean meal	pp	Archibald-Chalmers83, Delobel-Tran93, Okumura-Strong65
Lasioderma serricorne	spearmint	sea	Archibald-Chalmers83
Lasioderma serricorne	spice	sea	Aitken75, Archibald-Chalmers83, Campbell89, Hedges-Lacey96, Hill02, Howe57, Patton31, Srivastava-Saxena75, Zimmerman90
Lasioderma serricorne	squash	ffv	Archibald-Chalmers83
Lasioderma serricorne	straw	v	Hedges-Lacey96
Lasioderma serricorne	strychnine	oc	Archibald-Chalmers83
Lasioderma serricorne	sunflower seed	os	Okumura-Strong65
Lasioderma serricorne	sweet potato	r	Archibald-Chalmers83, Davies60, Delobel-Tran93
Lasioderma serricorne	tamarind	v	Tawfik et al85, Zimmerman90
Lasioderma serricorne	tamarind seed	se	Richards-Herford30
Lasioderma serricorne	tapioca chip	rp	Delobel-Tran93
Lasioderma serricorne	tapioca flour	rp	Delobel-Tran93
Lasioderma serricorne	tea leaf	bc	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lasioderma serricorne	tobacco leaf	v	Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Campbell89, Chittenden96, Cornes73, Cotton-Good37, Davies60, Delobel-Tran93, Haines81, Hayhurst-Britten42, Hedges-Lacey96, Hill02, Howe57, Imura03, Livingstone-Reed36, Nayar et al76, Patton31, Richards-Herford30, Strong-Okumura58
Lasioderma serricorne	tomato	ffv	Archibald-Chalmers83
Lasioderma serricorne	tomato, dried	v	Mookherjee et al70, Zimmerman90
Lasioderma serricorne	tree seed	se	Howe 57
Lasioderma serricorne	turmeric	sea	Abraham75, Archibald-Chalmers83, Chittenden96, Patton31, Srivastava-Saxena75
Lasioderma serricorne	vegetable material, dried	v	Archibald-Chalmers83, Cotton-Good37, Patton31
Lasioderma serricorne	walnut	n	Haines74
Lasioderma serricorne	wheat	g	Archibald-Chalmers83, Davies60, Haines81, Okumura-Strong65, Strong-Okumura58,
Lasioderma serricorne	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Okumura-Strong65
Lasioderma serricorne	wheat flour	gp	Buchelos-Athanassiou98, Campbell89, Cornes73, Forsyth66, Haines81, Howe57, Pierrard62
Lasioderma serricorne	wheat germ	gp	Archibald-Chalmers83
Lasioderma serricorne	wool	anv	Delobel-Tran93
Lasioderma serricorne	yeast	v	Campbell89, Chittenden96, Davies60, Delobel-Tran93, Howe57
Latheticus oryzae	animal feed	oc	Allotey et al97, Strong-Okumura58
Latheticus oryzae	bagaruwa seed (Gambia pod)	se	Cornes73
Latheticus oryzae	barley	g	Archibald-Chalmers83, Awadallah et al82, Calderon-Donahaye64, Hayhurst-Britten42, Hedges-Lacey96, Strong-Okumura58
Latheticus oryzae	barley, rolled	gp	Strong-Okumura58
Latheticus oryzae	BBQ sauce	oc	Zimmerman90
Latheticus oryzae	bean	p	Davies60, Okumura-Strong65
Latheticus oryzae	bean sauce, yellow	oc	Zimmerman90
Latheticus oryzae	cashew	n	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Latheticus oryzae	cassava root chip	rp	Parker et al81
Latheticus oryzae	cereal (cereal product)	gp	Haines81, Hill02, McFarlane63, Strong-Okumura58
Latheticus oryzae	copra oilcake	osp	Haines81
Latheticus oryzae	cottonseed	os	Haines81
Latheticus oryzae	date	df	Calderon-Donahaye64, Donahaye-Calderon64
Latheticus oryzae	fishmeal	anv	Haines81
Latheticus oryzae	grain product	gp	Aitken75, Cotton-Good37
Latheticus oryzae	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Cotton-Good37, Yan et al10
Latheticus oryzae	hay	v	Buchelos-Athanassiou98
Latheticus oryzae	maize	g	Caliboso et al86, Campbell89, Delobel-Tran93, Haines81, Hill02, McFarlane63
Latheticus oryzae	maize meal	gp	Davies60, Pierrard62
Latheticus oryzae	malt	gp	Pierrard62
Latheticus oryzae	medicine, herbal	me	Kamel58
Latheticus oryzae	millet	g	Delobel-Tran93, Forsyth66
Latheticus oryzae	noodle	gp	Campbell89
Latheticus oryzae	oatmeal	gp	Campbell89
Latheticus oryzae	oilcake	osp	Aitken75
Latheticus oryzae	oilseed	os	Aitken75, Hill02
Latheticus oryzae	paddy	g	Caliboso et al86, Haines81, Nayar et al76
Latheticus oryzae	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Latheticus oryzae	peanut	os	Redlinger-Davis82, Singh90
Latheticus oryzae	peanut, shelled	osp	Davies60
Latheticus oryzae	pepper, chilli	sea	Zimmerman90
Latheticus oryzae	pulse	p	Haines81
Latheticus oryzae	raisin	df	Strong-Okumura58
Latheticus oryzae	residue	res	Haines81
Latheticus oryzae	rice	g	Delobel-Tran93, Douglas41, Haines81, Hayhurst-Britten42, Hedges-Lacey96, Nayar et al76, Rao et al73, Yao-Lo62
Latheticus oryzae	rice bran	gp	Caliboso et al86, Haines81, Hill02
Latheticus oryzae	rice meal	gp	Caliboso et al86, McFarlane63
Latheticus oryzae	root, dried cassava (manioc)	r	Campbell89, Delobel92, Delobel-Tran93, Ratti-Rampini77, Wohlgemuth-Reichmuth83
Latheticus oryzae	rye	g	Hedges-Lacey96

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Latheticus oryzae	sorghum (broomcorn)	g	Awadallah et al82, Campbell89, Cornes73, Davies60, Haines74, 81; Okumura-Strong65, Peng98
Latheticus oryzae	tea leaf	bc	Campbell89
Latheticus oryzae	wheat	g	Athanassiou et al01, Calderon-Donahaye64, Delobel-Tran93, Hayhurst-Britten42, Hedges-Lacey96, Rao et al73, Strong-Okumura58, Trematerra-Gentile06
Latheticus oryzae	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Haines81
Latheticus oryzae	wheat flour	gp	Buchelos-Athanassiou98, Haines81, Hayhurst-Britten42, Hedges-Lacey96, Imura03, Patton31, Strong-Okumura58
Lathridius minutus	barley	g	Athanassiou et al10, Attia-Kamel66, Cotton-Good37, Hayhurst-Britten42, Hinton45, Strong-Okumura58
Lathridius minutus	bay leaf	v	Weidner73
Lathridius minutus	carob (locust)	df	Aitken75
Lathridius minutus	casein, dried	anv	Aitken75
Lathridius minutus	cheese	anv	Hinton45
Lathridius minutus	cocoa bean	bc	Hinton45
Lathridius minutus	coffee, moldy	sp	Hinton45
Lathridius minutus	cottonseed	os	Aitken75
Lathridius minutus	date	df	Aitken75
Lathridius minutus	dried fruit	df	Aitken75
Lathridius minutus	fig	ffv	Aitken75, Strong-Okumura58
Lathridius minutus	flax	v	Hinton45
Lathridius minutus	grain, cereal	g	Cotton-Good37, Yan et al10
Lathridius minutus	grass skirt	v	USDA36-61
Lathridius minutus	hay	v	Hayhurst-Britten42, USDA36-61
Lathridius minutus	hay residue	res	Hinton45
Lathridius minutus	herbarium specimen	v	Hinton45
Lathridius minutus	hominy grit	gp	Cotton-Good37
Lathridius minutus	licorice	rp	Hinton45
Lathridius minutus	linseed meal	osp	Aitken75
Lathridius minutus	maize	g	Davies60
Lathridius minutus	medicine residue, Chinese traditional	res	Guilin et al99
Lathridius minutus	millet	g	Aitken75
Lathridius minutus	oat	g	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lathridius minutus	oatmeal	gp	Hinton45
Lathridius minutus	orange (decaying)	sp	Calderon-Donahaye64
Lathridius minutus	pea meal	pp	Aitken75
Lathridius minutus	pig bladder, moldy	sp	Hinton45
Lathridius minutus	prune	df	Aitken75
Lathridius minutus	radish, moldy	sp	Hinton45
Lathridius minutus	rapeseed meal	osp	Aitken75
Lathridius minutus	rice	g	Aitken75, USDA36-61
Lathridius minutus	sorghum (broomcorn)	g	Strong-Okumura58
Lathridius minutus	soybean	p	Hinton45
Lathridius minutus	sultana, dried	df	Aitken75
Lathridius minutus	sunflower seed	os	Stojanovic-Kosovac74
Lathridius minutus	walnut	n	Aitken75
Lathridius minutus	wheat	g	Aitken75, Hayhurst-Britten42, Hinton45, Strong-Okumura58, USDA36-61, Winks69
Lathridius minutus	wheat flour	gp	Aitken75, Attia-Kamel66, Cotton-Good37, Hinton45
Lathridius minutus	wheat flour, damp moldy	gs	Hinton45, Winks69
Lathridius minutus	wood	w	Hayhurst-Britten42
Leichenum canaliculatum	soybean	p	Cornes73
Liposcelis corrodens	maize	g	Kalinovic79, Kalinovic-Ivezic96
Liposcelis corrodens	noodle	gp	Imura03
Liposcelis corrodens	pastry dough	oc	Kalinovic79
Liposcelis corrodens	peanut	os	Champ65
Liposcelis corrodens	wheat	g	Kalinovic79
Litargus balteatus	almond	n	Aitken75
Litargus balteatus	almond hull and meal, wet	sp	Okumura-Strong65
Litargus balteatus	animal feed	oc	Strong-Okumura58
Litargus balteatus	barley	g	Strong-Okumura58
Litargus balteatus	Brazil nut (para nut)	n	Aitken75
Litargus balteatus	cereal (cereal product)	gp	Hill02
Litargus balteatus	chickpea (Bengal gram, garbanzo)	p	Aitken75
Litargus balteatus	cocoa	bc	Hill02
Litargus balteatus	cocoa bean	bc	Aitken75
Litargus balteatus	cottonseed	os	Strong-Okumura58
Litargus balteatus	grain, cereal	g	Cotton-Good37
Litargus balteatus	hay	v	Buchelos-Athanassiou98

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Litargus balteatus	hoof meal	anv	Hinton45
Litargus balteatus	maize	g	Aitken75, Cotton-Good37, Delobel-Tran93, Haines81, Hinton45
Litargus balteatus	maize cob	gp	Haines74
Litargus balteatus	maize meal	gp	Aitken75, Davies60
Litargus balteatus	nut	n	Hill02
Litargus balteatus	paddy	g	Pires et al07
Litargus balteatus	peanut	os	Champ65
Litargus balteatus	pulse	p	Hill02
Litargus balteatus	raisin	df	Delobel-Tran93, Hinton45
Litargus balteatus	rice bran	gp	Aitken75
Litargus balteatus	sorghum (broomcorn)	g	Strong-Okumura58
Litargus balteatus	sultana, dried	df	Aitken75
Litargus balteatus	wheat	g	Aitken75, Hinton47
Litargus balteatus	wheat flour	gp	Aitken75, Buchelos-Athanassiou98, Strong-Okumura58, Hinton47
Lophocateres pusillus	achuete spice	sea	Olsen81
Lophocateres pusillus	annatto seed	se	Zimmerman90
Lophocateres pusillus	apple, dried	df	Cotton-Good37, Halstead68b
Lophocateres pusillus	bambara groundnut	p	Delobel-Tran93, Halstead68b
Lophocateres pusillus	bamboo, dried leaf or shoot	v	Zimmerman90
Lophocateres pusillus	banana, dried	df	Delobel-Tran93, Halstead68b
Lophocateres pusillus	barley	g	Delobel-Tran93, Halstead68b
Lophocateres pusillus	basketware, wicker	v	Archibald-Chalmers83
Lophocateres pusillus	bean	p	Archibald-Chalmers83, Aitken75, Cotton-Good37, Halstead68b
Lophocateres pusillus	bean curd	pp	Olsen81
Lophocateres pusillus	bean flour	pp	Halstead68b
Lophocateres pusillus	bean sauce, black bean	oc	Zimmerman90
Lophocateres pusillus	bean sauce, hot	oc	Zimmerman90
Lophocateres pusillus	bean with ginger	v	Zimmerman90
Lophocateres pusillus	bean, dried black	p	Zimmerman90
Lophocateres pusillus	bean, salted	pp	Olsen81
Lophocateres pusillus	Brazil nut (para nut)	n	Aitken75
Lophocateres pusillus	butternut	n	Halstead68b
Lophocateres pusillus	cantaloupe seed (casaba)	se	Imura03
Lophocateres pusillus	cassava root chip	rp	Delobel-Tran93, Parker et al81
Lophocateres pusillus	castor bean	se	Davies60
Lophocateres pusillus	cereal (cereal product)	gp	Hedges-Lacey96

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lophocateres pusillus	chickpea (Bengal gram, garbanzo)	p	USDA36-61
Lophocateres pusillus	cocoa	bc	Delobel-Tran93
Lophocateres pusillus	cocoa bean	bc	Aitken75, Cornes73, Delobel-Tran93, Halstead68b
Lophocateres pusillus	coffee	bc	Delobel-Tran93, Schulten-Roorda84
Lophocateres pusillus	coffee bean	bc	Aitken75, Halstead68b, Hedges-Lacey96
Lophocateres pusillus	cottonseed	os	Davies60, Halstead68, Hedges-Lacey96, USDA36-61
Lophocateres pusillus	cowpea	p	Aitken75, Cornes73, Delobel-Tran93, Halstead68b
Lophocateres pusillus	date	df	Archibald-Chalmers83
Lophocateres pusillus	dill seed	se	Archibald-Chalmers83
Lophocateres pusillus	dried fruit	df	Hedges-Lacey96
Lophocateres pusillus	garlic	sea	USDA36-61
Lophocateres pusillus	grain, cereal	g	Cotton-Good37, Halstead68b, Yan et al10
Lophocateres pusillus	illipenut	os	Aitken75
Lophocateres pusillus	kidney bean	p	Delobel-Tran93, Halstead68b
Lophocateres pusillus	lentil (masur)	p	Archibald-Chalmers83, Delobel-Tran93, Halstead68b
Lophocateres pusillus	lima bean	p	Richards-Herford30, USDA36-61
Lophocateres pusillus	lime pickle in oil	oc	Zimmerman90
Lophocateres pusillus	lotus	v	Archibald-Chalmers83
Lophocateres pusillus	maize	g	Delobel-Tran93, Forsyth66, Haines81, USDA36-61
Lophocateres pusillus	maize meal	gp	Davies60
Lophocateres pusillus	maize residue	res	Halstead68
Lophocateres pusillus	mung bean	p	Archibald-Chalmers83, Aitken75, Caliboso et al86, Delobel-Tran93, Halstead68b
Lophocateres pusillus	mushroom, dried	v	Zimmerman90
Lophocateres pusillus	mussel, dried	aninv	Zimmerman90
Lophocateres pusillus	noodle	gp	Cotton-Good37, Halstead68b
Lophocateres pusillus	nut	n	Imura03
Lophocateres pusillus	nutmeg (mace)	sea	Aitken75, Halstead68b, Hedges-Lacey96
Lophocateres pusillus	oat	g	Archibald-Chalmers83
Lophocateres pusillus	paddy	g	Caliboso et al86, Davies60, Haines81, Halstead68b, Sukprakarn86, USDA36-61

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lophocateres pusillus	pea	p	Aitken75, Halstead68b
Lophocateres pusillus	peanut	os	Delobel-Tran93, Hill02, USDA36-61
Lophocateres pusillus	peanut, shelled	osp	Cornes73, Halstead68b
Lophocateres pusillus	pepper, chilli	sea	Zimmerman90
Lophocateres pusillus	pepper, pod dried chilli	sea	Zimmerman87
Lophocateres pusillus	pigeonpea (arhar, red gram)	p	Delobel-Tran93
Lophocateres pusillus	pulse	p	Halstead68b Hedges-Lacey96, Hill02, Imura03,
Lophocateres pusillus	rice	g	Aitken75, Attia-Kamel66, Cornes73, Delobel-Tran93, Douglas41, Forsyth66, Haines81, Halstead68b, Hill02, Imura03, Richards-Herford30, USDA36-61, Yao-Lo62, Zimmerman90
Lophocateres pusillus	rice meal	gp	Caliboso et al86
Lophocateres pusillus	rice product	gp	Halstead68b, Hedges-Lacey96
Lophocateres pusillus	root, dried cassava (manioc)	r	Aitken75, Davies60, Delobel92, Halstead68b, Hedges-Lacey96, Hill02
Lophocateres pusillus	roselle (sorrel)	v	USDA36-61
Lophocateres pusillus	seaweed, dried	v	Zimmerman90
Lophocateres pusillus	seed	se	Cotton-Good37
Lophocateres pusillus	sesame seed	os	Cornes73, Delobel-Tran93, Halstead68b
Lophocateres pusillus	sesame seed oilcake	osp	Zimmerman90
Lophocateres pusillus	sorghum (broomcorn)	g	Caliboso et al86, Cornes73, Forsyth66
Lophocateres pusillus	soybean	p	Caliboso et al86, Delobel-Tran93, Zimmerman90
Lophocateres pusillus	spice	sea	Cotton-Good37, Delobel-Tran93
Lophocateres pusillus	sunflower seed	os	Davies60, Weidner73
Lophocateres pusillus	sweet potato	r	Davies60, Delobel-Tran93, Halstead68b, Hedges-Lacey96
Lophocateres pusillus	walnut	n	USDA36-61
Lophocateres pusillus	watermelon seed	se	Zimmerman90
Lophocateres pusillus	wheat flour	gp	Cotton-Good37
Lyctus africanus	bamboo	v	USDA36-61
Lyctus africanus	cottonseed	os	Haines81
Lyctus africanus	licorice	rp	Nayar et al76
Lyctus africanus	peanut	os	Davies60
Lyctus africanus	potato, dried	r	Delobel-Tran93
Lyctus africanus	root, derris (rotenone)	r	Muthukrishnan-Abraham59, Nayar et al76

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Lyctus africanus	root, dried cassava (manioc)	r	Aitken75, Davies60, Delobel92, Muthukrishnan-Abraham59, Pierrard62, Walker79
Lyctus africanus	root, ginger	r	Muthukrishnan-Abraham59
Lyctus africanus	root, licorice	r	Aitken75, Delobel-Tran93, Muthukrishnan-Abraham59
Lyctus africanus	wood	w	Aitken75
Lyctus brunneus	apricot, dried	df	Attia-Kamel66
Lyctus brunneus	cinnamon	sea	Delobel-Tran93
Lyctus brunneus	grain, cereal	g	Yan et al10
Lyctus brunneus	medicine, Chinese traditional	me	Guilin et al99
Lyctus brunneus	medicine, drug	me	Attia-Kamel66
Lyctus brunneus	medicine, herbal	me	Delobel-Tran93
Lyctus brunneus	root, dried (tuber)	r	Attia-Kamel66
Lyctus brunneus	root, dried cassava (manioc)	r	Davies60, Delobel92, Delobel-Tran93, Hill02, Pierrard62
Lyctus brunneus	root, licorice	r	Aitken75
Lyctus brunneus	sweet potato	r	Davies60, Walker79
Lyctus brunneus	tobacco leaf	v	Haines81
Lyctus brunneus	wood furniture	w	Hayhurst-Britten42, McFarlane63
Lyctus linearis	grain, cereal	g	Yan et al10
Lyctus linearis	wood furniture	w	Hayhurst-Britten42
Melyris oblonga	almond	n	Aitken75
Melyris oblonga	barley	g	Aitken75
Melyris oblonga	carob (locust)	df	Aitken75
Melyris oblonga	carob meal	dfp	Aitken75
Melyris oblonga	dried fruit	df	Aitken75
Melyris oblonga	filbert	n	Aitken75
Melyris oblonga	gallnut	aninv	Aitken75
Melyris oblonga	lentil (masur)	p	Aitken75
Melyris oblonga	root, licorice	r	Aitken75
Mesostena picea	barley	g	Attia-Kamel66
Mesostena picea	peanut	os	Cornes73
Mesostena picea	wheat	g	Attia-Kamel66
Mezium affine	animal feed	oc	Archibald-Chalmers83
Mezium affine	cloth	t	Archibald-Chalmers83, Papp62, Patton31
Mezium affine	cotton	t	Archibald-Chalmers83, Wise61
Mezium affine	fishmeal	anv	Campbell89
Mezium affine	grain, cereal	g	Yan et al10

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Mezium affine	insect, dried	aninv	Gorham91, Hinton41, Papp62, Patton31
Mezium affine	seed	se	Campbell89, Gorham91, Hinton41
Mezium affine	vegetable refuse	v	Campbell89, Gorham91
Mezium affine	wool	anv	Archibald-Chalmers83
Mezium americanum	animal feed	oc	Gorham91, Hedges-Lacey96, Strong-Okumura58
Mezium americanum	animal product	anv	Cotton-Good37, Gorham91, Hinton41
Mezium americanum	barley	g	Aitken75
Mezium americanum	blood, dried	anv	Archibald-Chalmers83
Mezium americanum	bone	anv	Archibald-Chalmers83
Mezium americanum	bone grist	anv	Aitken75
Mezium americanum	carpet	t	Archibald-Chalmers83, Hedges-Lacey96
Mezium americanum	castor bean	se	Aitken75
Mezium americanum	cereal (cereal product)	gp	Delobel-Tran93
Mezium americanum	cottonseed meal	osp	Aitken75
Mezium americanum	dallisgrass seed	se	Archibald-Chalmers83
Mezium americanum	fish, dried	anv	Delobel-Tran93
Mezium americanum	grain, cereal	g	Cotton-Good37, Hedges-Lacey96, Hinton41, Papp62
Mezium americanum	hide drum	anv	Archibald-Chalmers83
Mezium americanum	meat, cured, dried or smoked	anv	Delobel-Tran93
Mezium americanum	melon seed	se	Gorham91, Hedges-Lacey96, Okumura-Strong65, Strong-Okumura58
Mezium americanum	milk, dried	anv	Aitken75
Mezium americanum	millet	g	Aitken75
Mezium americanum	opium cake	v	Cotton-Good37, Gorham91, Hinton41, Papp62
Mezium americanum	peanut	os	Archibald-Chalmers83, Champ65
Mezium americanum	pepper	sea	Delobel-Tran93
Mezium americanum	pepper, cayenne	sea	Cotton-Good37, Gorham91, Hedges-Lacey96, Hinton41, Papp62
Mezium americanum	prune	df	Aitken75
Mezium americanum	shark fin, dried	anv	Olsen81
Mezium americanum	sunflower seed meal	osp	Aitken75
Mezium americanum	tobacco leaf	v	Hinton41, Hedges-Lacey96, Livingstone-Reed36, Patton31
Mezium americanum	tobacco seed	se	Cotton-Good37, Delobel-Tran93, Gorham91, Papp62
Mezium americanum	wheat bran (pollard)	gp	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Mezium americanum	wheat flour	gp	Aitken75
Mezium americanum	wheat gluten	gp	Aitken75
Mezium americanum	wool	anv	Gorham91, Strong-Okumura58
Migneauxia lederi	fig	ffv	Aitken75
Migneauxia lederi	grain, cereal	g	Yan et al10
Migneauxia lederi	medicine, Chinese traditional	me	Guilin et al99
Migneauxia lederi	pulse	p	Imura03
Migneauxia lederi	rice	g	Aitken75, Hinton45, Imura03
Migneauxia lederi	rice bran	gp	Aitken75
Migneauxia lederi	rice, broken	gp	Aitken75
Migneauxia lederi	tobacco leaf	v	Imura03
Migneauxia lederi	wheat	g	Aitken75
Monanus concinnulus	bamboo, dried leaf or shoot	v	Halstead93, Zimmerman90
Monanus concinnulus	basketware, wicker	v	Archibald-Chalmers83, Halstead93
Monanus concinnulus	cigar (cheroot, stogie)	v	Halstead93, Wheeler21
Monanus concinnulus	cocoa	bc	Delobel-Tran93
Monanus concinnulus	cocoa bean	bc	Halstead93, Imura03
Monanus concinnulus	coconut	os	Halstead93
Monanus concinnulus	hay residue	res	Halstead93
Monanus concinnulus	herbarium specimen	v	Archibald-Chalmers83, Halstead93
Monanus concinnulus	illipenut	os	Aitken75, Delobel-Tran93, Halstead93
Monanus concinnulus	leaf, dried	v	Zimmerman90
Monanus concinnulus	maize	g	Cornes73, Haines81, Halstead93
Monanus concinnulus	maize cob	gp	Halstead93
Monanus concinnulus	mung bean	p	Halstead93, Zimmerman90
Monanus concinnulus	nut	n	Imura03
Monanus concinnulus	palm kernel	os	Delobel-Tran93
Monanus concinnulus	pepper	sea	Delobel-Tran93
Monanus concinnulus	pepper, chilli	sea	Halstead93, Zimmerman90
Monanus concinnulus	pepper, pod dried chilli	sea	Zimmerman87
Monanus concinnulus	rice	g	Archibald-Chalmers83, Aitken75, Delobel-Tran93, Imura03, Halstead93
Monanus concinnulus	root, lonchocarpus (rotenone)	r	Downes-Williams50, Halstead93
Monanus concinnulus	seafood, dried	aninv	Archibald-Chalmers83, Halstead93
Monanus concinnulus	seaweed, dried	v	Archibald-Chalmers83, Halstead93
Monanus concinnulus	soybean	p	Halstead93
Monanus concinnulus	tomato	ffv	Archibald-Chalmers83, Halstead93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Monanus concinnulus	wheat bran (pollard)	gp	Cotton-Good37, Delobel-Tran93, Halstead93
Monanus concinnulus	wheat flour	gp	Cotton-Good37, Delobel-Tran93, Halstead93
Monopis laevigella	animal product	anv	Nawrot-Klejdysz09
Monopis laevigella	cloth, rotten	sp	Nawrot-Klejdysz09
Monopis laevigella	feather	anv	Nawrot-Klejdysz09
Monopis laevigella	fur	anv	Carter84, Nawrot-Klejdysz09
Monopis laevigella	hair	anv	Nawrot-Klejdysz09
Monopis laevigella	hide, pelt or skin	anv	Carter84, Hill02
Monotoma picipes	grain, cereal	g	Yan et al10
Monotoma picipes	grain, moldy	gs	Imura03
Monotoma picipes	maize	g	Delobel-Tran93, Sedlacek et al98
Monotoma picipes	medicine, Chinese traditional	me	Guilin et al99
Monotoma picipes	wheat	g	Aitken75, Delobel-Tran93
Murmidius ovalis	apple, dried	df	Cotton-Good37, Patton31
Murmidius ovalis	dried fruit	df	Delobel-Tran93, Hinton45
Murmidius ovalis	gallnut	aninv	Aitken75, Halstead68a, Hinton45, Imura03, Patton31
Murmidius ovalis	ginger	sea	Aitken75, Delobel-Tran93, Imura03
Murmidius ovalis	grain, cereal	g	Yan et al10
Murmidius ovalis	hay	v	Delobel-Tran93, Hinton45, Patton31
Murmidius ovalis	maize	g	Aitken75, Halstead68a, Cotton-Good37, Delobel-Tran93, Hinton45, Imura03, Sedlacek et al98
Murmidius ovalis	oilcake	osp	Aitken75
Murmidius ovalis	paddy	g	Delobel-Tran93, Halstead 68a
Murmidius ovalis	paper	wp	Imura03
Murmidius ovalis	pepper and ginger spillage	res	Halstead 68a
Murmidius ovalis	rice	g	Aitken75, Cotton-Good37, Delobel-Tran93, Douglas41, Haines81, Halstead68a, Imura03, Patton31
Murmidius ovalis	rice, broken	gp	Halstead 68a, Hinton45
Murmidius ovalis	sorghum (broomcorn)	g	Haines74
Murmidius ovalis	straw	v	Imura03
Murmidius ovalis	wheat	g	Cotton-Good37, Hinton45
Murmidius ovalis	wheat flour	gp	Delobel-Tran93
Mycetophagus quadriquttatus	animal feed	oc	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Mycetophagus quadriquttatus	barley	g	Strong-Okumura58
Mycetophagus quadriguttatus	grain, cereal	g	Yan et al10
Mycetophagus quadriquttatus	grain, moldy	gs	Hill02
Mycetophagus quadriquttatus	maize	g	Strong-Okumura58
Mycetophagus quadriquttatus	oat	g	Strong-Okumura58
Mycetophagus quadriguttatus	sunflower seed	os	Stojanovic-Kosovac74
Nacerdes melanura	rice	g	Aitken75
Nausibius clavicornis	apple, dried	df	Breese-Wise59, Cotton-Good37, Halstead80, 93; Patton31
Nausibius clavicornis	cassia husk	v	Breese-Wise59, Cotton-Good37, Patton31
Nausibius clavicornis	cereal (cereal product)	gp	Delobel-Tran93, Halstead93
Nausibius clavicornis	cocoa bean	bc	Halstead80, Halstead93
Nausibius clavicornis	ginger	sea	Aitken75, Breese-Wise59, Cotton-Good37, Delobel-Tran93, Halstead80, 93; Patton31
Nausibius clavicornis	medicine, herbal	me	Delobel-Tran93
Nausibius clavicornis	peanut	os	Delobel-Tran93
Nausibius clavicornis	rice	g	Breese-Wise59, Cotton-Good37, Halstead80, 93; Patton31, Wheeler21
Nausibius clavicornis	sugar	v	Breese-Wise59, Cotton-Good37, Delobel-Tran93, Halstead80, 93; McFarlane63, Patton31, Wheeler21
Necrobia ruficollis	animal feed	oc	Archibald-Chalmers83
Necrobia ruficollis	animal product	anv	Aitken75, Imura03
Necrobia ruficollis	bone	anv	Archibald-Chalmers83, Cornes73
Necrobia ruficollis	bone meal	anv	Leavengood08
Necrobia ruficollis	cheese	anv	Campbell89, Delobel-Tran93
Necrobia ruficollis	cocoa bean	bc	Aitken75
Necrobia ruficollis	copra	osp	Archibald-Chalmers83, Aitken75, Attia-Kamel66, Campbell89, Cornes73, Delobel-Tran93, Hill02, Kiritani59
Necrobia ruficollis	cottonseed	os	Kiritani59
Necrobia ruficollis	fish, dried	anv	Cornes73, Delobel-Tran93, Haines-Rees89
Necrobia ruficollis	ginger	sea	Attia-Kamel66

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Necrobia ruficollis	grain product	gp	Aitken75
Necrobia ruficollis	grain, cereal	g	Aitken75, Yan et al10
Necrobia ruficollis	ham	anv	Campbell89, Hill02
Necrobia ruficollis	hide, pelt or skin	anv	Archibald-Chalmers83, Attia-Kamel66, Cornes73
Necrobia ruficollis	hoof meal	anv	Okumura-Strong65
Necrobia ruficollis	kapok seed	se	Kiritani59
Necrobia ruficollis	meat meal	anv	Archibald-Chalmers83
Necrobia ruficollis	meat, processed	anv	Hill02
Necrobia ruficollis	medicine, Chinese traditional	me	Guilin et al99
Necrobia ruficollis	oilcake	osp	Aitken75
Necrobia ruficollis	palm kernel	os	Aitken75, Cornes73
Necrobia ruficollis	prune	df	Attia-Kamel66
Necrobia ruficollis	seafood, dried	aninv	Archibald-Chalmers83
Necrobia ruficollis	silkworm cocoon	aninv	Imura03
Necrobia rufipes	almond	n	Archibald-Chalmers83
Necrobia rufipes	animal feed	oc	Hayhurst-Britten42, McFarlane63
Necrobia rufipes	animal product	anv	Aitken75, Imura03
Necrobia rufipes	animal specimen	anv	Hedges-Lacey96
Necrobia rufipes	animal specimen, snakes dried	anv	Zimmerman90
Necrobia rufipes	animal specimen, whale	anv	Patton31
Necrobia rufipes	asparagus, dried	v	Archibald-Chalmers83
Necrobia rufipes	bacon, smoked	anv	Campbell89, Hedges-Lacey96, Hill02, Leavengood08, Patton31
Necrobia rufipes	banana, dried	df	Howe-Freeman55
Necrobia rufipes	basketware, wicker	v	Archibald-Chalmers83
Necrobia rufipes	bean	p	Campbell89, Howe-Freeman55
Necrobia rufipes	beewax	aninv	Archibald-Chalmers83
Necrobia rufipes	biscuit	bg	Archibald-Chalmers83
Necrobia rufipes	blood, dried	anv	Archibald-Chalmers83
Necrobia rufipes	bone	anv	Archibald-Chalmers83, Cornes73, Davies60, Hill02, Howe-Freeman55, Patton31
Necrobia rufipes	bone meal	anv	Campbell89, Hedges-Lacey96, Leavengood08, Patton31, Rao et al73
Necrobia rufipes	cashew	n	Archibald-Chalmers83, Delobel-Tran93, Nair et al79, Nayar et al76, Pinheiro68
Necrobia rufipes	cassava root meal	rp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Necrobia rufipes	castor bean	se	Howe-Freeman55, Kiritani59
Necrobia rufipes	cheese	anv	Campbell89, Delobel-Tran93, Hedges-Lacey96, Hill02, Leavengood08, Patton31
Necrobia rufipes	cocoa	bc	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Forsyth66, Hayhurst-Britten42, Patton31, Richards-Herford30
Necrobia rufipes	cocoa bean	bc	Aitken75, Cornes73, Hill02, Howe-Freeman55, Olsen81, Schulten-Roorda84
Necrobia rufipes	cocoa cake	bc	Howe-Freeman55
Necrobia rufipes	coconut	os	Leavengood08
Necrobia rufipes	coffee bean	bc	Archibald-Chalmers83, Howe-Freeman55
Necrobia rufipes	copra	osp	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Bawalan04, Calderon-Donahaye64, Campbell89, Cornes73, Delobel-Tran93, Forsyth66, Haines81, Hedges-Lacey96, Hill02, Howe-Freeman55, Kiritani59, McFarlane63, Patton31, Richards-Herford30, Strong-Okumura58
Necrobia rufipes	copra meal	osp	Bawalan04, Strong-Okumura58, Wohlgemuth-Reichmuth83
Necrobia rufipes	copra oilcake	osp	Haines81, Hayhurst-Britten42, Strong-Okumura58, Wohlgemuth-Reichmuth83
Necrobia rufipes	copra, moldy	sp	Patton31
Necrobia rufipes	cotton	t	Hayhurst-Britten42, Leavengood08, Patton31
Necrobia rufipes	cottonseed	os	Cornes73, Cotterell52, Howe-Freeman55, Kiritani59
Necrobia rufipes	cowrie	aninv	Hayhurst-Britten42, Richards-Herford30
Necrobia rufipes	date	df	Archibald-Chalmers83
Necrobia rufipes	dog biscuit	bg	Hayhurst-Britten42, Hedges-Lacey96
Necrobia rufipes	dried fruit	df	Archibald-Chalmers83, Campbell89, Delobel-Tran93
Necrobia rufipes	egg, dried	anv	Campbell89, Patton31
Necrobia rufipes	fertilizer	oc	Archibald-Chalmers83
Necrobia rufipes	fig	ffv	Archibald-Chalmers83, Hayhurst-Britten42, Patton31, Richards-Herford30

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Necrobia rufipes	fish, dried	anv	Archibald-Chalmers83, Cornes73, Delobel-Tran93, Haines81, Haines-Rees89, Hill02, Leavengood08, Patton31, Rajendran-Parveen05
Necrobia rufipes	fish, preserved	anv	Campbell89, Davies60, Hedges-Lacey96, Zimmerman90
Necrobia rufipes	fishmeal	anv	Haines81, Hedges-Lacey96, Okumura-Strong65
Necrobia rufipes	garlic	sea	Hedges-Lacey96, Leavengood08
Necrobia rufipes	ginger	sea	Attia-Kamel66, Howe-Freeman55, Weidner73
Necrobia rufipes	grain product	gp	Aitken75
Necrobia rufipes	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Leavengood08, Yan et al10
Necrobia rufipes	ham	anv	Campbell89, Davies60, Hayhurst-Britten42, Hill02, Leavengood08, Patton31
Necrobia rufipes	hemp (marijuana)	v	Strong-Okumura58
Necrobia rufipes	hide, pelt or skin	anv	Archibald-Chalmers83, Attia-Kamel66, Campbell89, Cornes73, Hayhurst-Britten42, Howe-Freeman55, Knoche57, Patton31, Rajendran-Parveen05
Necrobia rufipes	horn	anv	Archibald-Chalmers83
Necrobia rufipes	insect, dried	aninv	Campbell89
Necrobia rufipes	kapok seed	se	Kiritani59
Necrobia rufipes	maize	g	Archibald-Chalmers83, Caliboso et al86, Forsyth66, Hayhurst-Britten42
Necrobia rufipes	meat product	anv	Hill02
Necrobia rufipes	meat, cured, dried or smoked	anv	Campbell89, Cornes73, Delobel-Tran93, Hedges-Lacey96, Patton31, Strong-Okumura58
Necrobia rufipes	medicine, Chinese traditional	me	Guilin et al99
Necrobia rufipes	medicine, kava kava root	me	Weidner73
Necrobia rufipes	milk, dried	anv	Patton31
Necrobia rufipes	museum collection	oc	Hedges-Lacey96, Rajendran-Parveen05
Necrobia rufipes	museum collection, mummy	oc	Hedges-Lacey96, Patton31
Necrobia rufipes	museum collection, mummy skull	oc	Leavengood08
Necrobia rufipes	nut	n	Archibald-Chalmers83, Campbell89, Schulten-Roorda84

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Necrobia rufipes	nutmeg (mace)	sea	Hayhurst-Britten42, Richards-Herford30, Schulten-Roorda84
Necrobia rufipes	oat	g	Hayhurst-Britten42
Necrobia rufipes	oilcake	osp	Aitken75
Necrobia rufipes	oilseed	os	Hill02, Schulten-Roorda84
Necrobia rufipes	palm kernel	os	Allotey88, Aitken75, Cornes73, Cotterell52, Delobel-Tran93, Hill02, Howe-Freeman55, Kiritani59, Patton31
Necrobia rufipes	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Necrobia rufipes	peanut	os	Archibald-Chalmers83, Cornes73, Cotterell52, Delobel-Tran93, Howe-Freeman55, Kiritani59, Nayar et al76
Necrobia rufipes	peanut flake	osp	Hayhurst-Britten42
Necrobia rufipes	peanut oilcake	osp	Howe-Freeman55
Necrobia rufipes	pepper, cayenne	sea	Archibald-Chalmers83
Necrobia rufipes	pepper, chilli	sea	Archibald-Chalmers83, Howe-Freeman55
Necrobia rufipes	pineapple	ffv	Archibald-Chalmers83
Necrobia rufipes	pork, smoked	anv	Campbell89, Patton31
Necrobia rufipes	prune	df	Attia-Kamel66
Necrobia rufipes	pulse	p	Schulten-Roorda84
Necrobia rufipes	raisin	df	Archibald-Chalmers83
Necrobia rufipes	rattan	v	Leavengood08, Patton31
Necrobia rufipes	rice	g	Archibald-Chalmers83, Stejskal-Kucerova93, Strong-Okumura58
Necrobia rufipes	rice bran	gp	Caliboso et al86
Necrobia rufipes	rice stick	gp	Zimmerman90
Necrobia rufipes	root, dried cassava (manioc)	r	Delobel92, Ratti-Rampini77
Necrobia rufipes	root, lonchocarpus (rotenone)	r	Downes-Williams50
Necrobia rufipes	salt	oc	Leavengood08, Patton31
Necrobia rufipes	sausage rusk	oc	Rajendran-Parveen05
Necrobia rufipes	seafood, dried	aninv	Archibald-Chalmers83
Necrobia rufipes	seed	se	Archibald-Chalmers83
Necrobia rufipes	sesame seed	os	Cornes73, Howe-Freeman55
Necrobia rufipes	sheanut	n	Howe-Freeman55
Necrobia rufipes	shrimp paste	aninv	Zimmerman90
Necrobia rufipes	shrimp, dried	aninv	Allotey et al97, Cornes73, Olsen81
Necrobia rufipes	silk	aninv	Hayhurst-Britten42, Leavengood08
Necrobia rufipes	soup mix, dried	oc	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Necrobia rufipes	soybean	p	Howe-Freeman55
Necrobia rufipes	spice	sea	Archibald-Chalmers83, Delobel-Tran93, Hill02
Necrobia rufipes	squid, dried	aninv	Archibald-Chalmers83
Necrobia rufipes	sugarcane	v	Archibald-Chalmers83
Necrobia rufipes	tallow	anv	Archibald-Chalmers83
Necrobia rufipes	tapioca	r	Campbell89
Necrobia rufipes	taro	r	Archibald-Chalmers83
Necrobia rufipes	tomato	ffv	Archibald-Chalmers83
Necrobia rufipes	turmeric	sea	Archibald-Chalmers83
Necrobia rufipes	turtle shell	anv	Archibald-Chalmers83
Necrobia rufipes	wheat bran (pollard)	gp	Buchelos-Athanassiou98
Necrobia rufipes	wheat flour	gp	Buchelos-Athanassiou98
Necrobia rufipes	wool	anv	Patton31
Necrobia violacea	animal product	anv	Imura03
Necrobia violacea	bone	anv	Aitken75, Campbell89
Necrobia violacea	fish, dried	anv	Campbell89, Haines-Rees89, Hill02
Necrobia violacea	grain, cereal	g	Yan et al10
Necrobia violacea	hide, pelt or skin	anv	Campbell89
Necrobia violacea	meat, cured, dried or smoked	anv	Hill02
Nemapogon cloacella	cork	wp	Cotton-Good37, Hinton56, Patton31
Nemapogon cloacella	fungi	v	Carter84
Nemapogon cloacella	grain, cereal	g	Carter84, Cotton-Good37, Hinton56
Nemapogon cloacella	mushroom, dried	v	Hinton56
Nemapogon cloacella	vegetable material, dried	v	Carter84
Nemapogon granella	almond	n	Hinton56, Sinha-Watters85
Nemapogon granella	barley	g	Athanassiou et al10, Hill02, Sinha-Watters85
Nemapogon granella	bilberry, dried	df	Hinton56
Nemapogon granella	biscuit	bg	Hinton56
Nemapogon granella	bulb	r	Corbet-Tams43
Nemapogon granella	cereal (cereal product)	gp	Patton31
Nemapogon granella	cheese, moldy	sp	Sinha-Watters85
Nemapogon granella	cherry, dried	df	Hinton56
Nemapogon granella	chestnut	n	Hinton56, Sinha-Watters85
Nemapogon granella	chocolate	bc	Sinha-Watters85
Nemapogon granella	cigar (cheroot, stogie)	v	Hinton56, Patton31
Nemapogon granella	clover seed	se	Hinton56, Sinha-Watters85
Nemapogon granella	date	df	Hinton56

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Nemapogon granella	dextrine	oc	Hinton56
Nemapogon granella	dried fruit	df	Carter84, Gorham91, Sinha-Watters85, Strong-Okumura58
Nemapogon granella	fig	ffv	Hayhurst-Britten42
Nemapogon granella	flax	v	Sinha-Watters85
Nemapogon granella	grain product	gp	Aitken84
Nemapogon granella	grain, cereal	g	Aitken84, Corbet-Tams43, Gorham91, Hinton56, Solis99
Nemapogon granella	grain, moldy	gs	Imura03
Nemapogon granella	grass seed	se	Sinha-Watters85
Nemapogon granella	hazel nut	n	Hinton56, Sinha-Watters85
Nemapogon granella	maize	g	Haines81, Hayhurst-Britten42, Hinton56
Nemapogon granella	medicine, dried anemone root	me	Hinton56
Nemapogon granella	milk, dried	anv	Somerfield et al80
Nemapogon granella	mushroom, dried	v	Carter84, Gorham91, Hinton56, Imura03, Sinha-Watters85
Nemapogon granella	nut	n	Aitken84, Carter84
Nemapogon granella	oat	g	Hill02, Sinha-Watters85
Nemapogon granella	oilseed	os	Aitken84
Nemapogon granella	ornamental plant seed	se	Sinha-Watters85
Nemapogon granella	peach, dried	df	Hinton56
Nemapogon granella	peanut	os	Hinton56, Sinha-Watters85
Nemapogon granella	pistachio nut	n	Hayhurst-Britten42, Hinton56, Richards-Herford30
Nemapogon granella	prune	df	Sinha-Watters85
Nemapogon granella	rice	g	Hinton56, Kim et al88, Sinha-Watters85
Nemapogon granella	rye	g	Carter84, Hill02, Hinton45, Sinha-Watters85
Nemapogon granella	rye flour paste	gp	Hinton45, Patton31
Nemapogon granella	soybean	p	Sinha-Watters85
Nemapogon granella	soybean meal	pp	Haines81
Nemapogon granella	walnut	n	Sinha-Watters85
Nemapogon granella	wheat	g	Hill02, Hinton56, Sinha-Watters85
Nemapogon granella	wheat bran (pollard)	gp	Hayhurst-Britten42, Hinton56, Sinha-Watters85
Niditinea fuscella	almond	n	Hinton56
Niditinea fuscella	animal feed	oc	Strong-Okumura58
Niditinea fuscella	animal product	anv	Aitken84, Cotton-Good37, Patton31, Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Niditinea fuscella	animal specimen, hunting trophy	anv	Patton31
Niditinea fuscella	bedding (blanket, spread)	t	Hinton56, Patton31
Niditinea fuscella	book	oc	Hinton56, Patton31
Niditinea fuscella	carpet	t	Patton31
Niditinea fuscella	cloth	t	Patton31
Niditinea fuscella	cocoa bean	bc	Aitken84
Niditinea fuscella	dried fruit	df	Aitken84, Carter84, Cotton-Good37, Hinton56
Niditinea fuscella	feather	anv	Patton31
Niditinea fuscella	fur	anv	Hayhurst-Britten42, Patton31
Niditinea fuscella	grain product	gp	Aitken84
Niditinea fuscella	grain, cereal	g	Aitken84, Carter84
Niditinea fuscella	hide, pelt or skin	anv	Patton31
Niditinea fuscella	linseed oilcake	osp	Hinton56
Niditinea fuscella	maize residue	res	Hinton56
Niditinea fuscella	nut	n	Aitken84
Niditinea fuscella	oilcake	osp	Aitken84
Niditinea fuscella	pea	p	Hinton56
Niditinea fuscella	peanut	os	Cornes73, Cotterell52
Niditinea fuscella	prune	df	Hinton56
Niditinea fuscella	seed	se	Carter84, Cotton-Good37, Hinton56
Niditinea fuscella	wheat	g	Hinton56
Niditinea fuscella	wheat bran (pollard)	gp	Hinton56
Niditinea fuscella	wool	anv	Hayhurst-Britten42, Hill02, Patton31
Niptus hololeucus	animal feed	oc	Hayhurst-Britten42
Niptus hololeucus	barley	g	Gorham91
Niptus hololeucus	barley meal	gp	Hayhurst-Britten42
Niptus hololeucus	bean	ffv	Hayhurst-Britten42
Niptus hololeucus	bone	anv	Hedges-Lacey96, Patton31
Niptus hololeucus	book	oc	Gorham91, Hedges-Lacey96, Hinton41
Niptus hololeucus	bread	bg	Gorham91, Hinton41
Niptus hololeucus	bristle, brush	anv	Gorham91, Hinton41, Patton31
Niptus hololeucus	cake	bg	Hinton41
Niptus hololeucus	casein, dried	anv	Gorham91, Hinton41, Patton31
Niptus hololeucus	cloth	t	Archibald-Chalmers83, Patton31
Niptus hololeucus	cloth, linen	t	Gorham91, Hedges-Lacey96, Hinton41, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Niptus hololeucus	cocoa	bc	Gorham91, Hinton41
Niptus hololeucus	cork	wp	Gorham91
Niptus hololeucus	cotton	t	Gorham91, Hinton41, Papp62
Niptus hololeucus	dog biscuit	bg	Hayhurst-Britten42
Niptus hololeucus	feather	anv	Gorham91, Hedges-Lacey96, Hinton41, Patton31
Niptus hololeucus	grain, cereal	g	Gorham91, Hinton41, Yan et al10
Niptus hololeucus	hide, pelt or skin	anv	Hayhurst-Britten42
Niptus hololeucus	insect, dried	aninv	Gorham91, Hedges-Lacey96, Hinton41
Niptus hololeucus	leather	anv	Gorham91, Hedges-Lacey96, Hinton41, Patton31
Niptus hololeucus	linseed meal	osp	Hayhurst-Britten42
Niptus hololeucus	maize	g	Hayhurst-Britten42
Niptus hololeucus	maize meal	gp	Hayhurst-Britten42
Niptus hololeucus	malt culm	gp	Hayhurst-Britten42
Niptus hololeucus	medicine, belladonna root	me	Gorham91
Niptus hololeucus	medicine, Chinese traditional	me	Guilin et al99
Niptus hololeucus	medicine, rhubarb root	me	Gorham91
Niptus hololeucus	oat	g	Gorham91, Hayhurst-Britten42
Niptus hololeucus	oatmeal	gp	Hayhurst-Britten42
Niptus hololeucus	paper	wp	Gorham91, Hedges-Lacey96, Hinton41
Niptus hololeucus	pea meal	pp	Aitken75
Niptus hololeucus	rice	g	Hayhurst-Britten42, Kim et al88
Niptus hololeucus	rice meal	gp	Hayhurst-Britten42
Niptus hololeucus	root, dried cassava (manioc)	r	Wohlgemuth-Reichmuth83
Niptus hololeucus	sago flour	v	Hayhurst-Britten42
Niptus hololeucus	seed	se	Gorham91, Hedges-Lacey96, Hinton41, Papp62
Niptus hololeucus	silk	aninv	Archibald-Chalmers83, Campbell89, Gorham91, Hedges-Lacey96, Hinton41, Papp62, Patton31, Wise56
Niptus hololeucus	soapstone	oc	Hayhurst-Britten42
Niptus hololeucus	sorghum (broomcorn)	g	Gorham91
Niptus hololeucus	spice	sea	Campbell89, Gorham91, Hedges-Lacey96
Niptus hololeucus	sponge, bath	oc	Gorham91, Hedges-Lacey96, Hinton41, Patton31
Niptus hololeucus	tea leaf	bc	Gorham91
Niptus hololeucus	vegetable material, dried	v	Papp62
Niptus hololeucus	wheat	g	Gorham91, Hayhurst-Britten42

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Niptus hololeucus	wheat bran (pollard)	gp	Gorham91, Hayhurst-Britten42, Hedges-Lacey96, Hinton41
Niptus hololeucus	wheat farina	gp	Hayhurst-Britten42
Niptus hololeucus	wheat flour	gp	Aitken75, Gorham91, Hayhurst-Britten42, Hedges-Lacey96, Hinton41
Niptus hololeucus	wheat meal	gp	Hayhurst-Britten42
Niptus hololeucus	wool	anv	Campbell89, Gorham91, Hedges-Lacey96, Hinton41, Patton31
Nitidula bipunctata	bacon, smoked	anv	Hinton45
Nitidula bipunctata	bread	bg	Hinton45
Nitidula bipunctata	cake	bg	Hinton45
Nitidula bipunctata	grain, cereal	g	Yan et al10
Nitidula bipunctata	ham	anv	Hinton45
Nitidula bipunctata	maize	g	Sedlacek et al98
Nitidula bipunctata	sausage	anv	Hinton45
Omonadus floralis	barley	g	Campbell89
Omonadus floralis	canary grass seed	se	Archibald-Chalmers83
Omonadus floralis	carob (locust)	df	Aitken75
Omonadus floralis	cocoa bean	bc	Aitken75, Cornes73, Cotterell52, Delobel-Tran93, Hinton45, Richards-Herford30
Omonadus floralis	cottonseed	os	Davies60
Omonadus floralis	dried fruit	df	Aitken75, Cotton-Good37
Omonadus floralis	food, decaying	sp	Imura03
Omonadus floralis	grain product	gp	Aitken75
Omonadus floralis	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Yan et al10
Omonadus floralis	grass seed	se	Archibald-Chalmers83
Omonadus floralis	hay	v	Archibald-Chalmers83
Omonadus floralis	maize	g	Davies60, Delobel-Tran93, Richards-Herford30
Omonadus floralis	nectarine, dried	df	Hinton45
Omonadus floralis	nut	n	Aitken75
Omonadus floralis	oat	g	Campbell89
Omonadus floralis	oilcake	osp	Aitken75
Omonadus floralis	oilseed	os	Aitken75
Omonadus floralis	orchard grass seed	se	Archibald-Chalmers83
Omonadus floralis	paddy	g	Pires et al07
Omonadus floralis	pulse	p	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Omonadus floralis	pulse product	pp	Aitken75
Omonadus floralis	root, dried cassava (manioc)	r	Delobel92
Omonadus floralis	rye, perennial	v	Archibald-Chalmers83
Omonadus floralis	spangled fruit	ffv	Archibald-Chalmers83
Omonadus floralis	straw	v	Campbell89, Cotton-Good37
Omonadus floralis	sunflower seed	os	Athanassov74, Delobel-Tran93, Stojanovic-Kosovac74
Omonadus floralis	water chestnut	v	Campbell89, Cotton-Good37, Hinton45
Omonadus floralis	wheat	g	Campbell89, Cotton-Good37, Hinton45
Omonadus floralis	yam	r	Hinton45
Omosita colon	grain, cereal	g	Yan et al10
Omosita colon	hay residue	res	Hinton45
Orphinus fulvipes	book	oc	Aitken75, Peacock93
Orphinus fulvipes	Brazil nut (para nut)	n	Aitken75
Orphinus fulvipes	cheese	anv	Aitken75
Orphinus fulvipes	cinnamon bark	sea	Aitken75, Peacock93
Orphinus fulvipes	cocoa bean	bc	Aitken75, Peacock93
Orphinus fulvipes	ginger	sea	Aitken75, Peacock93
Orphinus fulvipes	grain, cereal	g	Yan et al10
Orphinus fulvipes	illipenut	os	Peacock93, Rajendran-Parveen05
Orphinus fulvipes	insect, dried	aninv	Peacock93, Rajendran-Parveen05
Orphinus fulvipes	kola nut	n	Aitken75
Orphinus fulvipes	lima bean	p	Aitken75, Peacock93
Orphinus fulvipes	nut	n	Peacock93
Orphinus fulvipes	nutmeg (mace)	sea	Aitken75, Peacock93
Orphinus fulvipes	rice	g	Aitken75, Peacock93
Orphinus fulvipes	sago flour	v	Aitken75
Orphinus fulvipes	shrimp, dried	aninv	Aitken75, Peacock93
Orphinus fulvipes	silkworm cocoon	aninv	Rajendran-Parveen05, VijayVeer et al96
Orphinus fulvipes	tobacco seed	se	Aitken75
Oryzaephilus mercator	African mango seed	os	Dudu et al98, Lale et al96
Oryzaephilus mercator	algarroba pod	p	Hayhurst-Britten42
Oryzaephilus mercator	almond	n	Archibald-Chalmers83, Davies60, Patton31, Richards-Herford30
Oryzaephilus mercator	animal specimen, lizard dried	anv	Archibald-Chalmers83
Oryzaephilus mercator	aniseed (anise spice)	sea	Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus mercator	apricot	ffv	Archibald-Chalmers83
Oryzaephilus mercator	bambara groundnut	p	Delobel-Tran93, Forsyth66
Oryzaephilus mercator	banana baked with honey	v	Zimmerman90
Oryzaephilus mercator	banana, dried	df	Imura03
Oryzaephilus mercator	barley	g	Buchelos-Katopodis95
Oryzaephilus mercator	bean curd	pp	Olsen81
Oryzaephilus mercator	betel nut (areca nut)	n	Archibald-Chalmers83
Oryzaephilus mercator	biscuit	bg	McFarlane63
Oryzaephilus mercator	bulb	r	Hayhurst-Britten42
Oryzaephilus mercator	cake mix	oc	Campbell89
Oryzaephilus mercator	candy bar with peanut	v	Campbell89
Oryzaephilus mercator	caneware	v	Archibald-Chalmers83
Oryzaephilus mercator	carob (locust)	df	Aitken75
Oryzaephilus mercator	cashew	n	Archibald-Chalmers83, Campbell89, Davies60, Delobel-Tran93, Nair et al79
Oryzaephilus mercator	cassava root chip	rp	Parker et al81, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	castor bean	se	Cornes73, Kiritani59
Oryzaephilus mercator	cereal (cereal product)	gp	Archibald-Chalmers83, Haines81, McFarlane63
Oryzaephilus mercator	chocolate	bc	Archibald-Chalmers83, Delobel-Tran93
Oryzaephilus mercator	cinnamon roll	bg	Zimmerman90
Oryzaephilus mercator	cocoa	bc	Delobel-Tran93, Dudu et al98, Hayhurst-Britten42, Patton31, Richards-Herford30
Oryzaephilus mercator	cocoa bean	bc	Aitken75, Cornes73, Schulten-Roorda84
Oryzaephilus mercator	coconut	os	Campbell89
Oryzaephilus mercator	coconut fiber	osp	Richards-Herford30
Oryzaephilus mercator	coffee	bc	Archibald-Chalmers83
Oryzaephilus mercator	confectionery	oc	Archibald-Chalmers83
Oryzaephilus mercator	cookie	bg	Campbell89
Oryzaephilus mercator	copra	osp	Aitken75, Archibald-Chalmers83, Bawalan04, Campbell89, Cornes73, Delobel-Tran93, Forsyth66, Haines81, Kiritani59, McFarlane63
Oryzaephilus mercator	copra chip	osp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	copra meal	osp	Bawalan04, Strong-Okumura58, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	copra oilcake	osp	Haines81, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	coriander seed	se	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus mercator	cottonseed	os	Davies60, Delobel-Tran93
Oryzaephilus mercator	cottonseed meal	osp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	cottonseed meal pellet	osp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	cottonseed oilcake	osp	Haines81, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	cowpea	p	Cornes73, Davies60, Delobel-Tran93, Forsyth66
Oryzaephilus mercator	currant	df	Patton31, Wheeler21
Oryzaephilus mercator	curry powder	sea	Archibald-Chalmers83
Oryzaephilus mercator	date	df	Archibald-Chalmers83, Calderon-Donahaye64, Donahaye-Calderon64, Donahaye-Calderon64, Patton31, Richards-Herford30
Oryzaephilus mercator	dog food	oc	Okumura-Strong65
Oryzaephilus mercator	dried fruit	df	Archibald-Chalmers83, Aitken75, Delobel-Tran93
Oryzaephilus mercator	fennel seed	se	Zimmerman90
Oryzaephilus mercator	fig	ffv	Archibald-Chalmers83, Calderon-Donahaye64
Oryzaephilus mercator	fig, dried	df	Okumura-Strong65, Patton31
Oryzaephilus mercator	fish, preserved	anv	Zimmerman90
Oryzaephilus mercator	flower seed	se	Archibald-Chalmers83
Oryzaephilus mercator	garlic	sea	Archibald-Chalmers83
Oryzaephilus mercator	ginger	sea	Cornes73, Hayhurst-Britten42, McFarlane63, Weidner73
Oryzaephilus mercator	grain product	gp	Aitken75
Oryzaephilus mercator	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Imura03, Strong-Okumura58, Yan et al10
Oryzaephilus mercator	gum dammar	v	Schulten-Roorda84
Oryzaephilus mercator	hay	v	Buchelos-Athanassiou98
Oryzaephilus mercator	herb	v	Archibald-Chalmers83, Hayhurst-Britten42
Oryzaephilus mercator	licorice apricot	rp	Zimmerman90
Oryzaephilus mercator	lily, Hong Kong	v	Archibald-Chalmers83
Oryzaephilus mercator	linseed oilcake	osp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	litchi nut (lychee)	n	Archibald-Chalmers83
Oryzaephilus mercator	lotus	v	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus mercator	maize	g	Archibald-Chalmers83, Cornes73, Davies60, Forsyth66, Haines81, Hayhurst-Britten42, Patton31, Tadesse96, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	maize flour	gp	Delobel-Tran93, Walker79
Oryzaephilus mercator	maize germ meal	gp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	maize meal	gp	Archibald-Chalmers83, Davies60, Pierrard62, Wheeler21
Oryzaephilus mercator	mango	ffv	Archibald-Chalmers83
Oryzaephilus mercator	mango seed	os	Cornes73
Oryzaephilus mercator	meat meal	anv	Archibald-Chalmers83
Oryzaephilus mercator	medicine, herbal	me	Basak91
Oryzaephilus mercator	melon seed	se	Archibald-Chalmers83, Dudu et al98, Zimmerman90
Oryzaephilus mercator	melon seed, bitter	os	Dudu et al98
Oryzaephilus mercator	milk, dried	anv	Archibald-Chalmers83, Somerfield et al80
Oryzaephilus mercator	millet	g	Cornes73, Delobel-Tran93, Forsyth66
Oryzaephilus mercator	mushroom, dried	v	Archibald-Chalmers83, Zimmerman90
Oryzaephilus mercator	noodle	gp	Campbell89, Olsen81, Zimmerman90
Oryzaephilus mercator	nut	n	Aitken75, Archibald-Chalmers83, Campbell89, Patton31, Schulten-Roorda84, Zimmerman90
Oryzaephilus mercator	nutmeg (mace)	sea	Archibald-Chalmers83, Delobel-Tran93, Haines81, Hayhurst-Britten42, Patton31, Richards-Herford30, Schulten-Roorda84
Oryzaephilus mercator	oat	g	Archibald-Chalmers83, Haines81
Oryzaephilus mercator	oat, rolled	gp	Campbell89
Oryzaephilus mercator	oatmeal	gp	Calderon-Donahaye64
Oryzaephilus mercator	oilcake	osp	Aitken75
Oryzaephilus mercator	oilseed	os	Aitken75, Halstead93, Hill02, Imura03
Oryzaephilus mercator	orange	ffv	Archibald-Chalmers83
Oryzaephilus mercator	paddy	g	McFarlane63
Oryzaephilus mercator	palm fruit	v	Richards-Herford30
Oryzaephilus mercator	palm kernel	os	Allotey88, Cornes73, Cotterell52, Delobel-Tran93, Dudu et al98, Kiritani59
Oryzaephilus mercator	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	palm kernel oilcake	osp	Pierrard62, Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus mercator	peanut	os	Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Champ65, Cornes73, Cotterell52, Delobel-Tran93, Dudu et al98, Forsyth66, Haines81, Kiritani59, Lale et al96, Redlinger-Davis82, Richards-Herford30, Schulten-Roorda84, Singh90, Walker79, Wheeler21
Oryzaephilus mercator	peanut candy	oc	Olsen81
Oryzaephilus mercator	peanut meal	osp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	peanut product	osp	Zimmerman90
Oryzaephilus mercator	peanut, shelled	osp	Davies60
Oryzaephilus mercator	pecan	n	Gecan et al71
Oryzaephilus mercator	pecan meat	np	Gecan et al71
Oryzaephilus mercator	pepper, black	sea	White57
Oryzaephilus mercator	pepper, chilli	sea	Archibald-Chalmers83, Olsen81, Patton31, Richards-Herford30, Zimmerman87, 90
Oryzaephilus mercator	pimento	sea	McFarlane63
Oryzaephilus mercator	pine nut	v	Hayhurst-Britten42
Oryzaephilus mercator	prune	df	Archibald-Chalmers83
Oryzaephilus mercator	pulse	p	Archibald-Chalmers83, Schulten-Roorda84
Oryzaephilus mercator	raisin	df	Archibald-Chalmers83, Okumura-Strong65
Oryzaephilus mercator	rice	g	Archibald-Chalmers83, Campbell89, Davies60, Forsyth66, Haines74, 81; Olsen81, Rao et al73,Wohlgemuth-Reichmuth83
Oryzaephilus mercator	rice meal	gp	McFarlane63
Oryzaephilus mercator	rice, broken	gp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	rice, puffed	gp	Campbell89
Oryzaephilus mercator	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93, Forsyth66, Ratti-Rampini77
Oryzaephilus mercator	root, ginseng	r	Archibald-Chalmers83
Oryzaephilus mercator	safflower meal	osp	Sinha-Watters85, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	sago flour	v	Aitken75
Oryzaephilus mercator	seafood, dried	aninv	Archibald-Chalmers83
Oryzaephilus mercator	sesame seed	os	Archibald-Chalmers83, Cornes73, Davies60, Kiritani59
Oryzaephilus mercator	sesame seed oilcake	osp	Davies60, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	shallot, fried	v	Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus mercator	sheanut	n	Cornes73, Cotterell52, Davies60, Delobel-Tran93, Forsyth66
Oryzaephilus mercator	shrimp, dried	aninv	Cornes73
Oryzaephilus mercator	sorghum (broomcorn)	g	Cornes73, Forsyth66, Giles64, Pierrard62, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	soybean	p	Cornes73
Oryzaephilus mercator	soybean meal	pp	Wohlgemuth-Reichmuth83
Oryzaephilus mercator	spice	sea	Aitken75, Archibald-Chalmers83
Oryzaephilus mercator	sugar	v	McFarlane63
Oryzaephilus mercator	sultana, dried	df	Haines81, Richards-Herford30
Oryzaephilus mercator	sunflower seed	os	Delobel-Tran93, Haines81, Weidner73
Oryzaephilus mercator	tapioca	r	Delobel-Tran93
Oryzaephilus mercator	taro	r	Archibald-Chalmers83, Delobel-Tran93
Oryzaephilus mercator	tomato	ffv	Archibald-Chalmers83
Oryzaephilus mercator	turmeric	sea	Archibald-Chalmers83
Oryzaephilus mercator	vegetable material, dried	v	Archibald-Chalmers83
Oryzaephilus mercator	walnut	n	Archibald-Chalmers83, Calderon-Donahaye64, Davies60, Patton31, Wheeler21
Oryzaephilus mercator	watermelon seed	se	Zimmerman90
Oryzaephilus mercator	wheat	g	Cornes73, Haines81, Hayhurst-Britten42, Patton31, Wheeler21
Oryzaephilus mercator	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Wohlgemuth-Reichmuth83
Oryzaephilus mercator	wheat flour	gp	Buchelos-Athanassiou98, Campbell89, Delobel-Tran93, Hayhurst-Britten42, Pierrard62
Oryzaephilus mercator	wheat meal	gp	Hayhurst-Britten42
Oryzaephilus mercator	yam	r	Hayhurst-Britten42
Oryzaephilus mercator	yeast	v	Davies60
Oryzaephilus surinamensis	alfalfa seed (lucerne)	se	Strong-Okumura58
Oryzaephilus surinamensis	almond meat	np	Strong-Okumura58
Oryzaephilus surinamensis	animal feed	oc	Allotey et al97, Campbell89, Hayhurst-Britten42, Hedges-Lacey96, Sinha-Watters85, Stejskal06, Strong-Okumura58
Oryzaephilus surinamensis	annatto seed	se	Archibald-Chalmers83
Oryzaephilus surinamensis	apple, dried	df	Patton31
Oryzaephilus surinamensis	apricot, dried	df	Archibald-Chalmers83
Oryzaephilus surinamensis	baking soda	oc	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus surinamensis	bambara groundnut	p	Forsyth66
Oryzaephilus surinamensis	banana, dried	df	Delobel-Tran93, Patton31
Oryzaephilus surinamensis	bari (sundried pulse cake)	pp	Joshi-Srivastava64
Oryzaephilus surinamensis	barley	g	Archibald-Chalmers83, Athanassiou et al10, Awadallah et al82, Buchelos-Katopodis95, Campbell89, Hayhurst-Britten42, Imura03, Patton31, Sinha-Watters85, Wohlgemuth-Reichmuth83, Zimmerman90
Oryzaephilus surinamensis	barley meal	gp	Hayhurst-Britten42, Wheeler21
Oryzaephilus surinamensis	basketware, wicker	v	Archibald-Chalmers83
Oryzaephilus surinamensis	bean	p	Cornes73, Kiritani59, Zimmerman90
Oryzaephilus surinamensis	bean curd	pp	Olsen81, Zimmerman90
Oryzaephilus surinamensis	bean paste	pp	Zimmerman90
Oryzaephilus surinamensis	betel nut (areca nut)	n	Archibald-Chalmers83
Oryzaephilus surinamensis	bird feed	se	Sinha-Watters85
Oryzaephilus surinamensis	biscuit	bg	Archibald-Chalmers83, Patton31
Oryzaephilus surinamensis	bonbon	oc	Delobel-Tran93
Oryzaephilus surinamensis	bread	bg	Chittenden96, Wheeler21
Oryzaephilus surinamensis	calumba powder	v	Tawfik et al85
Oryzaephilus surinamensis	canary grass seed	se	Archibald-Chalmers83
Oryzaephilus surinamensis	candy	oc	Sinha-Watters85, Strong-Okumura58
Oryzaephilus surinamensis	caraway	sea	Tawfik et al85
Oryzaephilus surinamensis	carob (locust)	df	Aitken75, Calderon-Donahaye64, Delobel-Tran93, Halstead93
Oryzaephilus surinamensis	cashew	n	Archibald-Chalmers83, Nair et al79, Nayar et al76
Oryzaephilus surinamensis	cassava root chip	rp	Parker et al81, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	castor bean	se	Kiritani59
Oryzaephilus surinamensis	cereal (cereal product)	gp	Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Chittenden96, Delobel-Tran93, Haines81, Hedges-Lacey96, Hill02, McFarlane63, Patton31, Sinha-Watters85, Strong-Okumura58
Oryzaephilus surinamensis	cherry, dried	df	Patton31
Oryzaephilus surinamensis	chickpea (Bengal gram, garbanzo)	p	Strong-Okumura58
Oryzaephilus surinamensis	chocolate	bc	Campbell89, Forsyth66, Hedges-Lacey96, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus surinamensis	citrus pulp, dried	dfp	Laudani et al59
Oryzaephilus surinamensis	cocoa	bc	Archibald-Chalmers83, Hayhurst-Britten42, Patton31, Richards-Herford30
Oryzaephilus surinamensis	cocoa bean	bc	Aitken75
Oryzaephilus surinamensis	coconut cake	osp	Patton31
Oryzaephilus surinamensis	coffee bean	bc	Archibald-Chalmers83, Zimmerman90
Oryzaephilus surinamensis	copra	osp	Aitken75, Archibald-Chalmers83,Delobel-Tran93, Halstead93, Hill02, Kiritani59, Wheeler21
Oryzaephilus surinamensis	copra chip	osp	Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	copra meal	osp	Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	copra oilcake	osp	Patton31, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	coriander	sea	Tawfik et al85
Oryzaephilus surinamensis	cottonseed	os	Patton31
Oryzaephilus surinamensis	cottonseed oilcake	osp	Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	currant	df	Hayhurst-Britten42, Richards-Herford30
Oryzaephilus surinamensis	curry powder	sea	Archibald-Chalmers83
Oryzaephilus surinamensis	dallisgrass seed	se	Archibald-Chalmers83
Oryzaephilus surinamensis	date	df	Archibald-Chalmers83, Donahaye-Calderon64, Hayhurst-Britten42, Patton31, Richards-Herford30
Oryzaephilus surinamensis	dog food	oc	Imura03, Sinha-Watters85
Oryzaephilus surinamensis	dried fruit	df	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Campbell89, Delobel-Tran93, Halstead93, Hedges-Lacey96, Hill02, Imura03, Sinha-Watters85, Wheeler21, Zimmerman90
Oryzaephilus surinamensis	fig	ffv	Hayhurst-Britten42
Oryzaephilus surinamensis	fig, dried	df	Patton31, Zimmerman90
Oryzaephilus surinamensis	flax seed	os	Campbell89
Oryzaephilus surinamensis	flower, dried	v	Archibald-Chalmers83
Oryzaephilus surinamensis	fungus, dried	v	Olsen81
Oryzaephilus surinamensis	grain product	gp	Aitken75
Oryzaephilus surinamensis	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Calderon-Donahaye64, Yan et al10
Oryzaephilus surinamensis	hay	v	Buchelos-Athanassiou98, Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus surinamensis	hazel nut	n	Archibald-Chalmers83
Oryzaephilus surinamensis	hemp (marijuana)	v	Arnaud74
Oryzaephilus surinamensis	herb	v	Archibald-Chalmers83, Sinha-Watters85
Oryzaephilus surinamensis	jujube	df	Guilin et al99
Oryzaephilus surinamensis	kapok seed	se	Kiritani59
Oryzaephilus surinamensis	leaf, dried	v	Zimmerman90
Oryzaephilus surinamensis	lentil (masur)	p	Archibald-Chalmers83
Oryzaephilus surinamensis	linseed	os	Patton31
Oryzaephilus surinamensis	litchi nut (lychee)	n	Archibald-Chalmers83
Oryzaephilus surinamensis	macaroni paste	gp	Wheeler21
Oryzaephilus surinamensis	maize	g	Allotey et al97, Archibald-Chalmers83, Buchelos-Katopodis95, Caliboso et al86, Davies60, Forsyth66, Haines81, Hayhurst-Britten42, Imura03, Kiritani59, Olsen81, Patton31, Peng98, Sedlacek et al 98, Sinha-Watters85, Stejskal06, Strong-Okumura58, Tadesse96, Walker79, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	maize flour	gp	Delobel-Tran93, Walker79
Oryzaephilus surinamensis	maize germ meal	gp	Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	maize meal	gp	Davies60, Sinha-Watters85, Strong-Okumura58, Wheeler21
Oryzaephilus surinamensis	maize starch	gp	Sinha-Watters85, Strong-Okumura58
Oryzaephilus surinamensis	malt	gp	Pierrard62
Oryzaephilus surinamensis	mango, dried	df	Haines81
Oryzaephilus surinamensis	meat meal	anv	Awadallah et al90
Oryzaephilus surinamensis	meat, cured, dried or smoked	anv	Allotey et al97, Campbell89, Delobel-Tran93, Patton31, Sinha-Watters85, Wheeler21
Oryzaephilus surinamensis	medicine, belladonna	me	Tawfik et al85
Oryzaephilus surinamensis	medicine, Chinese traditional	me	Guilin et al99
Oryzaephilus surinamensis	medicine, drug	me	Hedges-Lacey96
Oryzaephilus surinamensis	medicine, herbal	me	Kamel58, Patton31, Wheeler21
Oryzaephilus surinamensis	medicine, passion flower	me	Weidner73
Oryzaephilus surinamensis	medicine, rhubarb root	me	Weidner73
Oryzaephilus surinamensis	melon	ffv	Archibald-Chalmers83
Oryzaephilus surinamensis	melon seed	se	Patton31
Oryzaephilus surinamensis	millet	g	Haines81

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus surinamensis	mollusca, dried	aninv	Archibald-Chalmers83
Oryzaephilus surinamensis	mung bean	p	Zimmerman90
Oryzaephilus surinamensis	noodle	gp	Campbell89, Hedges-Lacey96, Sinha-Watters85, Zimmerman90
Oryzaephilus surinamensis	nut	n	Aitken75, Allotey et al97, Archibald-Chalmers83, Chittenden96, Halstead93, Hill02, Imura03, Patton31, Sinha-Watters85, Wheeler21
Oryzaephilus surinamensis	nut meat	np	Campbell89, Sinha-Watters85
Oryzaephilus surinamensis	nutmeg (mace)	sea	Archibald-Chalmers83, Chittenden96, Hayhurst-Britten42, Patton31, Richards-Herford30
Oryzaephilus surinamensis	oat	g	Campbell89, Hedges-Lacey96, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	oatmeal	gp	Patton31
Oryzaephilus surinamensis	oilseed	os	Aitken75
Oryzaephilus surinamensis	olive, dried	df	Calderon-Donahaye64
Oryzaephilus surinamensis	onion, dried	v	Ibrahim et al70
Oryzaephilus surinamensis	orange	ffv	Archibald-Chalmers83
Oryzaephilus surinamensis	orchard grass seed	se	Archibald-Chalmers83
Oryzaephilus surinamensis	paddy	g	Caliboso et al86, Haines81, McFarlane63, Mookherjee et al68, Nayar et al76, Pires et al07
Oryzaephilus surinamensis	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	paste	oc	Campbell89
Oryzaephilus surinamensis	pastry	bg	Zimmerman90
Oryzaephilus surinamensis	pea	p	Hayhurst-Britten42, Sinha-Watters85, Strong-Okumura58
Oryzaephilus surinamensis	peach	ffv	Archibald-Chalmers83
Oryzaephilus surinamensis	peanut	os	Archibald-Chalmers83, Arthur56, Bissell-DuPree46, Calderon-Donahaye64, Champ65, Delobel-Tran93, Haines81, Kiritani59, LaHue et al59, Nayar et al76, Patton31, Redlinger-Davis82, Singh90, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	peanut flake	osp	Hayhurst-Britten42
Oryzaephilus surinamensis	peanut meal	osp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus surinamensis	pear, dried	df	Patton31, Richards-Herford30
Oryzaephilus surinamensis	pecan	n	Archibald-Chalmers83, Gecan et al71
Oryzaephilus surinamensis	pecan meat	np	Gecan et al71, Strong-Okumura58
Oryzaephilus surinamensis	pepper, black	sea	White57
Oryzaephilus surinamensis	pepper, chilli	sea	Olsen81, Zimmerman90
Oryzaephilus surinamensis	pepper, pod dried chilli	sea	Zimmerman87
Oryzaephilus surinamensis	pepper, red	sea	Chittenden96
Oryzaephilus surinamensis	phane (edible caterpillar)	aninv	Rajendran-Parveen05
Oryzaephilus surinamensis	pimento	sea	McFarlane63
Oryzaephilus surinamensis	pistachio	n	Weidner73
Oryzaephilus surinamensis	prune	df	Archibald-Chalmers83, Patton31
Oryzaephilus surinamensis	raisin	df	Archibald-Chalmers83, Delobel-Tran93, Donohoe39, Hayhurst-Britten42, Patton31, Richards-Herford29, Strong-Okumura58
Oryzaephilus surinamensis	residue	res	Haines81
Oryzaephilus surinamensis	rice	g	Archibald-Chalmers83, Cornes73, Cotterell52, Douglas41, Forsyth66, Haines74, 81; Kim et al88, Kiritani59Imura03, Nayar et al76, Patton31, Pires et al07, Rao et al73, Sinha-Watters85, Stejskal-Kucerova93, Strong-Okumura58, Sukprakarn86, Wohlgemuth-Reichmuth83 , Yao-Lo62, Zimmerman90
Oryzaephilus surinamensis	rice bran	gp	Caliboso et al86
Oryzaephilus surinamensis	rice flour	gp	Kiritani59, Olsen81
Oryzaephilus surinamensis	rice meal	gp	Caliboso et al86, Hayhurst-Britten42, McFarlane63, Wheeler21
Oryzaephilus surinamensis	root, dried cassava (manioc)	r	Delobel92, Ratti-Rampini77
Oryzaephilus surinamensis	root, ginger	r	McFarlane63
Oryzaephilus surinamensis	rye	g	Sinha-Watters85, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	safflower	os	Strong-Okumura58
Oryzaephilus surinamensis	seafood, dried	aninv	Archibald-Chalmers83
Oryzaephilus surinamensis	seed	se	Archibald-Chalmers83, Chittenden96, Sinha-Watters85
Oryzaephilus surinamensis	sesame seed	os	Nayar et al76
Oryzaephilus surinamensis	sheanut	n	Davies60
Oryzaephilus surinamensis	snuff	v	Chittenden96, Wheeler21

(*continued on next page*)

TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus surinamensis	sorghum (broomcorn)	g	Archibald-Chalmers83, Caliboso et al86, Davies60, Forsyth66, Haines74, 81; Imura03, Mookherjee et al68, Peng98, Pierrard62, Sinha-Watters85, Strong-Okumura58, Walker79, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	soup mix, dried	oc	Olsen81, Zimmerman90
Oryzaephilus surinamensis	soybean	p	Caliboso et al86
Oryzaephilus surinamensis	soybean meal	pp	Caliboso et al86, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	spice	sea	Campbell89, Delobel-Tran93, Hill02, Imura03, Sinha-Watters85
Oryzaephilus surinamensis	starch	v	Patton31, Wheeler21
Oryzaephilus surinamensis	straw	v	Hayhurst-Britten42
Oryzaephilus surinamensis	sugar	v	Hayhurst-Britten42, Hedges-Lacey96, Patton31, Sinha-Watters85, Wheeler21
Oryzaephilus surinamensis	sultana, dried	df	Hayhurst-Britten42, Patton31, Richards-Herford30
Oryzaephilus surinamensis	sunflower seed	os	Athanassov74, Campbell89, Haines81
Oryzaephilus surinamensis	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	sweet potato, dried	r	Zimmerman90
Oryzaephilus surinamensis	tamarind	v	Olsen81
Oryzaephilus surinamensis	tamarind product	v	Zimmerman90
Oryzaephilus surinamensis	tea leaf	bc	Sinha-Watters85
Oryzaephilus surinamensis	tobacco leaf	v	Delobel-Tran93, Hedges-Lacey96, Livingstone-Reed36, Patton31, Sinha-Watters85, Wheeler21
Oryzaephilus surinamensis	tomato, dried	v	Zimmerman90
Oryzaephilus surinamensis	vegetable, preserved	v	Zimmerman90
Oryzaephilus surinamensis	vetch seed	se	Strong-Okumura58
Oryzaephilus surinamensis	walnut	n	Archibald-Chalmers83, Delobel-Tran93, Patton31
Oryzaephilus surinamensis	water chestnut powder	v	Zimmerman90
Oryzaephilus surinamensis	wheat	g	Archibald-Chalmers83, Athanassiou et al01, 03, 05, 06; Campbell89, Hayhurst-Britten42, Haines74, 81; Imura03, Mookherjee et al68, Patton31, Sinha-Watters85, Strong-Okumura58, Trematerra-Gentile06, Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Oryzaephilus surinamensis	wheat bran (pollard)	gp	Archibald-Chalmers83, Buchelos-Athanassiou98, Delobel-Tran93, Hayhurst-Britten42, Patton31, Pierrard62,Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83
Oryzaephilus surinamensis	wheat chaff	gp	Archibald-Chalmers83, Patton31
Oryzaephilus surinamensis	wheat flour	gp	Campbell89, Sinha-Watters85, Strong-Okumura58, Wheeler21
Oryzaephilus surinamensis	wheat meal	gp	Campbell89
Oryzaephilus surinamensis	yam	r	Patton31
Oryzaephilus surinamensis	yeast	v	Chittenden96, Delobel-Tran93, Sinha-Watters85
Pagiocerus frontalis	avocado seed	se	Hill02, Yust57
Pagiocerus frontalis	coffee bean	bc	Yust57
Pagiocerus frontalis	maize	g	Cotton-Good37, Delobel-Tran93, Haines81, Hill02
Palorus depressus	root, dried cassava (manioc)	r	Delobel92
Palorus subdepressus	animal feed	oc	Campbell89, Cotton-Good37, Gorham91, Strong-Okumura58
Palorus subdepressus	barley	g	Attia-Kamel66, Buchelos-Katopodis95, Patton31
Palorus subdepressus	bean	p	Gorham91
Palorus subdepressus	bean sauce, yellow	oc	Zimmerman90
Palorus subdepressus	betel nut (areca nut)	n	Delobel-Tran93, Gorham91, Patton31
Palorus subdepressus	bread	bg	Patton31
Palorus subdepressus	carob (locust)	df	Aitken75
Palorus subdepressus	cashew	n	Davies60, Delobel-Tran93, Nair et al79, Pinheiro68
Palorus subdepressus	cassava root chip	rp	Parker et al81
Palorus subdepressus	cassava root meal	rp	Pierrard62
Palorus subdepressus	cereal (cereal product)	gp	Hill02
Palorus subdepressus	cocoa	bc	Gorham91, Halstead67, Richards-Herford30
Palorus subdepressus	coffee bean	bc	Delobel-Tran93
Palorus subdepressus	copra	osp	Delobel-Tran93, Gorham91, Halstead67
Palorus subdepressus	copra meal	osp	Wohlgemuth-Reichmuth83
Palorus subdepressus	cowpea	p	Cornes73
Palorus subdepressus	flax seed	os	Gorham91, Strong-Okumura58
Palorus subdepressus	ginger	sea	Delobel-Tran93, Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Palorus subdepressus	grain product	gp	Aitken75, Cotton-Good37
Palorus subdepressus	grain, cereal	g	Buchelos-Athanassiou98, Campbell89, Cotton-Good37, Gorham91, Halstead67, Imura03, Strong-Okumura58, Yan et al10
Palorus subdepressus	hay	v	Buchelos-Athanassiou98
Palorus subdepressus	illipenut	os	Aitken75, Delobel-Tran93, Gorham91, Halstead67
Palorus subdepressus	lentil (masur)	p	Haines81, Patton31
Palorus subdepressus	maize	g	Attia-Kamel66, Buchelos-Katopodis95, Caliboso et al86, Cornes73, Delobel-Tran93, Forsyth66, Gorham91,Haines81, Halstead67, Patton31, Tadesse96, Walker79
Palorus subdepressus	maize meal	gp	Davies60
Palorus subdepressus	medicine residue, Chinese traditional	res	Guilin et al99
Palorus subdepressus	millet	g	Cornes73, Delobel-Tran93, Forsyth66
Palorus subdepressus	nut	n	Hill02
Palorus subdepressus	paddy	g	Caliboso et al86
Palorus subdepressus	palm kernel	os	Allotey88, Delobel-Tran93
Palorus subdepressus	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Palorus subdepressus	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Palorus subdepressus	peanut	os	Delobel-Tran93, Gorham91, Halstead67, Richards-Herford30
Palorus subdepressus	pepper and ginger spillage	res	Halstead67, Hill02
Palorus subdepressus	rice	g	Attia-Kamel66, Delobel-Tran93, Gorham91, Haines81, Halstead67, Patton31, Pierrard62
Palorus subdepressus	rice bran	gp	Caliboso et al86, Haines81
Palorus subdepressus	rice meal	gp	Caliboso et al86
Palorus subdepressus	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93, Wohlgemuth-Reichmuth83
Palorus subdepressus	sago	v	Aitken75
Palorus subdepressus	sago flour	v	Aitken75, Gorham91, Halstead67
Palorus subdepressus	sesame seed	os	Delobel-Tran93, Zimmerman90
Palorus subdepressus	sorghum (broomcorn)	g	Caliboso et al86, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Giles64, Gorham91, Haines81, Halstead67
Palorus subdepressus	spice	sea	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Palorus subdepressus	wheat	g	Attia-Kamel66, Gorham91, Halstead67, Patton31
Palorus subdepressus	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Gorham91, Haines81, Halstead67
Palorus subdepressus	wheat flour	gp	Attia-Kamel66, Buchelos-Athanassiou98, Cotton-Good37Delobel-Tran93, Haines81, Hill02, Imura03, Patton31
Palorus subdepressus	yam	r	Delobel-Tran93, Sauphanor et al87
Pharaxonotha kirschii	animal feed	oc	Strong-Okumura58
Pharaxonotha kirschii	bean	p	Hinton45
Pharaxonotha kirschii	bread	bg	Delobel-Tran93
Pharaxonotha kirschii	bread stick	bg	Zimmerman90
Pharaxonotha kirschii	grain product	gp	Strong-Okumura58
Pharaxonotha kirschii	maize	g	Aitken75, Caliboso et al86, Cotton-Good37, Delobel-Tran93, Hinton45, Strong-Okumura58
Pharaxonotha kirschii	maize meal	gp	Cotton-Good37, Delobel-Tran93, Hinton45
Pharaxonotha kirschii	maize residue	res	Aitken75
Pharaxonotha kirschii	pepper, dried	sea	Delobel-Tran93
Pharaxonotha kirschii	pepper, pod dried chilli	sea	Zimmerman90
Pharaxonotha kirschii	root (tuber)	r	Cotton-Good37, Hinton45
Pharaxonotha kirschii	root, dried cassava (manioc)	r	Delobel-Tran93
Pharaxonotha kirschii	shallot, fried	v	Zimmerman90
Pharaxonotha kirschii	wheat	g	Hinton45
Phradonoma nobile	bone	anv	Aitken75
Phradonoma nobile	coffee bean	bc	Aitken75
Phradonoma nobile	cottonseed	os	Aitken75
Phradonoma nobile	cottonseed oilcake	osp	Aitken75
Phradonoma nobile	date	df	Aitken75
Phradonoma nobile	maize gluten	gp	Aitken75
Phradonoma nobile	medicine, senna leaf	me	Aitken75
Phradonoma nobile	oilcake	osp	Aitken75
Phradonoma nobile	peanut	os	Aitken75
Phradonoma nobile	raisin	df	Aitken75
Phradonoma nobile	rapeseed meal	osp	Aitken75
Phradonoma nobile	rice bran	gp	Aitken75
Phradonoma nobile	sorghum (broomcorn)	g	Delobel-Tran93, Giles64
Phradonoma tricolor	peanut	os	Cornes73, Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Phthorimaea operculella	pimento	sea	Carter84
Phthorimaea operculella	potato	r	Carter84, Nayar et al76, Strong-Okumura58
Phthorimaea operculella	tobacco leaf	v	Carter84, Nayar et al76
Phthorimaea operculella	tomato	ffv	Carter84, Nayar et al76
Phthorimaea operculella	wild brinjal (eggplant)	ffv	Nayar et al76
Pimelia grandis	tobacco leaf	v	Cornes73
Plochionus pallens	carob (locust)	df	Aitken75
Plochionus pallens	cocoa bean	bc	Hinton45
Plochionus pallens	copra	osp	Aitken75, Hinton45
Plochionus pallens	garlic	sea	Hinton45
Plochionus pallens	illipenut	os	Aitken75
Plochionus pallens	nutmeg (mace)	sea	Hinton45, Richards-Herford30
Plochionus pallens	oilcake	osp	Aitken75
Plochionus pallens	palm kernel	os	Aitken75
Plochionus pallens	peanut	os	Aitken75, Hinton45
Plochionus pallens	peanut residue	res	Aitken75
Plochionus pallens	raisin	df	Donohoe39, Hinton45
Plochionus pallens	rice	g	Aitken75, Hinton45
Plochionus pallens	rice bran	gp	Aitken75
Plodia interpunctella	acorn	n	Chittenden96, Hamlin et al31, Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	alfalfa hay	v	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	algarroba pod	p	Bridwell20, Hayhurst-Britten42, Patton31
Plodia interpunctella	almond	n	Carter84, Chittenden96, Hayhurst-Britten42, Patton31, Richards-Herford30, Richards-Thomson32, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	almond hull	np	Strong-Okumura58
Plodia interpunctella	almond hull meal	np	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	animal feed	oc	Haines81, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	animal product	anv	Corbet-Tams43
Plodia interpunctella	apple skin, dried	dfp	Hayhurst-Britten42
Plodia interpunctella	apple, dried	df	Chittenden96, Richards-Thomson32, Sinha-Watters85
Plodia interpunctella	apricot kernel	se	Carter84

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Plodia interpunctella	apricot, dried	df	Chittenden96, Hayhurst-Britten42, Richards-Herford30, Richards-Thomson32
Plodia interpunctella	banana, dried	df	Hayhurst-Britten42, Howe-Freeman55, Richards-Thomson32, Wise55
Plodia interpunctella	barley	g	Athanassiou et al10, Carter84, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	barley, rolled	gp	Strong-Okumura58
Plodia interpunctella	bean	p	Chittenden96, Richards-Thomson32, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	beebread	aninv	Hamlin et al31
Plodia interpunctella	beehive	aninv	Chittenden96, Corbet-Tams43, Hayhurst-Britten42, Richards-Thomson32, Strong-Okumura58
Plodia interpunctella	beet pulp, sugar	rp	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	beet, sliced	rp	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	bilberry, dried	df	Hayhurst-Britten42, Richards-Herford30, Richards-Thomson32
Plodia interpunctella	biscuit	bg	Hayhurst-Britten42, Richards-Thomson32, Sinha-Watters85
Plodia interpunctella	bone	anv	Howe-Freeman55
Plodia interpunctella	book	oc	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	bread	bg	Hayhurst-Britten42, Richards-Thomson32, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	buckwheat	g	Carter84
Plodia interpunctella	bulb, iris	r	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	cactus, dried	v	Richards-Thomson32
Plodia interpunctella	cake	bg	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	canary grass seed	se	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	candied fruit	oc	Richards-Thomson32
Plodia interpunctella	candy	oc	Cotton-Good37, Strong-Okumura58
Plodia interpunctella	cantaloupe seed (casaba)	se	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	caraway seed	se	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	carob (locust)	df	Aitken84, Attia-Kamel66, Carter84, Hayhurst-Britten42, Hill02, Richards-Thomson32
Plodia interpunctella	carob meal	dfp	Aitken84
Plodia interpunctella	cashew	n	Nair et al79, Nayar et al76, Pinheiro68
Plodia interpunctella	castor bean	se	Howe-Freeman55

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Plodia interpunctella	cereal (cereal product)	gp	Calderon-Donahaye64, Corbet-Tams43, Cotton-Good37, Hill02, McFarlane63, Richards-Thomson32, Sinha-Watters85
Plodia interpunctella	cherry, dried	df	Chittenden96, Hayhurst-Britten42
Plodia interpunctella	chestnut	n	Hayhurst-Britten42, Richards-Herford30, Richards-Thomson32, Solis99
Plodia interpunctella	chickasaw plum	ffv	Richards-Thomson32
Plodia interpunctella	chickpea (Bengal gram, garbanzo)	p	Chittenden96, Richards-Thomson32, Solis99
Plodia interpunctella	chicory	sea	Sinha-Watters85, Wise61
Plodia interpunctella	chocolate	bc	Calderon-Donahaye64, Carter84, Hamlin et al31, Hill02, Roesler73, Sinha-Watters85, Wise55
Plodia interpunctella	chocolate covered almond	oc	Patton31, Richards-Thomson32
Plodia interpunctella	chocolate covered candy	oc	Richards-Thomson32
Plodia interpunctella	cinnamon bark	sea	Chittenden96, Hamlin et al31, Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	citrus pulp, dried	dfp	Hill02, Laudani et al59
Plodia interpunctella	clover seed	se	Chittenden96, Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	cocoa	bc	Calderon-Donahaye64, Patton31, Richards-Thomson32,Roesler73
Plodia interpunctella	cocoa bean	bc	Aitken94, Chittenden96, Cornes73, Cotterell52, Hamlin et al31, Howe-Freeman55, McFarlane63
Plodia interpunctella	coffee bean	bc	Howe-Freeman55, Imura03
Plodia interpunctella	copra	osp	Howe-Freeman55, McFarlane63, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	cottonseed	os	Howe-Freeman55, Strong-Okumura58
Plodia interpunctella	cottonseed meal cake	osp	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	cottonseed oilcake	osp	Wohlgemuth-Reichmuth83
Plodia interpunctella	cowpea	p	Carter84, Cornes73
Plodia interpunctella	cucumber seed	se	Okumura-Strong65
Plodia interpunctella	currant	df	Carter84, Chittenden96, Hayhurst-Britten42,Okumura-Strong65, Richards-Herford30, ichards-Thomson32
Plodia interpunctella	date	df	Calderon-Donahaye64, Donahaye-Calderon64, Hayhurst-Britten42, Okumura-Strong65, Patton31, Richards-Thomson32

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Plodia interpunctella	dried fruit	df	Aitken84, Corbet-Tams43, Cotton-Good37, Hamlin et al31, Hill02, Imura03, Richards-Thomson32, Roesler73, Schmidt-Grabner87, Sinha-Watters85, Wise55
Plodia interpunctella	fig	ffv	Hayhurst-Britten42, Nayar et al76, Patton31, Richards-Herford30, Solis99
Plodia interpunctella	fig, dried	df	Okumura-Strong65
Plodia interpunctella	fur	anv	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	garlic	sea	Hayhurst-Britten42, Richards-Thomson32, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	garlic head	v	Chittenden96, Hamlin et al31
Plodia interpunctella	ginger	sea	Carter84, Howe-Freeman55
Plodia interpunctella	graham cracker	bg	Hamlin et al31
Plodia interpunctella	grain product	gp	Aitken84, Hamlin et al31, Roesler73
Plodia interpunctella	grain, cereal	g	Aitken84, Calderon-Donahaye64, Cotton-Good37, Hamlin et al31, Imura03, Patton31, Richards-Herford30, Solis99, Yan et al10
Plodia interpunctella	hazel nut	n	Carter84, Sinha-Watters85
Plodia interpunctella	hemp (marijuana)	v	Arnaud74
Plodia interpunctella	hemp seed	se	Casteels et al96
Plodia interpunctella	herb	v	Hill02, Roesler73, Sinha-Watters85
Plodia interpunctella	herbarium specimen	v	Chittenden96, Hamlin et al31, Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	honeycomb (bee, wasp)	aninv	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	insect, dried	aninv	Chittenden96, Hamlin et al31, Hayhurst-Britten42, Hill02, Richards-Thomson32, Roesler73, Sinha-Watters85
Plodia interpunctella	jelly	oc	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	jujube	df	Guilin et al99, Solis99
Plodia interpunctella	lentil	p	Carter84
Plodia interpunctella	lettuce	ffv	Richards-Thomson32
Plodia interpunctella	lettuce seed	se	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	loganberry, dried	df	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	lozenge	oc	Richards-Thomson32
Plodia interpunctella	lupine	v	Hayhurst-Britten42, Richards-Thomson32

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Plodia interpunctella	maize	g	Attia-Kamel66, Caliboso et al86, Carter84, Cornes73, Cotterell52, Haines81, Hayhurst-Britten42, McFarlane63, Nayar et al76, Olsen81, Peng98, Richards-Thomson32, Sedlacek et al98, Sinha-Watters85, Strong-Okumura58, Tadesse96, Walker79, Wohlgemuth-Reichmuth83
Plodia interpunctella	maize germ meal	gp	Sinha-Watters85
Plodia interpunctella	maize meal	gp	Hayhurst-Britten42, Richards-Thomson32, Strong-Okumura58
Plodia interpunctella	malt	gp	Guilin et al99, Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	marzipan	v	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	meat, cured, dried or smoked	anv	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	medicine, apple peel tea	me	Weidner73
Plodia interpunctella	medicine, buckthron berry	me	Weidner73
Plodia interpunctella	medicine, Chinese traditional	me	Guilin et al99
Plodia interpunctella	medicine, dandelion root	me	Chittenden96, Hamlin et al31, Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	medicine, drug	me	Richards-Thomson32, Sinha-Watters85
Plodia interpunctella	medicine, juniper berry	me	Weidner73
Plodia interpunctella	medicine, orange peel	me	Weidner73
Plodia interpunctella	medicine, peppermint leaf	me	Weidner73
Plodia interpunctella	medicine, scotch broom flower	me	Weidner73
Plodia interpunctella	milk, dried	anv	Hamlin et al31, Sinha-Watters85
Plodia interpunctella	millet	g	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	mung bean	p	Caliboso et al86
Plodia interpunctella	mushroom, dried	v	Okumura-Strong65
Plodia interpunctella	mustard seed	se	Carter84
Plodia interpunctella	nectarine, dried	df	Patton31
Plodia interpunctella	noodle	gp	Carter84, Hayhurst-Britten42, Richards-Thomson32, Wise55
Plodia interpunctella	nougat	oc	Hayhurst-Britten42, Richards-Herford30, Richards-Thomson32
Plodia interpunctella	nut	n	Aitken84, Corbet-Tams43, Hamlin et al31, Hill02, Imura03, Patton31, Richards-Thomson32, Roesler73, Sinha-Watters85, Wise55
Plodia interpunctella	nut bar	np	Sinha-Watters85

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Plodia interpunctella	nut meat	np	Cotton-Good37
Plodia interpunctella	nutmeg (mace)	sea	Carter84
Plodia interpunctella	oat	g	Carter84, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	oat, rolled	gp	Sinha-Watters85
Plodia interpunctella	oilcake	osp	Aitken84
Plodia interpunctella	oilseed	os	Aitken84, Schulten-Roorda84
Plodia interpunctella	oilseed meal	osp	McFarlane63
Plodia interpunctella	oilseed product	osp	Hill02
Plodia interpunctella	onion, dried	v	Calderon-Donahaye64
Plodia interpunctella	paddy	g	Caliboso et al86, Pires et al07
Plodia interpunctella	palm kernel	os	Cornes73, Hayhurst-Britten42, Howe-Freeman55, Richards-Herford30, Richards-Thomson32
Plodia interpunctella	pea	p	Carter84, Hayhurst-Britten42, Richards-Thomson32, Sinha-Watters85, Strong-Okumura58, Wise55
Plodia interpunctella	peach, dried	df	Chittenden96, Hayhurst-Britten42, Patton31, Richards-Thomson32
Plodia interpunctella	peanut	os	Arthur56, Bissell-DuPree46, Calderon-Donahaye64, Champ65, Chittenden96, Cornes73, Cotterell52, Hayhurst-Britten42, Howe-Freeman55, LaHue et al59, Patton31, Redlinger-Davis82, Richards-Herford30, Richards-Thomson32, Schulten-Roorda84, Singh90, Sinha-Watters85, Strong-Okumura58, Wise55, 61; Wohlgemuth-Reichmuth83
Plodia interpunctella	peanut, shelled	osp	Wohlgemuth-Reichmuth83
Plodia interpunctella	pear, dried	df	Richards-Herford30, Richards-Thomson32
Plodia interpunctella	pecan	n	Chittenden96, Hayhurst-Britten42, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	pecan meat	np	Gecan et al71
Plodia interpunctella	pepper seed	se	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	pepper, bell or green	ffv	Solis99
Plodia interpunctella	pepper, cayenne	sea	Okumura-Strong65
Plodia interpunctella	pepper, chilli	sea	Hayhurst-Britten42, Howe-Freeman55, Richards-Herford30, Richards-Thomson32, Sinha-Watters85, Solis99

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Plodia interpunctella	pepper, ground chilli	sea	Strong-Okumura58
Plodia interpunctella	pepper, paprika	sea	Weidner73
Plodia interpunctella	pineapple	ffv	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	pistachio	n	Weidner73
Plodia interpunctella	plum	ffv	Richards-Thomson32
Plodia interpunctella	pollen	v	Sinha-Watters85
Plodia interpunctella	popcorn	g	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	poppy seed	se	Weidner73
Plodia interpunctella	prune	df	Chittenden96, Hayhurst-Britten42, Patton31, Richards-Herford30, Richards-Thomson32, Sinha-Watters85
Plodia interpunctella	pulse	p	Aitken94, Imura03, Schulten-Roorda84, Hill02, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	pulse product	pp	Aitken84, Sinha-Watters85
Plodia interpunctella	pumpkin seed	se	Sinha-Watters85, Strong-Okumura58, Weidner73
Plodia interpunctella	raisin	df	Carter84, Chittenden96, Hayhurst-Britten42, Patton31, Richards-Herford30, Richards-Thomson32, Roesler73,Sinha-Watters85, Solis99, Strong-Okumura58
Plodia interpunctella	rice	g	Carter84, Douglas41, Hayhurst-Britten42, Kim et al88, Patton31, Richards-Thomson32, Sinha-Watters85, Solis99, Strong-Okumura58, Walker79
Plodia interpunctella	rice bran	gp	Caliboso et al86
Plodia interpunctella	rice hull	gp	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	rice meal	gp	Caliboso et al86, McFarlane63
Plodia interpunctella	root, dried (tuber)	r	Hill02, Roesler73
Plodia interpunctella	rye	g	Carter84, Hayhurst-Britten42, Richards-Thomson32, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	safflower	os	Casteels et al96, Strong-Okumura58
Plodia interpunctella	seed	se	Corbet-Tams43, Hamlin et al31, Hill02, Patton31, Roesler73
Plodia interpunctella	sesame seed	os	Cornes73, Howe-Freeman55
Plodia interpunctella	sheanut	n	Howe-Freeman55

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Plodia interpunctella	sorghum (broomcorn)	g	Caliboso et al86, Carter84, Cornes73, Giles64, Okumura-Strong65, Peng98, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	soybean	p	Caliboso et al86, Howe-Freeman55, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	soybean flour	pp	Singh90
Plodia interpunctella	soybean meal	pp	Caliboso et al86
Plodia interpunctella	spice	sea	Aitken84, Hamlin et al31, Sinha-Watters85
Plodia interpunctella	spruce seed	se	Hayhurst-Britten42, Richards-Thomson32
Plodia interpunctella	squash seed	se	Okumura-Strong65
Plodia interpunctella	Sudan grass seed	se	Okumura-Strong65
Plodia interpunctella	sultana, dried	df	Carter84, Hayhurst-Britten42, Patton31, Richards-Herford30
Plodia interpunctella	sunflower seed	os	Sinha-Watters85, Strong-Okumura58, Weidner73
Plodia interpunctella	tamarind	v	Olsen81
Plodia interpunctella	tea leaf	bc	Solis99
Plodia interpunctella	tree seed	se	Hayhurst-Britten42, Richards-Herford30
Plodia interpunctella	vegetable material, dried	v	Corbet-Tams43, Hamlin et al31, Roesler73
Plodia interpunctella	vetch seed	se	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	walnut	n	Carter84, Calderon-Donahaye64, Chittenden96, Hayhurst-Britten42, Patton31, Richards-Thomson32, Roesler73, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	watermelon seed	se	Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	wheat	g	Athanassiou et al01, 03, 05, 06; Attia-Kamel66, Carter84, Haines81, Hayhurst-Britten42, Richards-Thomson32, Sinha-Watters85, Strong-Okumura58, Trematerra-Gentile06
Plodia interpunctella	wheat bran (pollard)	gp	Hayhurst-Britten42, Wohlgemuth-Reichmuth83
Plodia interpunctella	wheat flour	gp	Hayhurst-Britten42, Hill02, Patton31, Richards-Thomson32
Plodia interpunctella	wheat germ	gp	Carter84, Sinha-Watters85, Strong-Okumura58
Plodia interpunctella	yeast	v	Hamlin et al31, Hayhurst-Britten42, Richards-Thomson32
Prostephanus truncatus	cassava root chip	rp	Delobel-Tran93, Gnonlonfin et al 08

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Prostephanus truncatus	flower, lily dried	v	Zimmerman90
Prostephanus truncatus	maize	g	Calderon-Donahaye64, Cotton-Good37, Delobel-Tran93, Haines74, 81; Hedges-Lacey96, Hill02, USDA36-61
Prostephanus truncatus	root (tuber)	r	Cotton-Good37
Prostephanus truncatus	root, dried cassava (manioc)	r	Delobel92, Hedges-Lacey96, Hill02
Prostephanus truncatus	root, sarsaparilla	r	Delobel-Tran93
Prostephanus truncatus	wheat	g	Delobel-Tran93
Prostephanus truncatus	wood mask	w	Okumura-Strong65
Prostephanus truncatus	yam chip	rp	Gnonlonfin et al 08
Pseudeurostus hilleri	animal feed	oc	Gorham91
Pseudeurostus hilleri	cereal (cereal product)	gp	Haines81
Pseudeurostus hilleri	food, decaying	sp	Imura03
Pseudeurostus hilleri	grain, cereal	g	Imura03, Yan et al10
Pseudeurostus hilleri	maize	g	Sedlacek et al98
Pseudeurostus hilleri	oatmeal	gp	Gorham91
Pseudeurostus hilleri	sorghum (broomcorn)	g	Haines81
Pseudeurostus hilleri	tobacco leaf	v	Imura03
Pseudeurostus hilleri	wheat flour	gp	Gorham91
Pseudeurostus hilleri	yeast	v	Gorham91
Ptinus fur	animal product	anv	Cotton-Good37
Ptinus fur	animal specimen	anv	Campbell89, Chittenden96, Gorham91, Patton31
Ptinus fur	animal specimen, bird skin	anv	Hedges-Lacey96
Ptinus fur	barley	g	Hayhurst-Britten42
Ptinus fur	barley meal	gp	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus fur	book	oc	Gorham91
Ptinus fur	bread, rye	bg	Gorham91, Hinton41
Ptinus fur	cereal (cereal product)	gp	Gorham91, Hedges-Lacey96, Hinton41
Ptinus fur	cloth	t	Chittenden96, Patton31
Ptinus fur	cocoa	bc	Gorham91, Hayhurst-Britten42, Hinton41, Patton31, Richards-Herford30
Ptinus fur	cottonseed	os	Chittenden96, Gorham91
Ptinus fur	cracker	bg	Patton31
Ptinus fur	date	df	Gorham91, Hayhurst-Britten42, Hedges-Lacey96, Hinton41, Richards-Herford30
Ptinus fur	dried fruit	df	Schmidt-Grabner87,

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ptinus fur	feather	anv	Gorham91, Hedges-Lacey96, Hinton41
Ptinus fur	fruit	ffv	Gorham91
Ptinus fur	fur	anv	Chittenden96, Gorham91
Ptinus fur	ginger	sea	Gorham91, Hedges-Lacey96, Hayhurst-Britten42, Hinton41, Patton31
Ptinus fur	grain, cereal	g	Chittenden96, Cotton-Good37, Gorham91, Hinton41, Patton31
Ptinus fur	henbane seed	se	Gorham91, Hinton41, Richards-Herford30
Ptinus fur	herbarium specimen	v	Chittenden96, Gorham91, Hinton41, Patton31
Ptinus fur	hide, pelt or skin	anv	Gorham91, Hedges-Lacey96, Hinton41
Ptinus fur	hominy grit	gp	Aitken75
Ptinus fur	insect, dried	aninv	Chittenden96, Hedges-Lacey96, Hinton41, Patton31
Ptinus fur	leather	anv	Gorham91
Ptinus fur	maize	g	Papp-Okumura59, Strong-Okumura58
Ptinus fur	maize meal	gp	Aitken75, Campbell89
Ptinus fur	medicine, herbal	me	Patton31
Ptinus fur	medicine, senna leaf	me	Gorham91
Ptinus fur	medicine, senna root	me	Gorham91
Ptinus fur	oat	g	Hayhurst-Britten42
Ptinus fur	paper	wp	Gorham91
Ptinus fur	pepper	sea	Cotton-Good37
Ptinus fur	pepper, cayenne	sea	Patton31
Ptinus fur	pepper, paprika	sea	Gorham91, Hedges-Lacey96, Hinton41
Ptinus fur	pepper, red	sea	Gorham91
Ptinus fur	pollen	v	Gorham91
Ptinus fur	root, derris (rotenone)	r	Downes-Williams50
Ptinus fur	root, licorice	r	Gorham91
Ptinus fur	rye	g	Patton31
Ptinus fur	seed	se	Cotton-Good37, Hedges-Lacey96
Ptinus fur	spice	sea	Patton31
Ptinus fur	straw	v	Gorham91, Hayhurst-Britten42
Ptinus fur	tobacco leaf	v	Gorham91
Ptinus fur	tobacco seed	se	Gorham91
Ptinus fur	walnut	n	Aitken75
Ptinus fur	wheat bran (pollard)	gp	Campbell89, Patton31
Ptinus fur	wheat flour	gp	Aitken75, Campbell89, Cotton-Good37, Hedges-Lacey96, Hinton41, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ptinus fur	wood	w	Hayhurst-Britten42
Ptinus fur	yeast	v	Gorham91
Ptinus japonicus	Amorphophallus koniac flour	v	Hinton41
Ptinus japonicus	food, decaying	sp	Imura03
Ptinus japonicus	grain, cereal	g	Yan et al10
Ptinus japonicus	maize screening	gp	Aitken75
Ptinus japonicus	medicine, herbal	me	Imura03
Ptinus japonicus	pulse	p	Imura03
Ptinus japonicus	soybean	p	Aitken75
Ptinus japonicus	sunflower seed	os	Aitken75
Ptinus latro	alfalfa seed (lucerne)	se	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	almond	n	Aitken75
Ptinus latro	animal feed	oc	Archibald-Chalmers83, Gorham91, Hedges-Lacey96, Papp-Okumura59, Strong-Okumura58, Wise61
Ptinus latro	barley	g	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	barley meal	gp	Papp-Okumura59, Strong-Okumura58
Ptinus latro	barley residue	res	Aitken75
Ptinus latro	bean	p	Gorham91, Hedges-Lacey96, Papp-Okumura59, Strong-Okumura58
Ptinus latro	book	oc	Campbell89, Delobel-Tran93, Gorham91, Hinton41, Papp62
Ptinus latro	carob residue	res	Aitken75
Ptinus latro	carpet	t	Archibald-Chalmers83
Ptinus latro	cloth	t	Archibald-Chalmers83, Wise56, 61
Ptinus latro	cocoa	bc	Campbell89, Cotton-Good37, Delobel-Tran93, Gorham91
Ptinus latro	cottonseed	os	Gorham91, Strong-Okumura58
Ptinus latro	cottonseed meal	osp	Gorham91, Strong-Okumura58
Ptinus latro	currant	df	Aitken75
Ptinus latro	dallisgrass seed	se	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	dried fruit	df	Campbell89, Delobel-Tran93, Gorham91, Hedges-Lacey96
Ptinus latro	feather	anv	Campbell89, Gorham91, Hedges-Lacey96, Hinton41, Papp62
Ptinus latro	food, decaying	sp	Imura03

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ptinus latro	grain, cereal	g	Archibald-Chalmers83, Cotton-Good37, Hedges-Lacey96, Hinton41, Papp62
Ptinus latro	herb	v	Delobel-Tran93
Ptinus latro	hide, pelt or skin	anv	Campbell89, Gorham91, Hedges-Lacey96, Hinton41, Papp62
Ptinus latro	insect, dried	aninv	Wise61
Ptinus latro	maize	g	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	maize meal	gp	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	medicine, herbal	me	Campbell89, Hinton41, Papp62
Ptinus latro	medicine, jaborandi leaf powder	me	Gorham91
Ptinus latro	medicine, senna leaf powder	me	Gorham91
Ptinus latro	milk, dried	anv	Archibald-Chalmers83, Wise56
Ptinus latro	mushroom, dried	v	Campbell89, Gorham91, Hedges-Lacey96, Hinton41, Papp62
Ptinus latro	oat	g	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	peanut	os	Aitken75
Ptinus latro	rice	g	Archibald-Chalmers83, Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	root, dried (tuber)	r	Campbell89, Hinton41, Papp62
Ptinus latro	root, dried cassava (manioc)	r	Ratti-Rampini77
Ptinus latro	root, musk	r	Gorham91
Ptinus latro	seed	se	Hedges-Lacey96, Papp62
Ptinus latro	sesame seed	os	Archibald-Chalmers83
Ptinus latro	sorghum (broomcorn)	g	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	soybean meal	pp	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	spice	sea	Delobel-Tran93
Ptinus latro	spinach seed	se	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	sugar	v	Campbell89, Cotton-Good37, Gorham91
Ptinus latro	sunflower seed	os	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	tobacco leaf	v	Hinton41
Ptinus latro	tobacco seed	se	Papp62

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ptinus latro	vetch seed	se	Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	wheat	g	Aitken75, Papp-Okumura59, Strong-Okumura58
Ptinus latro	wheat bran (pollard)	gp	Aitken75, Cotton-Good37, Hinton41
Ptinus latro	wheat flour	gp	Aitken75, Delobel-Tran93, Gorham91, Papp-Okumura59, Strong-Okumura58
Ptinus latro	wheat flour residue	res	Aitken75
Ptinus pusillus	grain residue	res	Cotton-Good37
Ptinus raptor	fish, dried	anv	Pierrard62
Ptinus raptor	grain, cereal	g	Cotton-Good37, Gorham91, Patton31
Ptinus raptor	oat	g	Aitken75
Ptinus raptor	paddy	g	Pires et al07
Ptinus raptor	pollen	v	Cotton-Good37, Gorham91, Hinton41, Papp62
Ptinus raptor	wheat	g	Aitken75
Ptinus raptor	wheat flour	gp	Aitken75, Campbell89, Gorham91
Ptinus raptor	wheat meal, spoiled	gs	Campbell89
Ptinus tectus	alfalfa hay	v	Gorham91, Strong-Okumura58
Ptinus tectus	almond	n	Gorham91, Hatch33, Hayhurst-Britten42, Hedges-Lacey96, Hinton41, Patton31, Richards-Herford30
Ptinus tectus	animal feed	oc	Archibald-Chalmers83, Campbell89, Gorham91, Hatch33,Hayhurst-Britten42, Papp62, Papp-Okumura59, Strong-Okumura58, Wise56
Ptinus tectus	animal product	anv	Aitken75, Cotton-Good37, Hill02
Ptinus tectus	animal specimen	anv	Hayhurst-Britten42
Ptinus tectus	apricot, dried	df	Archibald-Chalmers83, Gorham91, Hatch33, Hinton41, Papp62, Papp-Okumura59, Patton31, Richards-Herford30, Wise61
Ptinus tectus	barley	g	Archibald-Chalmers83, Gorham91, Strong-Okumura58
Ptinus tectus	barley meal	gp	Campbell89, Hayhurst-Britten42
Ptinus tectus	bean	ffv	Hayhurst-Britten42
Ptinus tectus	bean	p	Gorham91, Hatch33, Hedges-Lacey96, Patton31
Ptinus tectus	beet seed	se	Strong-Okumura58
Ptinus tectus	biscuit	bg	Archibald-Chalmers83
Ptinus tectus	blood, dried	anv	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ptinus tectus	bone	anv	Archibald-Chalmers83
Ptinus tectus	carpet	t	Archibald-Chalmers83, Hedges-Lacey96, Hinton41, Wise56
Ptinus tectus	carrot seed	se	Archibald-Chalmers83, Wise56
Ptinus tectus	casein, dried	anv	Gorham91, Hatch33, Hinton41, Patton31, Rajendran-Parveen05
Ptinus tectus	cassava root chip	rp	Wohlgemuth-Reichmuth83
Ptinus tectus	cereal (cereal product)	gp	Archibald-Chalmers83, Wise56
Ptinus tectus	chicory	sea	Wise61
Ptinus tectus	chocolate powder	bc	Hatch33, Hedges-Lacey96, Hinton41, Papp62, Papp-Okumura59, Patton31
Ptinus tectus	cloth	t	Archibald-Chalmers83, Wise56, 61;
Ptinus tectus	cocoa	bc	Forsyth66, Hatch33, Hayhurst-Britten42, Hinton41, Papp62, Papp-Okumura59, Richards-Herford30
Ptinus tectus	cocoa bean	bc	Aitken75, Okumura-Strong65, Patton31
Ptinus tectus	coffee	bc	Archibald-Chalmers83, Haines81
Ptinus tectus	copra oilcake	osp	Wohlgemuth-Reichmuth83
Ptinus tectus	cottonseed	os	USDA36-61
Ptinus tectus	cottonseed meal	osp	Hayhurst-Britten42
Ptinus tectus	crab meat	aninv	Gorham91, Hinton41
Ptinus tectus	date	df	Archibald-Chalmers83, Wise56
Ptinus tectus	dried fruit	df	Aitken75, Hedges-Lacey96, Schmidt-Grabner87
Ptinus tectus	feather	anv	Archibald-Chalmers83
Ptinus tectus	fertilizer	oc	Archibald-Chalmers83
Ptinus tectus	fig	ffv	Gorham91, Hatch33, Hayhurst-Britten42, Hinton41, Papp62, Papp-Okumura59, Patton31, Richards-Herford30
Ptinus tectus	fish food	oc	Gorham91, Hatch33, Patton31
Ptinus tectus	fishmeal	anv	Archibald-Chalmers83, Campbell89, Gorham91, Hatch33, Hedges-Lacey96, Hinton41, Strong-Okumura58, Wise56
Ptinus tectus	flax	v	Gorham91
Ptinus tectus	flower, dried	v	Hinton41
Ptinus tectus	fur	anv	Gorham91
Ptinus tectus	ginger	sea	Gorham91, Hatch33, Hayhurst-Britten42, Hedges-Lacey96, Hinton41, Patton31, Richards-Herford30
Ptinus tectus	grain product	gp	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ptinus tectus	grain, cereal	g	Aitken75, Archibald-Chalmers83, Cotton-Good37, Yan et al10
Ptinus tectus	hay	v	Archibald-Chalmers83
Ptinus tectus	hide, pelt or skin	anv	Archibald-Chalmers83, Hayhurst-Britten42, Wise56
Ptinus tectus	hop	v	Hatch33, Hayhurst-Britten42, Hedges-Lacey96, Hinton41, Papp62, Papp-Okumura59
Ptinus tectus	horn	anv	Archibald-Chalmers83
Ptinus tectus	insect, dried	aninv	Archibald-Chalmers83, Hinton41, Papp62, Papp-Okumura59, Wise56
Ptinus tectus	leaf, dried	v	Hinton45
Ptinus tectus	linseed meal	osp	Hayhurst-Britten42
Ptinus tectus	linseed oilcake	osp	Hayhurst-Britten42
Ptinus tectus	maize	g	Archibald-Chalmers83, Gorham91, Hatch33, Hayhurst-Britten42, Hedges-Lacey96, Hinton41, Patton31, Wohlgemuth-Reichmuth83
Ptinus tectus	maize flake	gp	Hayhurst-Britten42
Ptinus tectus	maize meal	gp	Archibald-Chalmers83, Campbell89, Hayhurst-Britten42, Strong-Okumura58, Wise56
Ptinus tectus	maize, split	gp	Hayhurst-Britten42
Ptinus tectus	malt culm	gp	Hayhurst-Britten42
Ptinus tectus	maple pea	p	Hayhurst-Britten42
Ptinus tectus	meat meal	anv	Archibald-Chalmers83
Ptinus tectus	medicine, chamomile tea	me	Weidner73
Ptinus tectus	medicine, dandelion root	me	Weidner73
Ptinus tectus	milk, dried	anv	Archibald-Chalmers83, Somerfield et al80
Ptinus tectus	nasturtium seed	se	Gorham91, Strong-Okumura58
Ptinus tectus	nut	n	Aitken75, Papp62, Papp-Okumura59
Ptinus tectus	nutmeg (mace)	sea	Gorham91, Hatch33, Hayhurst-Britten42, Hinton41, Patton31, Richards-Herford30
Ptinus tectus	oat	g	Gorham91, Hayhurst-Britten42, Strong-Okumura58
Ptinus tectus	oatmeal	gp	Archibald-Chalmers83, Campbell89, Hayhurst-Britten42, Wise56
Ptinus tectus	oat, rolled	gp	Hayhurst-Britten42
Ptinus tectus	pea	p	Archibald-Chalmers83, Hayhurst-Britten42
Ptinus tectus	peach, dried	df	Archibald-Chalmers83, Wise56

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ptinus tectus	peanut	os	Archibald-Chalmers83, Wise56
Ptinus tectus	peanut flake	osp	Hayhurst-Britten42
Ptinus tectus	pear, dried	df	Gorham91, Hatch33, Hayhurst-Britten42, Hinton41, Papp62, Patton31, Richards-Herford30
Ptinus tectus	pepper, cayenne	sea	Archibald-Chalmers83, Hatch33, Hayhurst-Britten42, Hedges-Lacey96, Hinton41, Patton31, Wise56, 61
Ptinus tectus	pepper, chilli	sea	Hayhurst-Britten42
Ptinus tectus	pepper, paprika	sea	Gorham91, Hatch33, Weidner73
Ptinus tectus	potato, dried	r	Schmidt-Grabner87
Ptinus tectus	raisin	df	Gorham91, Hedges-Lacey96
Ptinus tectus	rapeseed (canola)	os	Archibald-Chalmers83, Wise56
Ptinus tectus	rat poison	oc	Archibald-Chalmers83
Ptinus tectus	rice	g	Archibald-Chalmers83, Cornes73, Hayhurst-Britten42
Ptinus tectus	rice meal	gp	Hayhurst-Britten42
Ptinus tectus	root, lonchocarpus (rotenone)	r	Downes-Williams50
Ptinus tectus	rubber	oc	Hayhurst-Britten42
Ptinus tectus	rye	g	Gorham91, Hatch33, Hinton41, Patton31
Ptinus tectus	rye flour paste	gp	Hayhurst-Britten42
Ptinus tectus	sago flour	v	Hayhurst-Britten42
Ptinus tectus	sausage rusk	oc	Gorham91
Ptinus tectus	seafood, dried	aninv	Archibald-Chalmers83
Ptinus tectus	shrimp, dried	aninv	Archibald-Chalmers83, Wise56
Ptinus tectus	soap, desiccated	oc	Hatch33, Hinton41
Ptinus tectus	soup mix, dried	oc	Gorham91, Papp-Okumura59, Patton31
Ptinus tectus	soy grit	pp	Gorham91
Ptinus tectus	soybean meal	pp	Hayhurst-Britten42
Ptinus tectus	spice	sea	Haines81, Hill02
Ptinus tectus	starch	v	Gorham91
Ptinus tectus	straw	v	Hayhurst-Britten42
Ptinus tectus	sugar	v	Hayhurst-Britten42
Ptinus tectus	sultana, dried	df	Gorham91, Hatch33, Hayhurst-Britten42, Patton31, Richards-Herford30
Ptinus tectus	tree seed	se	Archibald-Chalmers83
Ptinus tectus	turnip seed	se	Archibald-Chalmers83, Wise56
Ptinus tectus	vegetable seed	se	Papp-Okumura59
Ptinus tectus	vegetable, dried	v	Schmidt-Grabner87

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Ptinus tectus	walnut	n	Haines74
Ptinus tectus	wheat	g	Archibald-Chalmers83, Gorham91, Hayhurst-Britten42, Strong-Okumura58, Wise56, 61
Ptinus tectus	wheat bran (pollard)	gp	Archibald-Chalmers83,Campbell89, Gorham91, Hayhurst-Britten42, Hinton41, Wise61
Ptinus tectus	wheat chaff	gp	Hayhurst-Britten42
Ptinus tectus	wheat farina	gp	Hayhurst-Britten42
Ptinus tectus	wheat flour	gp	Campbell89, Cornes73, Cotton-Good37, Gorham91, Hayhurst-Britten42, Hill02, Wise56
Ptinus tectus	wheat meal	gp	Archibald-Chalmers83, Hill02, Wise56
Ptinus tectus	wheat screening	res	Hayhurst-Britten42
Ptinus tectus	wood shaving	w	Archibald-Chalmers83
Ptinus tectus	wool	anv	Archibald-Chalmers83, Wise56
Ptinus tectus	yeast	v	Archibald-Chalmers83, Wise56
Ptinus villiger	animal feed	oc	Gorham91, Strong-Okumura58
Ptinus villiger	bean	p	Aitken75
Ptinus villiger	chamomile seed	se	Gorham91
Ptinus villiger	maize meal	gp	Campbell89, Cotton-Good37, Gorham91, Hedges-Lacey96, Hinton41, Papp-Okumura59, Patton31
Ptinus villiger	oatmeal	gp	Campbell89
Ptinus villiger	oat, rolled	gp	Campbell89
Ptinus villiger	wheat	g	Aitken75, Campbell89, Cotton-Good37, Gorham91, Hedges-Lacey96, Hinton41, Papp-Okumura59
Ptinus villiger	wheat bran (pollard)	gp	Campbell89
Ptinus villiger	wheat farina	gp	Campbell89, Cotton-Good37, Gorham91, Hedges-Lacey96, Hinton41, Papp-Okumura59, Patton31
Ptinus villiger	wheat flour	gp	Cotton-Good37, Gorham91, Hedges-Lacey96, Hinton41, Papp-Okumura59, Patton31
Pyralis farinalis	almond hull	np	Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	animal feed	oc	Strong-Okumura58
Pyralis farinalis	animal product	anv	Aitken84
Pyralis farinalis	barley	g	Calderon-Donahaye64, Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	bean	p	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Pyralis farinalis	bean cake	pp	Sinha-Watters85
Pyralis farinalis	bulb	r	Sinha-Watters85
Pyralis farinalis	bulb, gladiolus	r	Strong-Okumura58
Pyralis farinalis	bulb, hyacinth	r	Strong-Okumura58
Pyralis farinalis	bulb, tulip	r	Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	cereal (cereal product)	gp	Corbet-Tams43, Patton31
Pyralis farinalis	clover	v	Carter84
Pyralis farinalis	cotton gin trash	res	Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	cottonseed	os	Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	dried fruit	df	Aitken84, Sinha-Watters85
Pyralis farinalis	grain product	gp	Aitken84, Carter84
Pyralis farinalis	grain, cereal	g	Aitken84, Carter84, Cotton-Good37, Solis99, Yan et al10
Pyralis farinalis	grain, moldy	gs	Imura03
Pyralis farinalis	hay	v	Carter84, Cotton-Good37, Patton31
Pyralis farinalis	kidney bean	p	Sinha-Watters85
Pyralis farinalis	maize	g	Caliboso et al86, Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	maize residue	res	Sinha-Watters85
Pyralis farinalis	medicine, Chinese traditional	me	Guilin et al99
Pyralis farinalis	milk, dried	anv	Imura03
Pyralis farinalis	oat	g	Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	oilcake	osp	Aitken84
Pyralis farinalis	oilseed	os	Aitken84
Pyralis farinalis	pea	p	Sinha-Watters85
Pyralis farinalis	peanut	os	Carter84, Champ65, Hill02, Sinha-Watters85
Pyralis farinalis	potato	r	Hill02, Sinha-Watters85
Pyralis farinalis	pulse	p	Aitken84
Pyralis farinalis	pulse product	pp	Aitken84
Pyralis farinalis	rice	g	Kim et al88
Pyralis farinalis	root, dried chicory	r	Sinha-Watters85
Pyralis farinalis	seed	se	Cotton-Good37
Pyralis farinalis	sesame seed cake	osp	Carter84
Pyralis farinalis	sorghum (broomcorn)	g	McFarlane63
Pyralis farinalis	spice	sea	Imura03
Pyralis farinalis	straw	v	Cotton-Good37, Hill02
Pyralis farinalis	sunflower seed	os	Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	turmeric	sea	Guilin et al99

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Pyralis farinalis	vegetable material, dried	v	Solis99
Pyralis farinalis	wheat	g	Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	wheat bran (pollard)	gp	Hill02, Patton31, Sinha-Watters85, Strong-Okumura58
Pyralis farinalis	wheat flour	gp	Cotton-Good37, Hill02, Imura03, Patton31, Sinha-Watters85
Pyralis farinalis	wheat meal	gp	Cotton-Good37
Reesa vespulae	animal feed	oc	Strong-Okumura58
Reesa vespulae	animal specimen, bird skin	anv	Peacock93
Reesa vespulae	animal specimen, lizard dried	anv	Peacock93
Reesa vespulae	barley	g	Okumura-Strong65
Reesa vespulae	bean	p	Strong-Okumura58
Reesa vespulae	bread	bg	Peacock93
Reesa vespulae	broccoli seed	se	Okumura-Strong65
Reesa vespulae	cereal (cereal product)	gp	Peacock93
Reesa vespulae	cocksfood seed	se	Peacock93
Reesa vespulae	fungus, dried	v	Peacock93
Reesa vespulae	herbarium specimen	v	Campbell89, Peacock93
Reesa vespulae	insect, dried	aninv	Archibald-Chalmers83, Campbell89, Rajendran-Parveen05
Reesa vespulae	lettuce seed	se	Okumura-Strong65
Reesa vespulae	maize	g	Strong-Okumura58
Reesa vespulae	milk, dried	anv	Peacock93
Reesa vespulae	mushroom, dried	v	Peacock93
Reesa vespulae	pepper seed	se	Okumura-Strong65, Peacock93
Reesa vespulae	rye	g	Peacock93
Reesa vespulae	seed	se	Peacock93
Reesa vespulae	timothy grass seed	se	Peacock93
Reesa vespulae	tomato seed	se	Okumura-Strong65, Peacock93
Reesa vespulae	walnut	n	Okumura-Strong65
Reesa vespulae	wheat	g	Archibald-Chalmers83, Campbell89
Reesa vespulae	wheat flour	gp	Peacock93
Rhyzopertha dominica	alfalfa meal	v	Pierrard62
Rhyzopertha dominica	animal feed	oc	Allotey et al97, Stejskal06, Strong-Okumura58
Rhyzopertha dominica	annatto seed	se	Zimmerman90
Rhyzopertha dominica	arrowroot	r	Delobel-Tran93, Fisher50
Rhyzopertha dominica	arrowroot flour	rp	Potter35
Rhyzopertha dominica	bamboo	v	Fisher50

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Rhyzopertha dominica	banana product	v	Fisher50, Potter35
Rhyzopertha dominica	banana, dried	df	Forsyth66
Rhyzopertha dominica	barley	g	Aitken75, Athanassiou et al10, Awadallah et al82, Buchelos-Katopodis95, Calderon-Donahaye64, Delobel-Tran93, Gupta et al02, 04, 05; Haines81, Hedges-Lacey96, Mookherjee et al68, Patton31, Strong-Okumura58, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	basketware, wicker	v	Archibald-Chalmers83
Rhyzopertha dominica	BBQ sauce	oc	Zimmerman90
Rhyzopertha dominica	bean	p	Archibald-Chalmers83, Fisher50, Patton31, Potter35, Strong-Okumura58,
Rhyzopertha dominica	bean curd with rice	v	Zimmerman90
Rhyzopertha dominica	bean sauce, hot	oc	Zimmerman90
Rhyzopertha dominica	biscuit	bg	Fisher50, Patton31, Potter35
Rhyzopertha dominica	book	oc	Delobel-Tran93, Hedges-Lacey96
Rhyzopertha dominica	bulb	r	Fisher50, Potter35
Rhyzopertha dominica	cantaloupe seed (casaba)	se	Imura03
Rhyzopertha dominica	caraway	sea	Tawfik et al85
Rhyzopertha dominica	cassava root chip	rp	Parker et al81, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	cereal (cereal product)	gp	Haines81, Hill02
Rhyzopertha dominica	chickpea (Bengal gram, garbanzo)	p	Fisher50, Mookherjee et al70, Patton31, Potter35
Rhyzopertha dominica	chickpea, split	pp	Zimmerman90
Rhyzopertha dominica	cinnamon	sea	Tawfik et al85, Zimmerman90
Rhyzopertha dominica	cocoa bean	bc	McFarlane63
Rhyzopertha dominica	coffee bean	bc	Delobel-Tran93
Rhyzopertha dominica	copra	osp	Archibald-Chalmers83
Rhyzopertha dominica	copra meal	osp	Wohlgemuth-Reichmuth83
Rhyzopertha dominica	coriander	sea	Tawfik et al85
Rhyzopertha dominica	cork	wp	Campbell89, Fisher50, Potter35
Rhyzopertha dominica	cottonseed	os	Pierrard62
Rhyzopertha dominica	cowpea	p	Forsyth66
Rhyzopertha dominica	cracker	bg	Strong-Okumura58
Rhyzopertha dominica	cumin	sea	Tawfik et al85
Rhyzopertha dominica	dog biscuit	bg	Haines81
Rhyzopertha dominica	dried fruit	df	Attia-Kamel66
Rhyzopertha dominica	fish food	oc	Rajendran-Parveen05
Rhyzopertha dominica	ginger	sea	Cornes73, McFarlane63

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Rhyzopertha dominica	grain, cereal	g	Archibald-Chalmers83, Buchelos-Athanassiou98, Cotton-Good37, Hill02, Imura03, Yan et al10
Rhyzopertha dominica	grass seed	se	Archibald-Chalmers83
Rhyzopertha dominica	hay	v	Buchelos-Athanassiou98
Rhyzopertha dominica	herb	v	Archibald-Chalmers83
Rhyzopertha dominica	horse collar with straw stuffing	oc	Potter35
Rhyzopertha dominica	hyaciath bean	p	Archibald-Chalmers83
Rhyzopertha dominica	kidney bean	p	Potter35
Rhyzopertha dominica	lentil (masur)	p	Archibald-Chalmers83, Fisher50, Patton31, Potter35
Rhyzopertha dominica	licorice	rp	Delobel-Tran93
Rhyzopertha dominica	lima bean	p	Forsyth66
Rhyzopertha dominica	lime pickle in oil	oc	Zimmerman90
Rhyzopertha dominica	lotus seed	se	Delobel-Tran93, Fisher50, Potter35
Rhyzopertha dominica	maize	g	Allotey et al97, Buchelos-Katopodis95, Calderon-Donahaye64, Caliboso et al86, Campbell89, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Fisher50, Forsyth66, Haines74, 81; Hayhurst-Britten42, Hedges-Lacey96, McFarlane63, Mookherjee et al68, Nayar et al76, Peng98, Sedlacek et al98, Stejskal06, Strong-Okumura58, Tadesse96
Rhyzopertha dominica	maize flour	gp	Aitken75, Delobel-Tran93, Imura03, Potter35, Walker79
Rhyzopertha dominica	maize germ meal	gp	Wohlgemuth-Reichmuth83
Rhyzopertha dominica	maize meal	gp	Fisher50, Pierrard62
Rhyzopertha dominica	maize product	gp	Aitken75
Rhyzopertha dominica	malt	gp	Attia-Kamel66, Pierrard62
Rhyzopertha dominica	mango	ffv	Archibald-Chalmers83
Rhyzopertha dominica	meat meal	anv	Awadallah et al90
Rhyzopertha dominica	medicine, Chinese traditional	me	Guilin et al99
Rhyzopertha dominica	medicine, herbal	me	Campbell89, Fisher50, Hayhurst-Britten42, Kamel58, Potter35
Rhyzopertha dominica	medicine, rhubarb root	me	Delobel-Tran93
Rhyzopertha dominica	milk, dried	anv	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Rhyzopertha dominica	millet	g	Cornes73, Delobel-Tran93, Fisher50, Forsyth66, Mookherjee et al68, Nayar et al76, Potter35
Rhyzopertha dominica	millet meal	gp	Delobel-Tran93, Fisher50
Rhyzopertha dominica	mung bean	p	Archibald-Chalmers83, Caliboso et al86, Zimmerman90
Rhyzopertha dominica	noodle	gp	Potter35
Rhyzopertha dominica	nut	n	Archibald-Chalmers83, Zimmerman90
Rhyzopertha dominica	oat	g	Fisher50, Strong-Okumura58, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	oatmeal	gp	Fisher50
Rhyzopertha dominica	oilcake	osp	Aitken75
Rhyzopertha dominica	paddy	g	Caliboso et al86, Douglas41, Haines81, McFarlane63, Mookherjee et al68, Nayar et al76, Pires et al07, Sukprakarn86
Rhyzopertha dominica	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Rhyzopertha dominica	paper	wp	Potter35
Rhyzopertha dominica	peanut	os	Archibald-Chalmers83, Arthur56, Champ65, LaHue et al59, Nayar et al76
Rhyzopertha dominica	pepper, pod dried chilli	sea	Zimmerman90
Rhyzopertha dominica	phane (edible caterpillar)	aninv	Rajendran-Parveen05
Rhyzopertha dominica	pigeonpea (arhar, red gram)	p	Archibald-Chalmers83
Rhyzopertha dominica	potato, dried	r	Delobel-Tran93, Fisher50, Potter35
Rhyzopertha dominica	prune	df	Zimmerman90
Rhyzopertha dominica	pulse	p	Haines81, Hill02, Imura03
Rhyzopertha dominica	pumpkin seed	se	Potter35
Rhyzopertha dominica	rapeseed meal	osp	Wohlgemuth-Reichmuth83
Rhyzopertha dominica	residue	res	Haines81
Rhyzopertha dominica	rice	g	Aitken75, Archibald-Chalmers83, Delobel-Tran93, Campbell89, Cornes73, Fisher50, Forsyth66, Haines74, 81; Hayhurst-Britten42, Hedges-Lacey96, Imura03, Kim et al88, Nayar et al76, Olsen81, Patton31, Pierrard62, Stejskal-Kucerova93, Strong-Okumura58, Wohlgemuth-Reichmuth83 , Yao-Lo62, Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Rhyzopertha dominica	rice bran	gp	Caliboso et al86, Haines81, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	rice meal	gp	Caliboso et al86, Fisher50, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	rice sprout	gp	Guilin et al99
Rhyzopertha dominica	rice stick	gp	Zimmerman90
Rhyzopertha dominica	root, dried (tuber)	r	Archibald-Chalmers83, Campbell89
Rhyzopertha dominica	root, dried cassava (manioc)	r	Davies60, Delobel92, Delobel-Tran93, Fisher50, Forsyth66, Hedges-Lacey96, Hill02, Ratti-Rampini77, Sukprakarn86, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	rye	g	Strong-Okumura58, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	sago flour	v	Aitken75
Rhyzopertha dominica	seed	se	Archibald-Chalmers83, Campbell89
Rhyzopertha dominica	sorghum (broomcorn)	g	Archibald-Chalmers83, Awadallah et al82, Calderon-Donahaye64, Caliboso et al86, Casteels et al96, Cornes73, Davies60, Fisher50, Forsyth66, Giles64, Haines74, 81; Mookherjee et al68, Peng98, Pierrard62, Potter35, Strong-Okumura58, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	sorghum meal	gp	Fisher50
Rhyzopertha dominica	soup mix, dried	oc	Zimmerman90
Rhyzopertha dominica	soybean	p	Caliboso et al86, Singh90
Rhyzopertha dominica	soybean meal	pp	Caliboso et al86
Rhyzopertha dominica	soybean paste	pp	Zimmerman90
Rhyzopertha dominica	spice	sea	Archibald-Chalmers83, Delobel-Tran93
Rhyzopertha dominica	sunflower seed	os	Weidner73
Rhyzopertha dominica	sweet potato, dried	r	Davies60, Delobel-Tran93, Zimmerman90
Rhyzopertha dominica	tamarind	v	Tawfik et al85, Zimmerman90
Rhyzopertha dominica	tamarind seed	se	Potter35
Rhyzopertha dominica	tapioca root	r	Fisher50, Potter35
Rhyzopertha dominica	taro	r	Archibald-Chalmers83
Rhyzopertha dominica	tea leaf	bc	Archibald-Chalmers83
Rhyzopertha dominica	vegetable material, dried	v	Attia-Kamel66

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Rhyzopertha dominica	wheat	g	Aitken75, Archibald-Chalmers83, Athanassiou et al01, 03, 05, 06; Calderon-Donahaye64, Cornes73, Cotton-Good37, Delobel-Tran93, Fisher50, Gupta et al05, Haines74, 81; Hayhurst-Britten42, Hedges-Lacey96, Imura03, Mookherjee et al68, Patton31, Rao et al73, Strong-Okumura58, Trematerra-Gentile06, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Calderon-Donahaye64, Haines81, Wohlgemuth-Reichmuth83
Rhyzopertha dominica	wheat flour	gp	Buchelos-Athanassiou98, Caliboso et al86, Hayhurst-Britten42, Hill02, Imura03, Pierrard62
Rhyzopertha dominica	wheat meal	gp	Fisher50
Rhyzopertha dominica	wheat, bulgar	gp	Delobel-Tran93
Rhyzopertha dominica	wood	w	Campbell89, Hayhurst-Britten42, Hedges-Lacey96
Rhyzopertha dominica	yam	r	Cornes73, Delobel-Tran93, Sauphanor et al87
Sennius morosus	bean	p	Schoonhoven77
Silvanus bidentatus	grain	g	Yan et al10
Sitophilus granarius	acorn	n	Hedges-Lacey96, Sinha-Watters85
Sitophilus granarius	animal feed	oc	Haines81, Hayhurst-Britten42, Strong-Okumura58
Sitophilus granarius	barley	g	Aitken75, Archibald-Chalmers83, Buchelos-Katopodis95, Calderon-Donahaye64, Campbell89, Davies60, Haines81, Hedges-Lacey96, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83
Sitophilus granarius	barley meal	gp	Wohlgemuth-Reichmuth83
Sitophilus granarius	barley screening	res	Hayhurst-Britten42
Sitophilus granarius	bean	p	Archibald-Chalmers83, Strong-Okumura58
Sitophilus granarius	bird feed	se	Archibald-Chalmers83, Campbell89, Sinha-Watters85
Sitophilus granarius	buckwheat	g	Campbell89
Sitophilus granarius	cassava root chip	rp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus granarius	cereal (cereal product)	gp	Archibald-Chalmers83, Haines81, Hayhurst-Britten42
Sitophilus granarius	chestnut	n	Sinha-Watters85
Sitophilus granarius	chickpea (Bengal gram, garbanzo)	p	Sinha-Watters85
Sitophilus granarius	copra oilcake	osp	Wohlgemuth-Reichmuth83
Sitophilus granarius	cotton	t	Hayhurst-Britten42
Sitophilus granarius	cowpea	p	Sinha-Watters85
Sitophilus granarius	currant	df	Hayhurst-Britten42, Richards-Herford30
Sitophilus granarius	fig	ffv	Hayhurst-Britten42, Richards-Herford30
Sitophilus granarius	fish food	oc	Archibald-Chalmers83
Sitophilus granarius	grain product	gp	Campbell89, Cotton-Good37
Sitophilus granarius	grain, cereal	g	Archibald-Chalmers83, Buchelos-Athanassiou98, Cotton-Good37, Gorham91, Yan et al10
Sitophilus granarius	hay	v	Buchelos-Athanassiou98
Sitophilus granarius	kaffir seed	g	Campbell89
Sitophilus granarius	maize	g	Aitken75, Archibald-Chalmers83, Buchelos-Katopodis95, Calderon-Donahaye64, Campbell89, Hedges-Lacey96, Wohlgemuth-Reichmuth83
Sitophilus granarius	maize product	gp	Aitken75
Sitophilus granarius	medicine, herbal	me	Kamel58
Sitophilus granarius	millet	g	Hayhurst-Britten42
Sitophilus granarius	noodle	gp	Archibald-Chalmers83, Campbell89, Hayhurst-Britten42, Hedges-Lacey96
Sitophilus granarius	oat	g	Aitken75, Campbell89, Wohlgemuth-Reichmuth83
Sitophilus granarius	oat flake	gp	Wohlgemuth-Reichmuth83
Sitophilus granarius	peanut	os	Archibald-Chalmers83
Sitophilus granarius	residue	res	Haines81
Sitophilus granarius	rice	g	Aitken75, Archibald-Chalmers83, Hedges-Lacey96, Imura03, Sinha-Watters85, Strong-Okumura58
Sitophilus granarius	rice product	gp	Aitken75, Wohlgemuth-Reichmuth83
Sitophilus granarius	root, dried cassava (manioc)	r	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus granarius	rye	g	Campbell89, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83
Sitophilus granarius	seed	se	Archibald-Chalmers83
Sitophilus granarius	sorghum (broomcorn)	g	Calderon-Donahaye64, Campbell89, Haines81, Sinha-Watters85, Strong-Okumura58
Sitophilus granarius	sorghum flour	gp	Haines81
Sitophilus granarius	soybean meal	pp	Wohlgemuth-Reichmuth83
Sitophilus granarius	spinach seed	se	Strong-Okumura58
Sitophilus granarius	straw	v	Hayhurst-Britten42
Sitophilus granarius	sugarcane	v	Archibald-Chalmers83
Sitophilus granarius	sunflower seed	os	Hedges-Lacey96, Sinha-Watters85
Sitophilus granarius	wheat	g	Aitken75, Archibald-Chalmers83, Athanassiou et al03, Calderon-Donahaye64, Campbell89, Gupta et al04,Haines74, Hedges-Lacey96, Imura03, Sinha-Watters85,Strong-Okumura58, Trematerra-Gentile06, Wohlgemuth-Reichmuth83
Sitophilus granarius	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Hayhurst-Britten42, Strong-Okumura58, Wohlgemuth-Reichmuth83
Sitophilus granarius	wheat dust	gp	Hayhurst-Britten42
Sitophilus granarius	wheat flour	gp	Archibald-Chalmers83, Buchelos-Athanassiou98, Campbell89, Hayhurst-Britten42
Sitophilus granarius	wheat meal	gp	Campbell89
Sitophilus granarius	wheat product	gp	Aitken75
Sitophilus granarius	wheat screening	res	Hayhurst-Britten42
Sitophilus granarius	wheat semolina	gp	Hayhurst-Britten42
Sitophilus granarius	wool	anv	Hayhurst-Britten42
Sitophilus oryzae	acorn	n	Cotton-Good37
Sitophilus oryzae	adzuki bean	p	Delobel-Tran93
Sitophilus oryzae	alfalfa seed (lucerne)	se	Strong-Okumura58
Sitophilus oryzae	animal feed	oc	Allotey et al97, Hayhurst-Britten42, Pierrard62, Strong-Okumura58
Sitophilus oryzae	apricot, dried	df	Attia-Kamel66

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus oryzae	barley	g	Archibald-Chalmers83, Athanassiou et al10, Attia-Kamel66, Buchelos-Katopodis95, Campbell89, Delobel-Tran93, Hedges-Lacey96, Imura03, Mookherjee et al68, Olsen81, Patton31, Pierrard62, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83
Sitophilus oryzae	bean	p	Archibald-Chalmers83, Davies60, Haines81, Hayhurst-Britten42, Hedges-Lacey96, Kiritani59, Sinha-Watters85, Zimmerman90
Sitophilus oryzae	bean curd	pp	Zimmerman90
Sitophilus oryzae	beet pulp, sugar	rp	Hayhurst-Britten42
Sitophilus oryzae	bird feed	se	Archibald-Chalmers83, Chittenden96
Sitophilus oryzae	buckwheat	g	Campbell89, Delobel-Tran93
Sitophilus oryzae	bulb, hyacinth	r	Archibald-Chalmers83
Sitophilus oryzae	bulb, lily	r	Zimmerman90
Sitophilus oryzae	caraway	sea	Tawfik et al85
Sitophilus oryzae	carob pod	v	Attia-Kamel66, Delobel-Tran93
Sitophilus oryzae	carpet	t	Archibald-Chalmers83
Sitophilus oryzae	cashew	n	Archibald-Chalmers83
Sitophilus oryzae	cassava root chip	rp	Delobel-Tran93, Parker et al81
Sitophilus oryzae	cassava root meal	rp	Pierrard62
Sitophilus oryzae	castor bean	se	Kiritani59
Sitophilus oryzae	cereal (cereal product)	gp	Calderon-Donahaye64, Haines81, Hayhurst-Britten42, Hedges-Lacey96, McFarlane63
Sitophilus oryzae	chestnut	n	Chittenden96
Sitophilus oryzae	chickpea (Bengal gram, garbanzo)	p	Archibald-Chalmers83, Calderon-Donahaye64
Sitophilus oryzae	chickpea, split	pp	Delobel-Tran93, Zimmerman90
Sitophilus oryzae	cocoa	bc	Patton31
Sitophilus oryzae	copra meal	osp	Wohlgemuth-Reichmuth83
Sitophilus oryzae	copra oilcake	osp	Haines81
Sitophilus oryzae	coriander	sea	Tawfik et al85
Sitophilus oryzae	cotton gin trash	res	Hayhurst-Britten42
Sitophilus oryzae	cottonseed	os	Kiritani59, Patton31, Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus oryzae	cottonseed oilcake	osp	Wohlgemuth-Reichmuth83
Sitophilus oryzae	cowpea	p	Archibald-Chalmers83, Attia-Kamel66, Cornes73, Davies60
Sitophilus oryzae	cracker	bg	Chittenden96
Sitophilus oryzae	dallisgrass seed	se	Strong-Okumura58
Sitophilus oryzae	dried fruit	df	Archibald-Chalmers83
Sitophilus oryzae	fenugreek	ffv	Archibald-Chalmers83
Sitophilus oryzae	grain product	gp	Cotton-Good37
Sitophilus oryzae	grain, cereal	g	Buchelos-Athanassiou98, Calderon-Donahaye64, Cotton-Good37, Gorham91, Yan et al10
Sitophilus oryzae	hay	v	Buchelos-Athanassiou98
Sitophilus oryzae	herb	v	Archibald-Chalmers83
Sitophilus oryzae	kaffir seed	g	Campbell89
Sitophilus oryzae	kapok seed	se	Kiritani59
Sitophilus oryzae	linseed	os	Patton31
Sitophilus oryzae	linseed meal	osp	Wohlgemuth-Reichmuth83
Sitophilus oryzae	liver meal, dried	anv	Strong-Okumura58
Sitophilus oryzae	maize	g	Aitken75, Allotey et al97, Archibald-Chalmers83, Attia-Kamel66, Buchelos-Katopodis95, Caliboso et al86, Campbell89, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Forsyth66, Gupta et al02, Haines74, 81; Hedges-Lacey96, Hill02, Imura03, Kiritani59, Mookherjee et al68, Nayar et al76, Pierrard62, Sedlacek et al98, Sinha-Watters85, Tadesse96, Walker79, Wohlgemuth-Reichmuth83
Sitophilus oryzae	maize bran	gp	Wohlgemuth-Reichmuth83
Sitophilus oryzae	maize cob	gp	Haines74
Sitophilus oryzae	maize germ meal	gp	Wohlgemuth-Reichmuth83
Sitophilus oryzae	maize meal	gp	Pierrard62
Sitophilus oryzae	maize product	gp	Aitken75
Sitophilus oryzae	maize, cracked	gp	Chittenden96
Sitophilus oryzae	malt	gp	Guilin et al99, Pierrard62
Sitophilus oryzae	medicine, herbal	me	Kamel58
Sitophilus oryzae	millet	g	Aitken75, Attia-Kamel66, Cornes73, Nayar et al76, Sinha-Watters85
Sitophilus oryzae	millet and rice	g	Caliboso et al86, Haines81

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus oryzae	mung bean	p	Archibald-Chalmers83, Delobel-Tran93
Sitophilus oryzae	mussel, dried	aninv	Zimmerman90
Sitophilus oryzae	noodle	gp	Archibald-Chalmers83, Attia-Kamel66, Chittenden96, Cornes73, Cotton-Good37, Hedges-Lacey96, Hill02, Sinha-Watters85, Zimmerman90
Sitophilus oryzae	nut	n	Hedges-Lacey96
Sitophilus oryzae	oat	g	Campbell89, Patton31, Wohlgemuth-Reichmuth83
Sitophilus oryzae	orange	ffv	Archibald-Chalmers83
Sitophilus oryzae	paddy	g	Caliboso et al86, Douglas41, Haines74, 81; Hill02, McFarlane63, Mookherjee et al68, Nayar et al76, Pires et al07, Sukprakarn86
Sitophilus oryzae	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Sitophilus oryzae	papaya	ffv	Archibald-Chalmers83
Sitophilus oryzae	pea	p	Archibald-Chalmers83, Calderon-Donahaye64, Delobel-Tran93, Haines81, Hayhurst-Britten42, Walker79
Sitophilus oryzae	pea meal	pp	Pierrard62
Sitophilus oryzae	peanut	os	Archibald-Chalmers83, Arthur56, Bissell-DuPree46, Champ65, Kiritani59, LaHue et al59, Pierrard62, Sinha-Watters85
Sitophilus oryzae	pepper, black	sea	White57
Sitophilus oryzae	pigeonpea (arhar, red gram)	p	Archibald-Chalmers83, Haines81, Walker79
Sitophilus oryzae	pulse	p	Haines81, Hill02
Sitophilus oryzae	residue	res	Haines81
Sitophilus oryzae	rice	g	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Campbell89, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Douglas41, Forsyth66, Gupta et al02, Haines74, 81; Hill02, Hedges-Lacey96, Imura03, Kim et al88, Kiritani59, Nayar et al76, Patton31, Pierrard62, Pires et al07, Rao et al73, Sinha-Watters85, Stejskal-Kucerova93, Strong-Okumura58, Sukprakarn86, Zimmerman90
Sitophilus oryzae	rice bran	gp	Haines74
Sitophilus oryzae	rice flour	gp	Kiritani59

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus oryzae	rice hull	gp	Strong-Okumura58
Sitophilus oryzae	rice meal	gp	Caliboso et al86, McFarlane63
Sitophilus oryzae	root, dried cassava (manioc)	r	Davies60, Delobel92, Pierrard62. Sinha-Watters85, Wohlgemuth-Reichmuth83
Sitophilus oryzae	rubber	oc	Richards-Herford30
Sitophilus oryzae	rye	g	Campbell89, Wohlgemuth-Reichmuth83
Sitophilus oryzae	seed	se	Archibald-Chalmers83
Sitophilus oryzae	sesame seed	os	Kiritani59
Sitophilus oryzae	sheanut	n	Davies60
Sitophilus oryzae	sorghum (broomcorn)	g	Aitken75, Archibald-Chalmers83, Caliboso et al86, Campbell89, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Giles64, Gupta et al04, Haines81, Hill02, Imura03, Mookherjee et al68, Pierrard62, Sinha-Watters85, Strong-Okumura58, Walker79, Wohlgemuth-Reichmuth83
Sitophilus oryzae	soybean	p	Caliboso et al86, Hayhurst-Britten42
Sitophilus oryzae	soybean meal	pp	Caliboso et al86, Wohlgemuth-Reichmuth83
Sitophilus oryzae	spice	sea	Archibald-Chalmers83
Sitophilus oryzae	straw	v	Hayhurst-Britten42
Sitophilus oryzae	sugar	v	Pierrard62
Sitophilus oryzae	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Sitophilus oryzae	sweet potato	r	Davies60
Sitophilus oryzae	tamarind	v	Nayar et al76, Zimmerman90
Sitophilus oryzae	tapioca	r	Richards-Herford30
Sitophilus oryzae	tepary bean	p	Davies60
Sitophilus oryzae	tobacco leaf	v	Chittenden96, Livingstone-Reed36
Sitophilus oryzae	vetch seed	se	Strong-Okumura58
Sitophilus oryzae	watermelon seed	se	Zimmerman90
Sitophilus oryzae	wheat	g	Aitken75, Archibald-Chalmers83, Athanassiou et al01, Caliboso et al86, Campbell89, Davies60, Delobel-Tran93, Gupta et al02, 04; Hedges-Lacey96, Hill02, Haines74, 81; Imura03, Mookherjee et al68, Nayar et al76, Patton31, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus oryzae	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Pierrard62, Wohlgemuth-Reichmuth83
Sitophilus oryzae	wheat flour	gp	Archibald-Chalmers83, Attia-Kamel66, Buchelos-Athanassiou98, Caliboso et al86,Haines74, 81; Hayhurst-Britten42, Pierrard62, Hill02
Sitophilus oryzae	wheat meal	gp	Hayhurst-Britten42
Sitophilus oryzae	wheat product	gp	Aitken75
Sitophilus oryzae	wool	anv	Hayhurst-Britten42
Sitophilus oryzae	yeast	v	Chittenden96
Sitophilus zeamais	bambara groundnut	p	Forsyth66
Sitophilus zeamais	barley	g	Archibald-Chalmers83, Delobel-Tran93, Imura03, Haines81, Wohlgemuth-Reichmuth83, Zimmerman90
Sitophilus zeamais	bean	p	Haines81, Zimmerman90
Sitophilus zeamais	bulb, lily	r	Zimmerman90
Sitophilus zeamais	cashew	n	Nair et al79, Pinheiro68
Sitophilus zeamais	cassava root chip	rp	Gnonlonfin et al 08, Wohlgemuth-Reichmuth83
Sitophilus zeamais	chickpea (Bengal gram, garbanzo)	p	Haines81
Sitophilus zeamais	citrus pulp, dried	dfp	Archibald-Chalmers83
Sitophilus zeamais	cocoa	bc	Forsyth66
Sitophilus zeamais	coffee bean	bc	Forsyth66
Sitophilus zeamais	copra	osp	Forsyth66
Sitophilus zeamais	cowpea	p	Cornes73, Forsyth66, Haines81, Imura03, Walker79
Sitophilus zeamais	date	df	Archibald-Chalmers83
Sitophilus zeamais	fishmeal	anv	Haines81
Sitophilus zeamais	grain, cereal	g	Gorham91, Yan et al10
Sitophilus zeamais	hemp (marijuana)	v	Archibald-Chalmers83
Sitophilus zeamais	herb	v	Archibald-Chalmers83
Sitophilus zeamais	hyaciath bean	p	Archibald-Chalmers83
Sitophilus zeamais	kidney bean	p	Haines81
Sitophilus zeamais	lentil (masur)	p	Archibald-Chalmers83
Sitophilus zeamais	licorice apricot	rp	Zimmerman90
Sitophilus zeamais	lima bean	p	Forsyth66
Sitophilus zeamais	lotus seed	se	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus zeamais	maize	g	Aitken75, Archibald-Chalmers83, Calderon-Donahaye64, Caliboso et al86, Campbell89, Cornes73, Delobel-Tran93, Forsyth66, Gupta et al02, 04, 05; Haines74, 81; Imura03, McFarlane63, Peng98, Sedlacek et al98, Sukprakarn86, Tadesse96, Walker79, Wohlgemuth-Reichmuth83, Zimmerman90
Sitophilus zeamais	maize cob	gp	McFarlane63
Sitophilus zeamais	maize flour	gp	Delobel-Tran93
Sitophilus zeamais	maize product	gp	Aitken75
Sitophilus zeamais	malt	gp	Guilin et al99
Sitophilus zeamais	mango, dried	df	Haines81
Sitophilus zeamais	medicine, Chinese traditional	me	Guilin et al99
Sitophilus zeamais	millet	g	Delobel-Tran93, Forsyth66, Guilin et al99
Sitophilus zeamais	mung bean	p	Caliboso et al86, Haines81
Sitophilus zeamais	mushroom, dried	v	Archibald-Chalmers83
Sitophilus zeamais	noodle	gp	Archibald-Chalmers83, Imura03
Sitophilus zeamais	nut	n	Archibald-Chalmers83
Sitophilus zeamais	nut product	np	Zimmerman90
Sitophilus zeamais	oat	g	Haines81, Wohlgemuth-Reichmuth83
Sitophilus zeamais	paddy	g	Caliboso et al86, Haines74, 81; Pires et al07
Sitophilus zeamais	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Sitophilus zeamais	pastry	bg	Zimmerman90
Sitophilus zeamais	pea	p	Delobel-Tran93
Sitophilus zeamais	peanut	os	Archibald-Chalmers83, Cornes73, Forsyth66, Haines81, Imura03
Sitophilus zeamais	pigeonpea (arhar, red gram)	p	Haines81, Walker79
Sitophilus zeamais	pineapple	ffv	Archibald-Chalmers83
Sitophilus zeamais	popcorn	g	Zimmerman90
Sitophilus zeamais	rice	g	Aitken75, Archibald-Chalmers83, Calderon-Donahaye64, Cornes73, Delobel-Tran93, Forsyth66, Haines74, 81;Imura03, Rao et al73, Sukprakarn86, Zimmerman90
Sitophilus zeamais	rice cake	gp	Imura03
Sitophilus zeamais	rice meal	gp	Caliboso et al86
Sitophilus zeamais	rice product	gp	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitophilus zeamais	rice sprout	gp	Guilin et al99
Sitophilus zeamais	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93, Forsyth66, Ratti-Rampini77
Sitophilus zeamais	root, dried lotus	r	Zimmerman90
Sitophilus zeamais	root, ginseng	r	Archibald-Chalmers83
Sitophilus zeamais	rye	g	Wohlgemuth-Reichmuth83
Sitophilus zeamais	seafood, dried	aninv	Archibald-Chalmers83
Sitophilus zeamais	seed	se	Archibald-Chalmers83
Sitophilus zeamais	sesame seed	os	Cornes73
Sitophilus zeamais	sheanut	n	Forsyth66
Sitophilus zeamais	sorghum (broomcorn)	g	Aitken75, Caliboso et al86, Cornes73, Delobel-Tran93, Forsyth66, Giles64, Haines74, 81; Peng98, Sukprakarn86, Walker79, Wohlgemuth-Reichmuth83
Sitophilus zeamais	soup mix, dried	oc	Zimmerman90
Sitophilus zeamais	soybean	p	Archibald-Chalmers83, Caliboso et al86
Sitophilus zeamais	soybean meal	pp	Caliboso et al86, Wohlgemuth-Reichmuth83
Sitophilus zeamais	sweet potato, dried	r	Imura03
Sitophilus zeamais	taro	r	Archibald-Chalmers83
Sitophilus zeamais	tobacco leaf	v	Archibald-Chalmers83
Sitophilus zeamais	wheat	g	Aitken75, Archibald-Chalmers83, Delobel-Tran93, Forsyth66, Gupta et al02, 04, 05; Haines81, Imura03, Trematerra-Gentile06
Sitophilus zeamais	wheat bran (pollard)	gp	Wohlgemuth-Reichmuth83
Sitophilus zeamais	wheat flour	gp	Caliboso et al86, Forsyth66, Haines81
Sitophilus zeamais	wheat product	gp	Aitken75
Sitophilus zeamais	wheat, bulgar	gp	Delobel-Tran93
Sitophilus zeamais	yam	r	Cornes73, Delobel-Tran93, Sauphanor et al87
Sitophilus zeamais	yam chip	rp	Gnonlonfin et al 08
Sitotroga cerealella	animal feed	oc	Stejskal06, Strong-Okumura58
Sitotroga cerealella	barley	g	Calderon-Donahaye64, Haines81, Hill02, Strong-Okumura58
Sitotroga cerealella	citrus pulp, dried	dfp	Laudani et al59
Sitotroga cerealella	cocoa bean	bc	Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitotroga cerealella	cottonseed	os	Attia-Kamel66
Sitotroga cerealella	cottonseed oilcake	osp	Attia-Kamel66
Sitotroga cerealella	grain product	gp	Aitken84
Sitotroga cerealella	kidney bean	p	Attia-Kamel66
Sitotroga cerealella	lettuce seed	se	Attia-Kamel66
Sitotroga cerealella	maize	g	Aitken84, Attia-Kamel66, Calderon-Donahaye64, Caliboso et al86, Cornes73, Cotterell52, Forsyth66, Haines74, 81; Hill02, Imura03, Sedlacek et al98, Stejskal06, Strong-Okumura58, Tadesse96, Walker79
Sitotroga cerealella	maize meal	gp	Strong-Okumura58
Sitotroga cerealella	malt	gp	Guilin et al99
Sitotroga cerealella	medicine, Chinese traditional	me	Guilin et al99
Sitotroga cerealella	millet	g	Cornes73, Forsyth66, Guilin et al99, Haines81, Hill02, Imura03, Nayar et al76
Sitotroga cerealella	oat	g	Wohlgemuth-Reichmuth83
Sitotroga cerealella	paddy	g	Attia-Kamel66, Caliboso et al86, Douglas41, Haines81, Hill02, Imura03, McFarlane63, Mookherjee et al68, Nayar et al76, Pires et al07, Sukprakarn86
Sitotroga cerealella	peanut	os	Arthur56, Bissell-DuPree46, Forsyth66, Hill02, LaHue et al59
Sitotroga cerealella	pepper, black	sea	White57
Sitotroga cerealella	radish seed	se	Attia-Kamel66
Sitotroga cerealella	residue	res	Haines81
Sitotroga cerealella	rice	g	Aitken84, Attia-Kamel66, Forsyth66, Gupta et al05, Haines74, 81; Hill02, Kim et al88, Nayar et al76, Patton31, Yao-Lo62
Sitotroga cerealella	rice sprout	gp	Guilin et al99
Sitotroga cerealella	seed	se	Hill02, Patton31
Sitotroga cerealella	sorghum (broomcorn)	g	Atta-Kamel66, Awadallah et al82, Cornes73, Forsyth66, Haines74, 81; Hill02, Mookherjee et al68, Patton31, Pierrard62, Strong-Okumura58, Walker79
Sitotroga cerealella	vetch seed	se	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Sitotroga cerealella	wheat	g	Aitken84, Attia-Kamel66, Caliboso et al86, Hill02, Imura03, Strong-Okumura58, Trematerra-Gentile06
Sitotroga cerealella	wheat bran (pollard)	gp	Wohlgemuth-Reichmuth83
Sitotroga cerealella	wheat flour	gp	Pierrard62, Strong-Okumura58
Sphaericus gibboides	almond	n	Aitken75
Sphaericus gibboides	baking powder	oc	Archibald-Chalmers83
Sphaericus gibboides	caraway seed	se	Grace85, Papp62
Sphaericus gibboides	coriander	sea	Archibald-Chalmers83
Sphaericus gibboides	cotton	t	Delobel-Tran93
Sphaericus gibboides	cumin seed	se	Gorham91
Sphaericus gibboides	curry powder	sea	Campbell89, Grace85
Sphaericus gibboides	fishmeal	anv	Campbell89, Grace85
Sphaericus gibboides	gum arabic	v	Weidner73
Sphaericus gibboides	herb	v	Aitken75, Archibald-Chalmers83, Delobel-Tran93, Gorham91
Sphaericus gibboides	herbarium specimen	v	Gorham91, Papp62
Sphaericus gibboides	hide, pelt or skin	anv	Archibald-Chalmers83
Sphaericus gibboides	insect, dried	aninv	Grace85, Papp62
Sphaericus gibboides	medicine, peppermint leaf	me	Weidner73
Sphaericus gibboides	milk, dried	anv	Archibald-Chalmers83, Somerfield et al80
Sphaericus gibboides	mustard	sea	Archibald-Chalmers83
Sphaericus gibboides	pepper	sea	Delobel-Tran93
Sphaericus gibboides	pepper, cayenne	sea	Campbell89, Grace85
Sphaericus gibboides	pepper, paprika	sea	Archibald-Chalmers83, Weidner73
Sphaericus gibboides	pepper, red	sea	Gorham91, Grace85, Hinton41, Papp62
Sphaericus gibboides	peppermint	sea	Archibald-Chalmers83
Sphaericus gibboides	root, valerian	r	Gorham91
Sphaericus gibboides	saffron	sea	Campbell89, Grace85
Sphaericus gibboides	sodium bicarbonate	oc	Archibald-Chalmers83
Sphaericus gibboides	sugar	v	Archibald-Chalmers83
Sphaericus gibboides	wheat flour	gp	Archibald-Chalmers83
Stegobium paniceum	alfalfa meal	v	Strong-Okumura58
Stegobium paniceum	almond	n	Chittenden96, Okumura-Strong65
Stegobium paniceum	animal feed	oc	McFarlane63, Strong-Okumura58
Stegobium paniceum	aniseed (anise spice)	sea	Abdelghany et al10, Chittenden96, Olsen81
Stegobium paniceum	bagaruwa seed (Gambia pod)	se	Tawfik et al85
Stegobium paniceum	bamboo	v	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Stegobium paniceum	bamboo, dried leaf or shoot	v	Zimmerman90
Stegobium paniceum	barley	g	Archibald-Chalmers83, Strong-Okumura58
Stegobium paniceum	bean	p	Chittenden96
Stegobium paniceum	beet seed	se	Strong-Okumura58
Stegobium paniceum	betel nut (areca nut)	n	Srivastava-Saxena75
Stegobium paniceum	biscuit	bg	Archibald-Chalmers83, Davies60, Hayhurst-Britten42, Hill02, Patton31
Stegobium paniceum	book	oc	Campbell89, Chittenden96, Cotton-Good37, Delobel-Tran93, Hedges-Lacey96, Hill02, Lefkovitch67, Patton31
Stegobium paniceum	boot	oc	Chittenden96
Stegobium paniceum	bread	bg	Archibald-Chalmers83, Campbell89, Cotton-Good37, Hedges-Lacey96, Patton31, Richards-Herford30
Stegobium paniceum	bread, rye	bg	Archibald-Chalmers83, Chittenden96
Stegobium paniceum	buckwheat, tartary	g	Srivastava-Saxena75
Stegobium paniceum	caraway seed	se	Richards-Herford30, Tawfik et al85
Stegobium paniceum	cardamom	sea	Chittenden96
Stegobium paniceum	carrot seed	se	Archibald-Chalmers83
Stegobium paniceum	cashew	n	Archibald-Chalmers83
Stegobium paniceum	cereal (cereal product)	gp	Calderon-Donahaye64, Chittenden96, Delobel-Tran93, Hayhurst-Britten42, Lefkovitch67
Stegobium paniceum	chamomile	v	Chittenden96
Stegobium paniceum	chamomile flower	v	Abdelghany et al10
Stegobium paniceum	chickpea (Bengal gram, garbanzo)	p	Strong-Okumura58
Stegobium paniceum	chicory	sea	Archibald-Chalmers83
Stegobium paniceum	chocolate	bc	Archibald-Chalmers83, Campbell89, Chittenden96, Delobel-Tran93, Hill02, Okumura-Strong65
Stegobium paniceum	chocolate powder	bc	Archibald-Chalmers83
Stegobium paniceum	cloth	t	Hill02, Lefkovitch67
Stegobium paniceum	cocoa	bc	Archibald-Chalmers83, Delobel-Tran93, Patton31, Srivastava-Saxena75
Stegobium paniceum	cocoa bean	bc	Schmidt-Grabner87
Stegobium paniceum	coffee	bc	Chittenden96, Delobel-Tran93, Patton31
Stegobium paniceum	copra	osp	Srivastava-Saxena75
Stegobium paniceum	copra meal	osp	Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Stegobium paniceum	coriander	sea	Abdelghany et al10, Archibald-Chalmers83, Delobel-Tran93, Haines81, Richards-Herford30, Tawfik et al85
Stegobium paniceum	coriander seed	se	Abdelghany et al10
Stegobium paniceum	cork	wp	Chittenden96
Stegobium paniceum	cottonseed meal	osp	Strong-Okumura58
Stegobium paniceum	cottonseed meal pellet	osp	Strong-Okumura58
Stegobium paniceum	cottonseed oilcake	osp	Hayhurst-Britten42
Stegobium paniceum	cucumber seed	se	Strong-Okumura58
Stegobium paniceum	cumin	sea	Archibald-Chalmers83, Tawfik et al85
Stegobium paniceum	curry powder	sea	Davies60
Stegobium paniceum	dog biscuit	bg	Archibald-Chalmers83
Stegobium paniceum	dog food	oc	Campbell89
Stegobium paniceum	dried fruit	df	Aitken75, Archibald-Chalmers83
Stegobium paniceum	feather pillow	anv	Campbell89
Stegobium paniceum	fennel	sea	Archibald-Chalmers83, Tawfik et al85
Stegobium paniceum	fennel seed	se	Archibald-Chalmers83
Stegobium paniceum	fenugreek	v	Tawfik et al85
Stegobium paniceum	fish food	oc	Archibald-Chalmers83
Stegobium paniceum	fish, dried	anv	Zimmerman90
Stegobium paniceum	fishmeal	anv	Strong-Okumura58
Stegobium paniceum	flower, dried	v	Archibald-Chalmers83
Stegobium paniceum	garden egg	ffv	Cornes73
Stegobium paniceum	ginger	sea	Abraham75, Chittenden96, Weidner73
Stegobium paniceum	ginger candy	oc	Zimmerman90
Stegobium paniceum	grain product	gp	Aitken75, Cotton-Good37
Stegobium paniceum	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Calderon-Donahaye64, Cotton-Good37, Hill02, Lefkovitch67, Richards-Herford30, Yan et al10
Stegobium paniceum	grass seed	se	Archibald-Chalmers83
Stegobium paniceum	guava seed	se	Archibald-Chalmers83
Stegobium paniceum	herb	v	Archibald-Chalmers83, Chittenden96, Delobel-Tran93, Hill02, Zimmerman90
Stegobium paniceum	hide, pelt or skin	anv	Delobel-Tran93
Stegobium paniceum	hoba bean	p	Olsen81
Stegobium paniceum	horn	anv	Archibald-Chalmers83
Stegobium paniceum	ice cream cone	bg	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Stegobium paniceum	insect, dried	aninv	Archibald-Chalmers83, Richards-Herford30
Stegobium paniceum	kidney bean	p	Campbell89, Delobel-Tran93, Haines81, Schmidt-Grabner87, Strong-Okumura58
Stegobium paniceum	kitchen sage	v	Blaisdell92
Stegobium paniceum	leather	anv	Archibald-Chalmers83, Campbell89, Delobel-Tran93, Hill02, Lefkovitch67, Patton31, Weidner67
Stegobium paniceum	lemon balm	sea	Blaisdell92
Stegobium paniceum	lettuce seed	se	Richards-Herford30
Stegobium paniceum	licorice	rp	Chittenden96
Stegobium paniceum	liver meal, dried	anv	Archibald-Chalmers83
Stegobium paniceum	maize	g	Sedlacek et al98, Zimmerman90
Stegobium paniceum	maize flour	gp	Walker79
Stegobium paniceum	maize meal	gp	Strong-Okumura58
Stegobium paniceum	malt	gp	Guilin et al99
Stegobium paniceum	meat meal	anv	Awadallah et al90
Stegobium paniceum	meat, cured, dried or smoked	anv	Archibald-Chalmers83
Stegobium paniceum	medicine, aconite	me	Campbell89, Chittenden96, Patton31
Stegobium paniceum	medicine, angelica root	me	Weidner73
Stegobium paniceum	medicine, belladonna	me	Blaisdell92, Campbell89, Chittenden96, Patton31
Stegobium paniceum	medicine, borage	me	Blaisdell92
Stegobium paniceum	medicine, Chinese traditional	me	Guilin et al99
Stegobium paniceum	medicine, dandelion	me	Blaisdell92
Stegobium paniceum	medicine, dandelion root	me	Archibald-Chalmers83
Stegobium paniceum	medicine, dandelion root	me	Weidner73
Stegobium paniceum	medicine, drug	me	Lefkovitch67, Srivastava-Saxena75
Stegobium paniceum	medicine, henbane leaf	me	Blaisdell92
Stegobium paniceum	medicine, herbal	me	Basak91, Blaisdell92, Cotton-Good37, Kamel58, Patton31, Toh98
Stegobium paniceum	medicine, Himalayan rhubarb	me	Srivastava-Saxena75
Stegobium paniceum	medicine, Indian belladonna	me	Srivastava-Saxena75
Stegobium paniceum	medicine, liverwort	me	Blaisdell92
Stegobium paniceum	medicine, milkweed	me	Blaisdell92
Stegobium paniceum	medicine, poison hemlock	me	Blaisdell92
Stegobium paniceum	medicine, quaking aspen	me	Blaisdell92
Stegobium paniceum	medicine, rhubarb root	me	Weidner73

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Stegobium paniceum	milk, dried	anv	Archibald-Chalmers83, Okumura-Strong65, Rajendran-Parveen05
Stegobium paniceum	millet	g	Zimmerman90
Stegobium paniceum	mung bean	p	Rao et al73
Stegobium paniceum	mung bean thread	pp	Zimmerman90
Stegobium paniceum	museum collection	oc	Rajendran-Parveen05
Stegobium paniceum	museum collection, mummy	oc	Chittenden96
Stegobium paniceum	mushroom, dried	v	Zimmerman90
Stegobium paniceum	mustard seed	se	Strong-Okumura58
Stegobium paniceum	mustard, black	sea	Archibald-Chalmers83, Tawfik et al85
Stegobium paniceum	nasturtium seed	se	Archibald-Chalmers83
Stegobium paniceum	noodle	gp	Strong-Okumura58, Richards-Herford30, Patton31, Zimmerman90
Stegobium paniceum	nut	n	Aitken75, Srivastava-Saxena75
Stegobium paniceum	nut meal	np	Strong-Okumura58
Stegobium paniceum	nutmeg (mace)	sea	Archibald-Chalmers83, Haines81, Weidner73
Stegobium paniceum	oilcake	osp	Calderon-Donahaye64
Stegobium paniceum	oilseed	os	Aitken75
Stegobium paniceum	okra	ffv	Archibald-Chalmers83
Stegobium paniceum	onion, dried	v	Schmidt-Grabner87
Stegobium paniceum	oregano (marjoram)	sea	Abdelghany et al10, Blaisdell92
Stegobium paniceum	paddy	g	Pires et al07
Stegobium paniceum	parsley	sea	Campbell89
Stegobium paniceum	pea	p	Campbell89, Chittenden96, Delobel-Tran93
Stegobium paniceum	peanut	os	Archibald-Chalmers83, Calderon-Donahaye64, Champ65, Redlinger-Davis82
Stegobium paniceum	peanut oilcake	osp	Rao et al73
Stegobium paniceum	pepper, black	sea	Campbell89, Chittenden96, Lefkovitch67, White57, Zimmerman90
Stegobium paniceum	pepper, cayenne	sea	Archibald-Chalmers83
Stegobium paniceum	pepper, chilli	sea	Tawfik et al85
Stegobium paniceum	pepper, paprika	sea	Archibald-Chalmers83, Campbell89, Okumura-Strong65, Weidner73
Stegobium paniceum	pepper, pod dried chilli	sea	Delobel-Tran93, Patton31, Zimmerman90
Stegobium paniceum	pepper, red	sea	Chittenden96, Lefkovitch67,
Stegobium paniceum	peppermint	sea	Blaisdell92, Chittenden96

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Stegobium paniceum	phane (edible caterpillar)	aninv	Rajendran-Parveen05
Stegobium paniceum	pictures	oc	Patton31
Stegobium paniceum	pigeonpea (arhar, red gram)	p	Rao et al73
Stegobium paniceum	potato flour	rp	Schmidt-Grabner87
Stegobium paniceum	potato starch	rp	Schmidt-Grabner87
Stegobium paniceum	potato, dried	r	Schmidt-Grabner87
Stegobium paniceum	pulse	p	Haines81
Stegobium paniceum	raisin	df	Archibald-Chalmers83
Stegobium paniceum	Rhode Island bent grass seed	se	Archibald-Chalmers83
Stegobium paniceum	rhubarb, dried	v	Archibald-Chalmers83, Chittenden96
Stegobium paniceum	rice	g	Patton31
Stegobium paniceum	root, dried (tuber)	r	Patton31
Stegobium paniceum	root, dried cassava (manioc)	r	Delobel92, Delobel-Tran93
Stegobium paniceum	root, ginger	r	Archibald-Chalmers83, Delobel-Tran93, McFarlane63, Patton31, Richards-Herford30
Stegobium paniceum	root, moghat	r	Abdelghany et al10
Stegobium paniceum	root, orris	r	Chittenden96
Stegobium paniceum	roselle (sorrel)	v	Abdelghany et al10
Stegobium paniceum	rye	g	Patton31
Stegobium paniceum	saffron	sea	Delobel-Tran93, Srivastava-Saxena75, Tawfik et al85
Stegobium paniceum	seafood, dried	aninv	Archibald-Chalmers83
Stegobium paniceum	seaweed, dried	v	Archibald-Chalmers83
Stegobium paniceum	seed	se	Campbell89, Cotton-Good37, Patton31, Schmidt-Grabner87
Stegobium paniceum	sesame seed	os	Archibald-Chalmers83
Stegobium paniceum	sorghum (broomcorn)	g	Strong-Okumura58
Stegobium paniceum	soup mix, dried	oc	Hayhurst-Britten42
Stegobium paniceum	soybean	p	Archibald-Chalmers83
Stegobium paniceum	spice	sea	Aitken75, Archibald-Chalmers83, Campbell89, Delobel-Tran93, Hill02, Lefkovitch67, Schmidt-Grabner87, Srivastava-Saxena75, Patton31
Stegobium paniceum	strychnine	oc	Patton31, Richards-Herford30
Stegobium paniceum	syrup	v	Campbell89
Stegobium paniceum	tapioca chip	rp	Delobel-Tran93
Stegobium paniceum	tarragon	sea	Archibald-Chalmers83
Stegobium paniceum	tobacco leaf	v	Hill02, Lefkovitch67, Livingstone-Reed36, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Stegobium paniceum	tomato, dried	v	Zimmerman90
Stegobium paniceum	turmeric	sea	Abraham75, Delobel-Tran93
Stegobium paniceum	vegetable material, dried	v	Archibald-Chalmers83, Schmidt-Grabner87
Stegobium paniceum	velvet grass seed	se	Archibald-Chalmers83
Stegobium paniceum	walnut	n	Archibald-Chalmers83
Stegobium paniceum	wheat	g	Davies60, Strong-Okumura58, Trematerra-Gentile06
Stegobium paniceum	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Strong-Okumura58
Stegobium paniceum	wheat flour	gp	Buchelos-Athanassiou98, Campbell89, Chittenden96, Patton31, Richards-Herford30, Strong-Okumura58
Stegobium paniceum	wheat germ	gp	Archibald-Chalmers83, Strong-Okumura58
Stegobium paniceum	wheat meal	gp	Campbell89, Chittenden96
Stegobium paniceum	wintergreen	v	Blaisdell92
Stegobium paniceum	wood	w	Delobel-Tran93, Lefkovitch67
Stegobium paniceum	wool	anv	Archibald-Chalmers83
Stegobium paniceum	yam	r	Delobel-Tran93
Stegobium paniceum	yeast	v	Schmidt-Grabner87
Stelidota geminata	peanut	os	Redlinger-Davis82
Stelidota geminata	rice	g	Douglas41
Tenebrio guineensis	bone	anv	Aitken75, Cornes73
Tenebrio guineensis	cocoa bean	bc	Cornes73
Tenebrio guineensis	kidney bean	p	Delobel-Tran93
Tenebrio guineensis	maize	g	Delobel-Tran93
Tenebrio guineensis	peanut	os	Delobel-Tran93
Tenebrio guineensis	rice	g	Delobel-Tran93
Tenebrio guineensis	sheanut	n	Aitken75
Tenebrio guineensis	yam	r	Sauphanor et al87
Tenebrio molitor	animal feed	oc	Archibald-Chalmers83, Gorham91, Strong-Okumura58
Tenebrio molitor	animal product	anv	Aitken75, Hill02
Tenebrio molitor	apple, dried	df	Patton31
Tenebrio molitor	barley	g	Patton31
Tenebrio molitor	biscuit	bg	Delobel-Tran93, Hayhurst-Britten42, Sinha-Watters85
Tenebrio molitor	bread	bg	Campbell89, Delobel-Tran93, Gorham91, Patton31, Sinha-Watters85
Tenebrio molitor	cassava root meal	rp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tenebrio molitor	cereal (cereal product)	gp	Gorham91, Hill02, Sinha-Watters85
Tenebrio molitor	cloth	t	Patton31
Tenebrio molitor	cotton gin trash	res	Gorham91, Strong-Okumura58
Tenebrio molitor	cottonseed	os	Attia-Kamel66
Tenebrio molitor	cracker	bg	Campbell89, Gorham91, Sinha-Watters85
Tenebrio molitor	dried fruit	df	Aitken75, Attia-Kamel66, Delobel-Tran93, Gorham91, Sinha-Watters85
Tenebrio molitor	feather	anv	Campbell89, Gorham91, Sinha-Watters85
Tenebrio molitor	fertilizer	oc	Archibald-Chalmers83, Campbell89, Patton31
Tenebrio molitor	grain debris	res	Hill02
Tenebrio molitor	grain product	gp	Aitken75, Cotton-Good37
Tenebrio molitor	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Campbell89, Cotton-Good37, Patton31, Yan et al10
Tenebrio molitor	hay	v	Buchelos-Athanassiou98
Tenebrio molitor	hide, pelt or skin	anv	Delobel-Tran93
Tenebrio molitor	insect, dried	aninv	Campbell89, Delobel-Tran93, Hill02, Sinha-Watters85
Tenebrio molitor	lentil (masur)	p	Attia-Kamel66
Tenebrio molitor	maize	g	Gorham91
Tenebrio molitor	maize cob	gp	Gorham91, Strong-Okumura58
Tenebrio molitor	maize germ meal	gp	Wohlgemuth-Reichmuth83
Tenebrio molitor	maize meal	gp	Gorham91, Strong-Okumura58
Tenebrio molitor	malt	gp	Attia-Kamel66
Tenebrio molitor	meat scrap	anv	Campbell89, Sinha-Watters85
Tenebrio molitor	meat, cured, dried or smoked	anv	Delobel-Tran93, Gorham91
Tenebrio molitor	millet	g	Archibald-Chalmers83
Tenebrio molitor	nut	n	Aitken75, Delobel-Tran93
Tenebrio molitor	oat	g	Gorham91, Strong-Okumura58, Wohlgemuth-Reichmuth83
Tenebrio molitor	oatmeal	gp	Patton31
Tenebrio molitor	oilcake	osp	Aitken75
Tenebrio molitor	paddy	g	Nayar et al76
Tenebrio molitor	peanut	os	Arthur56, Attia-Kamel66, Champ65, Redlinger-Davis82
Tenebrio molitor	pear, dried	df	Patton31
Tenebrio molitor	pepper, black	sea	Campbell89, Patton31
Tenebrio molitor	porridge	oc	Sinha-Watters85

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tenebrio molitor	potato	r	Delobel-Tran93, Gorham91, Strong-Okumura58
Tenebrio molitor	pulse	p	Aitken75
Tenebrio molitor	pulse product	pp	Aitken75, Nayar et al76
Tenebrio molitor	rice	g	Attia-Kamel66, Patton31
Tenebrio molitor	salt	oc	Campbell89, Patton31
Tenebrio molitor	seed	se	Patton31
Tenebrio molitor	soda ash	oc	Campbell89, Patton31
Tenebrio molitor	tobacco leaf	v	Campbell89, Gorham91
Tenebrio molitor	wheat	g	Archibald-Chalmers83, Hayhurst-Britten42, Wohlgemuth-Reichmuth83
Tenebrio molitor	wheat bran (pollard)	gp	Attia-Kamel66, Buchelos-Athanassiou98, Delobel-Tran93, Gorham91, Hayhurst-Britten42, Sinha-Watters85, Strong-Okumura58
Tenebrio molitor	wheat flour	gp	Attia-Kamel66, Buchelos-Athanassiou98, Campbell89, Delobel-Tran93, Hayhurst-Britten42, Imura03, Sinha-Watters85
Tenebrio molitor	wheat meal	gp	Attia-Kamel66, Campbell89, Hayhurst-Britten42, Sinha-Watters85
Tenebrio obscurus	animal feed	oc	Gorham91, Strong-Okumura58
Tenebrio obscurus	animal product	anv	Aitken75
Tenebrio obscurus	apple, dried	df	Patton31
Tenebrio obscurus	barley	g	Gorham91, Patton31, Strong-Okumura58
Tenebrio obscurus	beet pulp	rp	Gorham91, Strong-Okumura58
Tenebrio obscurus	biscuit	bg	Delobel-Tran93
Tenebrio obscurus	bread	bg	Delobel-Tran93, Patton31
Tenebrio obscurus	carob (locust)	df	Aitken75
Tenebrio obscurus	cereal (cereal product)	gp	Hayhurst-Britten42
Tenebrio obscurus	cloth	t	Patton31
Tenebrio obscurus	cotton gin trash	res	Gorham91, Strong-Okumura58
Tenebrio obscurus	cottonseed	os	Attia-Kamel66, Chittenden96, Gorham91
Tenebrio obscurus	cottonseed meal	osp	Chittenden96, Gorham91, Strong-Okumura58
Tenebrio obscurus	dried fruit	df	Aitken75, Attia-Kamel66, Delobel-Tran93
Tenebrio obscurus	fertilizer	oc	Campbell89, Chittenden96, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tenebrio obscurus	grain product	gp	Aitken75, Cotton-Good37
Tenebrio obscurus	grain, cereal	g	Aitken75, Buchelos-Athanassiou98, Campbell89, Cotton-Good37, Patton31, Yan et al10
Tenebrio obscurus	grain, moldy	gs	Imura03
Tenebrio obscurus	hide, pelt or skin	anv	Delobel-Tran93
Tenebrio obscurus	insect, dried	aninv	Campbell89, Delobel-Tran93
Tenebrio obscurus	lentil (masur)	p	Attia-Kamel66
Tenebrio obscurus	maize	g	Archibald-Chalmers83, Gorham91
Tenebrio obscurus	malt	gp	Attia-Kamel66
Tenebrio obscurus	meat, cured, dried or smoked	anv	Delobel-Tran93
Tenebrio obscurus	medicine, Chinese traditional	me	Guilin et al99
Tenebrio obscurus	nut	n	Aitken75, Delobel-Tran93
Tenebrio obscurus	oatmeal	gp	Patton31
Tenebrio obscurus	oilcake	osp	Aitken75
Tenebrio obscurus	peanut	os	Attia-Kamel66
Tenebrio obscurus	pear, dried	df	Patton31
Tenebrio obscurus	pepper, black	sea	Chittenden96, Gorham91, Patton31
Tenebrio obscurus	potato	r	Delobel-Tran93
Tenebrio obscurus	pulse	p	Aitken75
Tenebrio obscurus	pulse product	pp	Aitken75
Tenebrio obscurus	rice	g	Attia-Kamel66, Patton31
Tenebrio obscurus	salt	oc	Patton31
Tenebrio obscurus	seed	se	Patton31
Tenebrio obscurus	soda ash	oc	Chittenden96, Patton31
Tenebrio obscurus	wheat bran (pollard)	gp	Attia-Kamel66, Delobel-Tran93, Hayhurst-Britten42
Tenebrio obscurus	wheat flour	gp	Atta-Kamel66, Delobel-Tran93, Gorham91, Hayhurst-Britten42
Tenebrio obscurus	wheat flour, decaying	gs	Calderon-Donahaye64, Imura03, Strong-Okumura58
Tenebrio obscurus	wheat meal	gp	Atta-Kamel66, Hayhurst-Britten42
Tenebrio obscurus	wheat, damp moldy	gs	Calderon-Donahaye64
Tenebroides mauritanicus	almond	n	Archibald-Chalmers83, Sinha-Watters85
Tenebroides mauritanicus	almond hull	np	Strong-Okumura58
Tenebroides mauritanicus	animal feed	oc	Archibald-Chalmers83, Hayhurst-Britten42, Hedges-Lacey96, McFarlane63, Pierrard62, Sinha-Watters85, Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tenebroides mauritanicus	annatto seed	se	Zimmerman90
Tenebroides mauritanicus	banana, dried	df	Howe-Freeman55
Tenebroides mauritanicus	barley	g	Calderon-Donahaye64, Delobel-Tran93, Sinha-Watters85, Strong-Okumura58
Tenebroides mauritanicus	basketware, wicker	v	Archibald-Chalmers83
Tenebroides mauritanicus	bean	p	Davies60, Howe-Freeman55
Tenebroides mauritanicus	bean curd	pp	Olsen81
Tenebroides mauritanicus	bean paste	pp	Delobel-Tran93
Tenebroides mauritanicus	beet pulp	rp	Sinha-Watters85, Strong-Okumura58
Tenebroides mauritanicus	biscuit	bg	Archibald-Chalmers83, Calderon-Donahaye64, Campbell89, Delobel-Tran93, Hedges-Lacey96, Sinha-Watters85
Tenebroides mauritanicus	biscuit meal	bg	Hayhurst-Britten42
Tenebroides mauritanicus	bone	anv	Cornes73, Howe-Freeman55
Tenebroides mauritanicus	Brazil nut (para nut)	n	Okumura-Strong65
Tenebroides mauritanicus	bread	bg	Delobel-Tran93, Sinha-Watters85
Tenebroides mauritanicus	carob (locust)	df	Aitken75
Tenebroides mauritanicus	cashew	n	Archibald-Chalmers83, Delobel-Tran93, Nair et al79, Nayar et al76, Pinheiro68
Tenebroides mauritanicus	cassava root chip	rp	Wohlgemuth-Reichmuth83
Tenebroides mauritanicus	cassava root meal	rp	Delobel-Tran93
Tenebroides mauritanicus	castor bean	se	Howe-Freeman55
Tenebroides mauritanicus	cereal (cereal product)	gp	Campbell89, Haines81, Hayhurst-Britten42, Hedges-Lacey96, McFarlane63, Sinha-Watters85
Tenebroides mauritanicus	cinnamon	sea	Delobel-Tran93, Patton31, Sinha-Watters85
Tenebroides mauritanicus	cocoa	bc	Hayhurst-Britten42, Patton31, Richards-Herford30
Tenebroides mauritanicus	cocoa bean	bc	Aitken75, Cornes73, Delobel-Tran93, Howe-Freeman55, Schulten-Roorda84, Sinha-Watters85
Tenebroides mauritanicus	coffee bean	bc	Howe-Freeman55, Zimmerman90
Tenebroides mauritanicus	copra	osp	Archibald-Chalmers83, Delobel-Tran93, Haines81, Howe-Freeman55
Tenebroides mauritanicus	copra meal	osp	Okumura-Strong65, Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tenebroides mauritanicus	copra oilcake	osp	Haines81, Wohlgemuth-Reichmuth83
Tenebroides mauritanicus	cottonseed	os	Cornes73, Cotterell52, Davies60, Delobel-Tran93, Howe-Freeman55, Sinha-Watters85
Tenebroides mauritanicus	cottonseed oilcake	osp	Wohlgemuth-Reichmuth83
Tenebroides mauritanicus	cowpea	p	Cornes73
Tenebroides mauritanicus	currant	df	Hayhurst-Britten42, Patton31, Richards-Herford30
Tenebroides mauritanicus	dried fruit	df	Aitken75
Tenebroides mauritanicus	fishmeal	anv	McFarlane63
Tenebroides mauritanicus	flower, chrysanthemum dried (pyrethrum)	v	Zimmerman90
Tenebroides mauritanicus	fruit	ffv	Campbell89, Hedges-Lacey96, Patton31
Tenebroides mauritanicus	fungus, dried	v	Zimmerman90
Tenebroides mauritanicus	ginger	sea	Abraham75, Cornes73, Howe-Freeman55
Tenebroides mauritanicus	grain product	gp	Aitken75, Campbell89, Cotton-Good37, Patton31
Tenebroides mauritanicus	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Campbell89, Cotton-Good37, Hill02, Patton31, Yan et al10
Tenebroides mauritanicus	grass seed	se	Archibald-Chalmers83
Tenebroides mauritanicus	gum dammar	v	Schulten-Roorda84
Tenebroides mauritanicus	hazel nut	n	Archibald-Chalmers83
Tenebroides mauritanicus	hemp (marijuana)	v	Archibald-Chalmers83
Tenebroides mauritanicus	herb	v	Archibald-Chalmers83
Tenebroides mauritanicus	horn	anv	Archibald-Chalmers83
Tenebroides mauritanicus	hyaciath bean	p	Archibald-Chalmers83
Tenebroides mauritanicus	illipenut	os	Aitken75
Tenebroides mauritanicus	kidney bean	p	Delobel-Tran93
Tenebroides mauritanicus	licorice apricot	rp	Zimmerman90
Tenebroides mauritanicus	maize	g	Calderon-Donahaye64, Caliboso et al86, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Forsyth66, Haines81, Hayhurst-Britten42, Hedges-Lacey96, Imura03, McFarlane63, Patton31, Pierrard62, Sedlacek et al98, Strong-Okumura58, Tadesse96

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tenebroides mauritanicus	maize bran	gp	Davies60
Tenebroides mauritanicus	maize cob	gp	Strong-Okumura58
Tenebroides mauritanicus	maize germ meal	gp	Wohlgemuth-Reichmuth83
Tenebroides mauritanicus	maize meal	gp	Archibald-Chalmers83, Davies60, Pierrard62, Sinha-Watters85
Tenebroides mauritanicus	maize stalk	gp	Strong-Okumura58
Tenebroides mauritanicus	malt	gp	Pierrard62
Tenebroides mauritanicus	mango	ffv	Archibald-Chalmers83
Tenebroides mauritanicus	meat meal	anv	Awadallah et al90
Tenebroides mauritanicus	medicine, Chinese angelica	me	Guilin et al99
Tenebroides mauritanicus	medicine, Chinese traditional	me	Guilin et al99
Tenebroides mauritanicus	medicine, herbal	me	Kamel58, Patton31
Tenebroides mauritanicus	medicine, rhubarb root	me	Weidner73
Tenebroides mauritanicus	millet	g	Delobel-Tran93, Forsyth66, Guilin et al99, Zimmerman90
Tenebroides mauritanicus	mung bean	p	Davies60
Tenebroides mauritanicus	nut	n	Aitken75, Archibald-Chalmers83, Campbell89, Hedges-Lacey96, Schulten-Roorda84
Tenebroides mauritanicus	nut meat	np	Cotton-Good37
Tenebroides mauritanicus	nutmeg (mace)	sea	Delobel-Tran93, Hayhurst-Britten42, Patton31, Richards-Herford30, Schulten-Roorda84, Sinha-Watters85
Tenebroides mauritanicus	oat	g	Hayhurst-Britten42, Hedges-Lacey96, Patton31
Tenebroides mauritanicus	oatmeal	gp	Hayhurst-Britten42
Tenebroides mauritanicus	oilcake	osp	Aitken75
Tenebroides mauritanicus	oilseed	os	Aitken75, Hill02, Schulten-Roorda84
Tenebroides mauritanicus	oilseed meal	osp	McFarlane63
Tenebroides mauritanicus	onion, dried	v	Delobel-Tran93, Ibrahim et al70
Tenebroides mauritanicus	paddy	g	Caliboso et al86, Douglas41, Haines81, McFarlane63, Nayar et al76
Tenebroides mauritanicus	palm kernel	os	Allotey88, Cornes73, Cotterell52, Delobel-Tran93, Howe-Freeman55, Sinha-Watters85
Tenebroides mauritanicus	palm kernel meal	osp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tenebroides mauritanicus	peanut	os	Archibald-Chalmers83, Arthur56, Bissell-DuPree46, Calderon-Donahaye64. Champ65, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Forsyth66, Gorham91, Howe-Freeman55, LaHue et al59, Nayar et al76, Redlinger-Davis82, Schulten-Roorda84, Singh90
Tenebroides mauritanicus	peanut meal	osp	Wohlgemuth-Reichmuth83
Tenebroides mauritanicus	peanut oilcake	osp	Hayhurst-Britten42, Howe-Freeman55, Wohlgemuth-Reichmuth83
Tenebroides mauritanicus	peanut sauce	osp	Zimmerman90
Tenebroides mauritanicus	pepper, chilli	sea	Cotterell52, Howe-Freeman55, Zimmerman90
Tenebroides mauritanicus	pepper, chilli sauce	oc	Zimmerman90
Tenebroides mauritanicus	pistachio	n	Weidner73
Tenebroides mauritanicus	plum, preserved	v	Zimmerman90
Tenebroides mauritanicus	potato	r	Hedges-Lacey96, Sinha-Watters85
Tenebroides mauritanicus	prune	df	Archibald-Chalmers83
Tenebroides mauritanicus	pulse	p	Schulten-Roorda84
Tenebroides mauritanicus	residue	res	Haines81
Tenebroides mauritanicus	rice	g	Archibald-Chalmers83, Cornes73, Cotterell52, Delobel-Tran93, Douglas41, Haines81, Imura03, Nayar et al76, Patton31, Pierrard62, Sinha-Watters85, Stejskal-Kucerova93, Strong-Okumura58, Yao-Lo62, Zimmerman90
Tenebroides mauritanicus	rice bran	gp	Caliboso et al86
Tenebroides mauritanicus	rice meal	gp	Caliboso et al86, McFarlane63
Tenebroides mauritanicus	root, derris (rotenone)	r	Downes-Williams50
Tenebroides mauritanicus	root, dried cassava (manioc)	r	Davies60, Haines81, Pierrard62, Ratti-Rampini77, Sinha-Watters85
Tenebroides mauritanicus	root, lonchocarpus (rotenone)	r	Downes-Williams50
Tenebroides mauritanicus	seaweed, dried	v	Zimmerman90
Tenebroides mauritanicus	seed	se	Hayhurst-Britten42
Tenebroides mauritanicus	sesame seed	os	Archibald-Chalmers83, Cornes73, Howe-Freeman55
Tenebroides mauritanicus	sheanut	n	Howe-Freeman55

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tenebroides mauritanicus	sorghum (broomcorn)	g	Calderon-Donahaye64, Caliboso et al86, Cornes73, Davies60, Delobel-Tran93, Giles64Haines81, Sinha-Watters85, Strong-Okumura58
Tenebroides mauritanicus	soup mix, dried	oc	Zimmerman90
Tenebroides mauritanicus	soybean	p	Archibald-Chalmers83, Cornes73, Howe-Freeman55
Tenebroides mauritanicus	soybean meal	pp	Caliboso et al86
Tenebroides mauritanicus	spice	sea	Aitken75, Archibald-Chalmers83, Campbell89, Delobel-Tran93, Hedges-Lacey96
Tenebroides mauritanicus	Sudan grass seed	se	Sinha-Watters85, Strong-Okumura58
Tenebroides mauritanicus	sultana, dried	df	Hayhurst-Britten42, Patton31, Richards-Herford30
Tenebroides mauritanicus	sunflower seed	os	Athanassov74, Davies60
Tenebroides mauritanicus	tapioca chip	rp	Delobel-Tran93
Tenebroides mauritanicus	tepary bean	p	Davies60
Tenebroides mauritanicus	tobacco leaf	v	Archibald-Chalmers83, Delobel-Tran93, Livingstone-Reed36
Tenebroides mauritanicus	turmeric	sea	Abraham75
Tenebroides mauritanicus	vegetable material, dried	v	Archibald-Chalmers83
Tenebroides mauritanicus	walnut	n	Archibald-Chalmers83
Tenebroides mauritanicus	wheat	g	Archibald-Chalmers83, Athanassiou et al01, Calderon-Donahaye64, Delobel-Tran93, Hayhurst-Britten42, Imura03, Patton31, Strong-Okumura58, Wohlgemuth-Reichmuth83
Tenebroides mauritanicus	wheat bran (pollard)	gp	Archibald-Chalmers83, Attia-Kamel66, Buchelos-Athanassiou98, Calderon-Donahaye64, Davies60, Haines81, Hayhurst-Britten42, Pierrard62, Sinha-Watters85, Wohlgemuth-Reichmuth83
Tenebroides mauritanicus	wheat flour	gp	Attia-Kamel66, Buchelos-Athanassiou98, Calderon-Donahaye64, Haines81, Hayhurst-Britten42, Hill02, Pierrard62, Strong-Okumura58
Tenebroides mauritanicus	wheat germ	gp	Archibald-Chalmers83
Tenebroides mauritanicus	wheat semolina	gp	Sinha-Watters85
Tenebroides mauritanicus	wheat, damp moldy	gs	Archibald-Chalmers83
Tenebroides mauritanicus	wheat, shredded	gp	Davies60

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Thaneroclerus buqueti	animal product	anv	Aitken75
Thaneroclerus buqueti	aniseed (anise spice)	sea	Zimmerman90
Thaneroclerus buqueti	apple, dried	df	Attia-Kamel66
Thaneroclerus buqueti	cassava root chip	rp	Delobel-Tran93, Parker et al81
Thaneroclerus buqueti	cocoa bean	bc	Aitken75, Calderon-Donahaye64, Cornes73, Cotterell52, Delobel-Tran93, McFarlane63, Richards-Herford30
Thaneroclerus buqueti	coffee bean	bc	Delobel-Tran93, McFarlane63
Thaneroclerus buqueti	copra	osp	Aitken75
Thaneroclerus buqueti	ginger	sea	Cornes73, McFarlane63, Richards-Herford30, Weidner73
Thaneroclerus buqueti	grain product	gp	Aitken75
Thaneroclerus buqueti	grain, cereal	g	Aitken75, Yan et al10
Thaneroclerus buqueti	ham	anv	Hill02
Thaneroclerus buqueti	hide, pelt or skin	anv	Hill02
Thaneroclerus buqueti	medicine, herbal	me	Basak91
Thaneroclerus buqueti	nutmeg (mace)	sea	Attia-Kamel66
Thaneroclerus buqueti	oilcake	osp	Aitken75
Thaneroclerus buqueti	oilseed	os	Aitken75
Thaneroclerus buqueti	peanut	os	Cornes73
Thaneroclerus buqueti	root, dried cassava (manioc)	r	Delobel92, Ratti-Rampini77
Thaneroclerus buqueti	sago flour	v	Aitken75
Thaneroclerus buqueti	spice	sea	Aitken75
Thaneroclerus buqueti	sweet basil leaf	sea	Zimmerman90
Thaneroclerus buqueti	sweet potato	r	Davies60
Thaneroclerus buqueti	tobacco leaf	v	Attia-Kamel66, Cornes73, Davies60, Delobel-Tran93. Livingstone-Reed36, Richards-Herford30
Thaneroclerus buqueti	watermelon seed	se	Zimmerman90
Thes bergrothi	cheese	anv	Hinton45
Thes bergrothi	cocoa	bc	Hinton45
Thes bergrothi	date	df	Cotton-Good37, Hinton45, Patton31
Thes bergrothi	grain, cereal	g	Yan et al10
Thes bergrothi	herbarium specimen	v	Hinton45
Thes bergrothi	medicine, Chinese traditional	me	Guilin et al99
Thes bergrothi	rhubarb, Chinese dried	ffv	Hinton45
Thes bergrothi	wheat flour	gp	Cotton-Good37, Hinton45
Thorictodes heydeni	animal feed	oc	Haines81, McFarlane63
Thorictodes heydeni	barley residue	res	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Thorictodes heydeni	bone	anv	Aitken75, Peacock93
Thorictodes heydeni	bone meal	anv	Aitken75, Chatterji-Sarup59
Thorictodes heydeni	cassava root chip	rp	Parker et al81
Thorictodes heydeni	cereal (cereal product)	gp	Delobel-Tran93, Peacock93
Thorictodes heydeni	copra oilcake	osp	Haines81
Thorictodes heydeni	cottonseed oilcake	osp	Aitken75
Thorictodes heydeni	fishmeal	anv	Aitken75, Peacock93
Thorictodes heydeni	grain, cereal	g	Beal03, Cotton-Good37, Yan et al10
Thorictodes heydeni	kapok seed	se	Chatterji-Sarup59, Cotton-Good37
Thorictodes heydeni	linseed	os	Chatterji-Sarup59
Thorictodes heydeni	maize	g	Aitken75, Caliboso et al86, Davies60, Haines81
Thorictodes heydeni	maize meal	gp	Davies60
Thorictodes heydeni	medicine, herbal	me	Basak91
Thorictodes heydeni	millet	g	Cotton-Good37
Thorictodes heydeni	myrabolan	p	Aitken75
Thorictodes heydeni	oilcake	osp	Aitken75, Delobel-Tran93, Peacock93
Thorictodes heydeni	peanut	os	Delobel-Tran93
Thorictodes heydeni	pulse	p	Aitken75, Imura03, Peacock93
Thorictodes heydeni	rape oilcake	osp	Imura03
Thorictodes heydeni	rice	g	Aitken75, Chatterji-Sarup59, Cotton-Good37, Haines74, 81; Peacock93
Thorictodes heydeni	rice bran	gp	Aitken75
Thorictodes heydeni	rice meal	gp	Caliboso et al86
Thorictodes heydeni	root, dried cassava (manioc)	r	Delobel92
Thorictodes heydeni	sesame seed	os	Cotton-Good37, Delobel-Tran93
Thorictodes heydeni	sorghum (broomcorn)	g	Cornes73, Haines81
Thorictodes heydeni	soybean	p	Aitken75, Caliboso et al86
Thorictodes heydeni	soybean meal	pp	Caliboso et al86
Thorictodes heydeni	wheat	g	Attia-Kamel66, Chatterji-Sarup59, Haines81
Thorictodes heydeni	wheat bran (pollard)	gp	Attia-Kamel66, Haines81
Thorictodes heydeni	wheat flour	gp	Imura03
Thylodrias contractus	bedding (blanket, spread)	t	Gorham91, Patton31
Thylodrias contractus	candy	oc	Strong-Okumura58
Thylodrias contractus	cantaloupe seed (casaba)	se	Okumura-Strong65
Thylodrias contractus	cereal (cereal product)	gp	Strong-Okumura58
Thylodrias contractus	cloth	t	Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Thylodrias contractus	fish food	oc	Strong-Okumura58
Thylodrias contractus	grain, cereal	g	Yan et al10
Thylodrias contractus	hair	anv	Delobel-Tran93
Thylodrias contractus	insect, dried	aninv	Campbell89, Patton31, Rajendran-Parveen05
Thylodrias contractus	maize meal	gp	Strong-Okumura58
Thylodrias contractus	medicine, Chinese traditional	me	Guilin et al99
Thylodrias contractus	museum collection	oc	Gorham91, Patton31, Rajendran-Parveen05
Thylodrias contractus	painting	oc	Campbell89
Thylodrias contractus	paper, tissue	wp	Patton31
Thylodrias contractus	pea	p	Forsyth66, Okumura-Strong65
Thylodrias contractus	pepper, black	sea	White57
Thylodrias contractus	rice	g	Okumura-Strong65
Thylodrias contractus	seed	se	Strong-Okumura58
Thylodrias contractus	silk fabric	aninv	Campbell89, VijayVeer et al96
Thylodrias contractus	wool	anv	Campbell89, Rajendran-Parveen05
Tinea pallescentella	blood, dried	anv	Aitken84
Tinea pallescentella	casein, dried	anv	Aitken84
Tinea pallescentella	cereal (cereal product)	gp	Corbet-Tams43
Tinea pallescentella	cloth	t	Hayhurst-Britten42
Tinea pallescentella	cottonseed hull	osp	Aitken84
Tinea pallescentella	feather	anv	Carter84, Hill02
Tinea pallescentella	feathermeal	anv	Aitken84
Tinea pallescentella	fishmeal	anv	Aitken84
Tinea pallescentella	fur	anv	Carter84
Tinea pallescentella	grain, cereal	g	Cotton-Good37, Hayhurst-Britten42
Tinea pallescentella	hair	anv	Hill02
Tinea pallescentella	hide, pelt or skin	anv	Aitken94, Carter84, Corbet-Tams43, Hayhurst-Britten42, McFarlane63
Tinea pallescentella	hoof	anv	Aitken84
Tinea pallescentella	horn	anv	Aitken84
Tinea pallescentella	maize	g	Aitken84
Tinea pallescentella	maize flour	gp	Aitken84
Tinea pallescentella	mohair	anv	Aitken84
Tinea pallescentella	oilcake	osp	Aitken84
Tinea pallescentella	wheat	g	Aitken84
Tinea pallescentella	wool	anv	Aitken94, Carter84, Corbet-Tams43, Hayhurst-Britten42, Hill02

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tinea pellionella	almond	n	Hayhurst-Britten42, Hinton56, Patton31
Tinea pellionella	animal specimen	anv	Hinton56
Tinea pellionella	bone meal	anv	Aitken84
Tinea pellionella	carpet	t	Hayhurst-Britten42
Tinea pellionella	cloth, felt	t	Hayhurst-Britten42
Tinea pellionella	feather	anv	Carter84, Hayhurst-Britten42, Hill02
Tinea pellionella	fishmeal	anv	Strong-Okumura58
Tinea pellionella	fur	anv	Carter84, Hayhurst-Britten42, Hill02, Hinton56, Patton31
Tinea pellionella	furniture, upholstered	oc	Patton31
Tinea pellionella	ginger	sea	Hayhurst-Britten42, Hinton56, Patton31
Tinea pellionella	hair	anv	Hayhurst-Britten42, Hill02
Tinea pellionella	hemp (marijuana)	v	Hinton56, Patton31
Tinea pellionella	hide, pelt or skin	anv	Carter84, Hill02, Hinton56
Tinea pellionella	hoof	anv	Aitken84
Tinea pellionella	horn	anv	Aitken84
Tinea pellionella	horseradish	v	Hayhurst-Britten42, Hinton56, Patton31
Tinea pellionella	leaf, cherry laurel	v	Hayhurst-Britten42, Patton31
Tinea pellionella	linseed	os	Hayhurst-Britten42, Hinton56, Patton31
Tinea pellionella	medicine, aconitum root	me	Hayhurst-Britten42, Hinton56, Patton31
Tinea pellionella	medicine, drug	me	Patton31
Tinea pellionella	mohair	anv	Aitken84, Hinton56
Tinea pellionella	museum collection	oc	Rajendran-Parveen05
Tinea pellionella	mustard leaf, black	v	Patton31
Tinea pellionella	mustard seed, black	se	Hayhurst-Britten42, Hinton56
Tinea pellionella	pepper, cayenne	sea	Hayhurst-Britten42, Hinton56, Patton31
Tinea pellionella	poppy head	v	Hinton56, Patton31
Tinea pellionella	rice	g	Aitken84
Tinea pellionella	root, orris	r	Hayhurst-Britten42, Hinton56, Patton31
Tinea pellionella	saffron	sea	Hayhurst-Britten42, Hinton56, Patton31
Tinea pellionella	soybean meal	pp	Aitken84
Tinea pellionella	tobacco leaf	v	Hayhurst-Britten42, Hinton56
Tinea pellionella	wheat	g	Aitken84
Tinea pellionella	wool	anv	Attia-Kamel66, Calderon-Donahaye64, Carter84, Hayhurst-Britten42, Hill02, Hinton56Rajendran-Parveen05
Tineola bisselliella	albumin with drugs	oc	Cox-Pinniger07, Hinton56
Tineola bisselliella	animal product	anv	Gorham91
Tineola bisselliella	animal specimen, bird skin	anv	Cox-Pinniger07, Imura03

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tineola bisselliella	animal specimen, imperfectly cleaned skeleton	anv	Cox-Pinniger07
Tineola bisselliella	barley	g	Hinton56
Tineola bisselliella	blood meal	anv	Aitken84
Tineola bisselliella	bone meal	anv	Aitken84
Tineola bisselliella	book	oc	Cox-Pinniger07
Tineola bisselliella	bread	bg	Hinton56
Tineola bisselliella	bristle	anv	Hinton56
Tineola bisselliella	carpet	t	Hayhurst-Britten42
Tineola bisselliella	cereal (cereal product)	gp	Corbet-Tams43, Cox-Pinniger07, Gorham91, Hinton56
Tineola bisselliella	cloth	t	Corbet-Tams43, Cox-Pinniger07, Hayhurst-Britten42, Hill02
Tineola bisselliella	cottonseed oilcake	osp	Hinton56
Tineola bisselliella	feather	anv	Carter84, Cox-Pinniger07, Gorham91, Hayhurst-Britten42, Hinton56
Tineola bisselliella	feathermeal	anv	Aitken84, Okumura-Strong65
Tineola bisselliella	fishmeal	anv	Cox-Pinniger07, Griswold-Crowell36, Hill02
Tineola bisselliella	fur	anv	Carter84, Cox-Pinniger07, Hinton56, Patton31
Tineola bisselliella	furniture, upholstered	oc	Cox-Pinniger07, Hinton56
Tineola bisselliella	grain, cereal	g	Cotton-Good37, Yan et al10
Tineola bisselliella	hair	anv	Cox-Pinniger07, Gorham91, Hayhurst-Britten42, Hinton56, Patton31
Tineola bisselliella	hide, pelt or skin	anv	Aitken84, Carter84, Cox-Pinniger07, Haines74, Hayhurst-Britten42, Hill02, Hinton56
Tineola bisselliella	insect, dried	aninv	Cox-Pinniger07, Hinton56
Tineola bisselliella	lettuce seed	se	Stejskal-Horak99
Tineola bisselliella	maize	g	Hayhurst-Britten42, Hinton56
Tineola bisselliella	meat extract, dried	anv	Cox-Pinniger07
Tineola bisselliella	medicine, drug	me	Hinton56
Tineola bisselliella	medicine, herbal	me	Imura03
Tineola bisselliella	mohair	anv	Aitken84
Tineola bisselliella	museum collection, mummy	oc	Cox-Pinniger07, Hinton56, Rajendran-Parveen05
Tineola bisselliella	oat	g	Hinton56
Tineola bisselliella	paper	wp	Cox-Pinniger07

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tineola bisselliella	piano felt	oc	Cox-Pinniger07
Tineola bisselliella	seed	se	Cox-Pinniger07
Tineola bisselliella	silk, soiled	aninv	Cox-Pinniger07
Tineola bisselliella	soybean meal	pp	Cox-Pinniger07
Tineola bisselliella	wheat	g	Hayhurst-Britten42
Tineola bisselliella	wheat bran (pollard)	gp	Hinton56
Tineola bisselliella	wool	anv	Attia-Kamel66, Carter84, Cotton-Good37, Gorham91, Hayhurst-Britten42, Hill02, Hinton56, Imura03, Patton31, Rajendran-Parveen05
Tribolium castaneum	adzuki bean	p	Archibald-Chalmers83
Tribolium castaneum	alfalfa meal	v	Pierrard62
Tribolium castaneum	alfalfa seed (lucerne)	se	Campbell89, Gorham91, Sinha-Watters85, Strong-Okumura58
Tribolium castaneum	almond	n	Davies60, Gorham91, Hayhurst-Britten42, Richards-Herford30, Sinha-Watters85, Strong-Okumura58
Tribolium castaneum	animal feed	oc	Allotey et al97, Hayhurst-Britten42, McFarlane63, Pierrard62, Stejskal06, Strong-Okumura58, Walker79
Tribolium castaneum	animal product	anv	Aitken75
Tribolium castaneum	apricot	ffv	Archibald-Chalmers83
Tribolium castaneum	asbestos	oc	Archibald-Chalmers83
Tribolium castaneum	bambara groundnut	p	Forsyth66
Tribolium castaneum	banana, dried	df	Howe-Freeman55
Tribolium castaneum	bari (sundried pulse cake)	pp	Joshi-Srivastava64
Tribolium castaneum	barley	g	Archibald-Chalmers83, Athanassiou et al10, Buchelos-Katopodis95, Delobel-Tran83, Gorham91, Haines81, Mookherjee et al68, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83, Zimmerman90
Tribolium castaneum	basketware, wicker	v	Archibald-Chalmers83
Tribolium castaneum	bean	p	Archibald-Chalmers83, Campbell89, Davies60, Gorham91, Howe-Freeman55, Kiritani59, Sinha-Watters85
Tribolium castaneum	bean cake	pp	Zimmerman90
Tribolium castaneum	bean noodle	pp	Olsen81

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	bean sauce, chili	oc	Zimmerman90
Tribolium castaneum	bean sauce, yellow	oc	Zimmerman90
Tribolium castaneum	bean thread	pp	Archibald-Chalmers83
Tribolium castaneum	bean, split	pp	Zimmerman90
Tribolium castaneum	betel nut (areca nut)	n	Archibald-Chalmers83
Tribolium castaneum	biscuit meal	bg	Hayhurst-Britten42, Zimmerman90
Tribolium castaneum	black gram (mash, urd)	p	Delobel-Tran93
Tribolium castaneum	bone	anv	Howe-Freeman55, Pierrard62
Tribolium castaneum	Brazil nut (para nut)	n	Gorham91
Tribolium castaneum	bread	bg	Archibald-Chalmers83
Tribolium castaneum	caneware	v	Archibald-Chalmers83
Tribolium castaneum	caraway seed	se	Archibald-Chalmers83
Tribolium castaneum	cardamom	sea	Abraham75, Archibald-Chalmers83, Sarkate et al78
Tribolium castaneum	cardboard	wp	Archibald-Chalmers83
Tribolium castaneum	carob (locust)	df	Aitken75, Calderon-Donahaye64
Tribolium castaneum	carpet	t	Archibald-Chalmers83
Tribolium castaneum	carrot	r	Forsyth66
Tribolium castaneum	cashew	n	Archibald-Chalmers83, Nair et al79, Nayar et al76, Pinheiro68, Sarkate et al78, Weidner73
Tribolium castaneum	cassava root chip	rp	Gnonlonfin et al 08, Gorham91, Parker et al81, Wohlgemuth-Reichmuth83
Tribolium castaneum	cassava root meal	rp	Cotterell52, Delobel-Tran83
Tribolium castaneum	castor bean	se	Delobel-Tran93, Howe-Freeman55, Kiritani59
Tribolium castaneum	cat food	oc	Gorham91
Tribolium castaneum	cereal (cereal product)	gp	Calderon-Donahaye64, Campbell89, Cotton-Good37, Gorham91, Haines81, Hayhurst-Britten42, Hill02, McFarlane63, Patton31, Richards-Herford30, Sarkate et al78
Tribolium castaneum	chicory	sea	Archibald-Chalmers83, Basak91
Tribolium castaneum	chirauli nut	n	Sarkate et al78
Tribolium castaneum	chocolate	bc	Archibald-Chalmers83, Campbell89, Cotton-Good37, Delobel-Tran93, Forsyth66, Hill02, Sinha-Watters85
Tribolium castaneum	citrus pulp, dried	dfp	Laudani et al59

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	cinnamon	sea	Gorham91
Tribolium castaneum	cloth	t	Archibald-Chalmers83
Tribolium castaneum	cocoa bean	bc	Aitken75, Archibald-Chalmers83, Delobel-Tran93, Cornes73, Cotterell52, Gorham91, Hayhurst-Britten42, Hill02, Howe-Freeman55, McFarlane63, Olsen81, Richards-Herford30, Schulten-Roorda84, Sinha-Watters85
Tribolium castaneum	coffee	bc	Archibald-Chalmers83, Cornes73, Hill02, Pierrard62
Tribolium castaneum	coffee bean	bc	Howe-Freeman55, Zimmerman90
Tribolium castaneum	copra	osp	Aitken75, Archibald-Chalmers83, Bawalan04, Calderon-Donahaye64, Cornes73, Delobel-Tran93, Forsyth66, Gorham91, Haines81, Howe-Freeman55, Kiritani59, McFarlane63
Tribolium castaneum	copra meal	osp	Bawalan04, Gorham91, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83
Tribolium castaneum	copra oilcake	osp	Haines81, Sinha-Watters85
Tribolium castaneum	coriander	sea	Archibald-Chalmers83
Tribolium castaneum	cotton	t	Hayhurst-Britten42
Tribolium castaneum	cotton gin trash	res	Archibald-Chalmers83, Gorham91, Hayhurst-Britten42, Sinha-Watters85, Strong-Okumura58
Tribolium castaneum	cottonseed	os	Attia-Kamel66, Bissell36, Calderon-Donahaye64, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Haines81, Howe-Freeman55, Kiritani59, Pierrard62, Sarkate et al78, Sinha-Watters85, Strong-Okumura58, Walker79
Tribolium castaneum	cottonseed meal	osp	Hayhurst-Britten42, Sinha-Watters85, Strong-Okumura58
Tribolium castaneum	cottonseed oilcake	osp	Davies60, Hayhurst-Britten42, Pierrard62
Tribolium castaneum	cowpea	p	Cornes73, Forsyth66, Stejskal06, Walker79
Tribolium castaneum	date	df	Archibald-Chalmers83, Donahaye-Calderon64,
Tribolium castaneum	dill seed	se	Zimmerman90
Tribolium castaneum	dog biscuit	bg	Hayhurst-Britten42
Tribolium castaneum	dog food	oc	Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	dried fruit	df	Aitken75, Archibald-Chalmers83, Attia-Kamel66, Calderon-Donahaye64, Campbell89, Cotton-Good37, Delobel-Tran93, Gorham91, Hayhurst-Britten42, Hill02, Imura03, Richards-Herford30, Sarkate et al78, Sinha-Watters85
Tribolium castaneum	egg plant seed	se	Mookherjee et al70
Tribolium castaneum	feather	anv	Archibald-Chalmers83
Tribolium castaneum	fennel seed	se	Zimmerman90
Tribolium castaneum	fertilizer	oc	Archibald-Chalmers83
Tribolium castaneum	fig	ffv	Gorham91, Hayhurst-Britten42, Okumura-Strong65, Richards-Herford30
Tribolium castaneum	fish food	oc	Rajendran-Parveen05
Tribolium castaneum	fish, dried	anv	Archibald-Chalmers83, Imura03
Tribolium castaneum	fishmeal	anv	Haines81, Pierrard62
Tribolium castaneum	flax	v	Gorham91
Tribolium castaneum	flax seed	os	Gorham91, Sinha-Watters85, Strong-Okumura58
Tribolium castaneum	fungus, dried	v	Zimmerman90
Tribolium castaneum	ginger	sea	Archibald-Chalmers83, Campbell89, Cornes73, Delobel-Tran93, Gorham91, Howe-Freeman55, McFarlane63, Sarkate et al78, Sinha-Watters85, Weidner73
Tribolium castaneum	gourd (squash)	ffv	Archibald-Chalmers83
Tribolium castaneum	grain product	gp	Aitken75
Tribolium castaneum	grain residue	res	Gorham91
Tribolium castaneum	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Calderon-Donahaye64, Chittenden96, Gorham91, Imura03, Yan et al10
Tribolium castaneum	grass seed	se	Archibald-Chalmers83
Tribolium castaneum	gum arabic	v	Schulten-Roorda84
Tribolium castaneum	gum dammar	v	Hayhurst-Britten42
Tribolium castaneum	hay	v	Buchelos-Athanassiou98
Tribolium castaneum	hazel nut	n	Archibald-Chalmers83
Tribolium castaneum	herb	v	Archibald-Chalmers83, Zimmerman90
Tribolium castaneum	herbarium specimen	v	Campbell89, Cotton-Good37
Tribolium castaneum	hide, pelt or skin	anv	Archibald-Chalmers83, Howe-Freeman55
Tribolium castaneum	hyaciath bean	p	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	illipenut	os	Aitken75
Tribolium castaneum	insect, dried	aninv	Campbell89, Cotton-Good37, Davies60, Delobel-Tran93, Sinha-Watters85
Tribolium castaneum	jujube	df	Guilin et al99
Tribolium castaneum	kapok seed	se	Archibald-Chalmers83, Kiritani59, Wohlgemuth-Reichmuth83
Tribolium castaneum	kidney bean	p	Delobel-Tran93, Haines81
Tribolium castaneum	lac	aninv	Hayhurst-Britten42
Tribolium castaneum	lady's finger seed	se	Mookherjee et al70
Tribolium castaneum	leaf, dried	v	Zimmerman90
Tribolium castaneum	lentil (masur)	p	Archibald-Chalmers83, Attia-Kamel66, Delobel-Tran93, Gorham91, Hayhurst-Britten42, Richards-Herford30
Tribolium castaneum	lima bean	p	Gorham91, Hayhurst-Britten42, Richards-Herford30
Tribolium castaneum	lime pickle in oil	oc	Zimmerman90
Tribolium castaneum	linseed flake	osp	Hayhurst-Britten42
Tribolium castaneum	lotus	v	Archibald-Chalmers83
Tribolium castaneum	maize	g	Allotey et al97, Archibald-Chalmers83, Buchelos-Katopodis95, Caliboso et al86, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Forsyth66, Gorham91, Haines74, 81; Hayhurst-Britten42, Kiritani59, McFarlane63, Peng98, Sinha-Watters85, Stejskal06, Sukprakarn86, Tadesse96, Wohlgemuth-Reichmuth83
Tribolium castaneum	maize bran	gp	Davies60
Tribolium castaneum	maize flour	gp	Archibald-Chalmers83
Tribolium castaneum	maize germ meal	gp	Wohlgemuth-Reichmuth83
Tribolium castaneum	maize meal	gp	Archibald-Chalmers83, Davies60, Haines81, Hayhurst-Britten42, Pierrard62
Tribolium castaneum	maize starch	gp	Schmidt-Grabner87
Tribolium castaneum	malt	gp	Attia-Kamel66, Pierrard62
Tribolium castaneum	malt culm	gp	Hayhurst-Britten42
Tribolium castaneum	mango	ffv	Archibald-Chalmers83
Tribolium castaneum	mango seed	se	Cornes73
Tribolium castaneum	marking nut	n	Sarkate et al78
Tribolium castaneum	medicine, Chinese traditional	me	Guilin et al99
Tribolium castaneum	medicine, hawthorn fruit	me	Guilin et al99

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	medicine, herbal	me	Basak91, Campbell89, Cotton-Good37, Kamel58
Tribolium castaneum	medicine, hibiscus flower	me	Weidner73
Tribolium castaneum	medicine, kava kava root	me	Weidner73
Tribolium castaneum	milk, dried	anv	Archibald-Chalmers83, Rajendran-Parveen05, Sinha-Watters85, Somerfield et al80
Tribolium castaneum	millet	g	Archibald-Chalmers83, Cornes73, Delobel-Tran93, Forsyth66, Gorham91, Guilin et al99, Mookherjee et al70, Sarkate et al78, Sinha-Watters85, Stejskal06, Strong-Okumura58
Tribolium castaneum	molasses meal	v	Archibald-Chalmers83
Tribolium castaneum	mung bean	p	Archibald-Chalmers83, Caliboso et al86, Haines81, Zimmerman90
Tribolium castaneum	mushroom, dried	v	Archibald-Chalmers83, Zimmerman90
Tribolium castaneum	mustard	sea	Gorham91
Tribolium castaneum	nigerseed	se	Casteels et al96
Tribolium castaneum	noodle	gp	Olsen81, Zimmerman90
Tribolium castaneum	nut	n	Aitken75, Archibald-Chalmers83, Campbell89, Cotton-Good37, Hill02, Imura03, McFarlane63, Schulten-Roorda84, Sinha-Watters85
Tribolium castaneum	nutmeg seed	se	Archibald-Chalmers83, Delobel-Tran93, Forsyth66, Gorham91, Hayhurst-Britten42, Richards-Herford30, Schulten-Roorda84
Tribolium castaneum	oat	g	Gorham91, Hayhurst-Britten42, Strong-Okumura58, Wohlgemuth-Reichmuth83
Tribolium castaneum	oat, rolled	gp	Hayhurst-Britten42
Tribolium castaneum	oatmeal	gp	Hayhurst-Britten42
Tribolium castaneum	oilcake	osp	Aitken75, Gorham91
Tribolium castaneum	oilseed	os	Aitken75, Sarkate et al78, Schulten-Roorda84
Tribolium castaneum	oilseed cake	osp	Sinha-Watters85
Tribolium castaneum	oilseed meal	osp	McFarlane63
Tribolium castaneum	oilseed product	osp	Sinha-Watters85
Tribolium castaneum	onion, dried	v	Haines81, Ibrahim et al70
Tribolium castaneum	oregano (marjoram)	sea	Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	paddy	g	Caliboso et al86, Haines74, 81; McFarlane63, Mookherjee et al68, Nayar et al76, Pires et al07, Sinha-Watters85
Tribolium castaneum	palm kernel	os	Allotey88, Cornes73, Cotterell52, Howe-Freeman55, Kiritani59
Tribolium castaneum	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Tribolium castaneum	palm kernel oilcake	osp	Pierrard62
Tribolium castaneum	pea	p	Campbell89, Sinha-Watters85, Strong-Okumura58
Tribolium castaneum	peanut	os	Archibald-Chalmers83, Arthur56, Attia-Kamel66, Bissell-DuPree46, Calderon-Donahaye64, Champ65, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Forsyth66, Haines81, Hayhurst-Britten42, Howe-Freeman55, Kiritani59, Nayar et al76, Patton31, Pierrard62, Redlinger-Davis82, Richards-Herford30, Sarkate et al78, Schulten-Roorda84, Singh90, Sinha-Watters85, Walker79, Wohlgemuth-Reichmuth83
Tribolium castaneum	peanut candy	oc	Olsen81
Tribolium castaneum	peanut meal	osp	Wohlgemuth-Reichmuth83
Tribolium castaneum	peanut oilcake	osp	Davies60, Howe-Freeman55
Tribolium castaneum	peanut, shelled	osp	Wohlgemuth-Reichmuth83
Tribolium castaneum	pecan	n	Archibald-Chalmers83, Gecan et al71
Tribolium castaneum	pecan meat	np	Gecan et al71
Tribolium castaneum	pepper, black	sea	White57
Tribolium castaneum	pepper, cayenne	sea	Campbell89, Sinha-Watters85
Tribolium castaneum	pepper, chilli	sea	Archibald-Chalmers83, Cotterell52, Gorham91, Hayhurst-Britten42, Howe-Freeman55, Olsen81, Richards-Herford30, Zimmerman87, 90
Tribolium castaneum	phane (edible caterpillar)	aninv	Rajendran-Parveen05
Tribolium castaneum	pigeonpea (arhar, red gram)	p	Archibald-Chalmers83, Singh90
Tribolium castaneum	pimento	sea	McFarlane63
Tribolium castaneum	pineapple	ffv	Archibald-Chalmers83
Tribolium castaneum	pineapple plant, decaying	sp	Gorham91
Tribolium castaneum	pistachio	n	Weidner73
Tribolium castaneum	poppy	v	Delobel-Tran93
Tribolium castaneum	potash	oc	Archibald-Chalmers83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	pulse	p	Aitken75, Hill02, Imura03, Sarkate et al78, Schulten-Roorda84, Sinha-Watters85
Tribolium castaneum	pulse product	pp	Aitken75
Tribolium castaneum	radish seed	se	Mookherjee et al70
Tribolium castaneum	raisin	df	Archibald-Chalmers83, Donohoe39, Gorham91, Patton31, Strong-Okumura58
Tribolium castaneum	rapeseed (canola)	os	Imura03, Sinha-Watters85, Wohlgemuth-Reichmuth83
Tribolium castaneum	residue	res	Haines81
Tribolium castaneum	rice	g	Archibald-Chalmers83, Attia-Kamel66, Casteels et al96, Chittenden96, Cornes73, Cotterell52, Davies60, Delobel-Tran93, Douglas41, Gorham91, Forsyth66, Haines74, 81; Hayhurst-Britten42, Kim et al88, Kiritani59, Nayar et al76, Pierrard62, Pires et al07, Rao et al73, Sinha-Watters85, Stejskal-Kucerova93, Strong-Okumura58, Sukprakarn86, Wohlgemuth-Reichmuth83 , Zimmerman90
Tribolium castaneum	rice bran	gp	Archibald-Chalmers83, Caliboso et al86, Haines81, Sinha-Watters85
Tribolium castaneum	rice flour	gp	Kiritani59
Tribolium castaneum	rice meal	gp	Caliboso et al86, Hayhurst-Britten42, McFarlane63, Pierrard62
Tribolium castaneum	rice stick	gp	Zimmerman90
Tribolium castaneum	rice, broken	gp	Sarkate et al78
Tribolium castaneum	root, derris (rotenone)	r	Gorham91
Tribolium castaneum	root, dried (tuber)	r	Campbell89
Tribolium castaneum	root, dried cassava (manioc)	r	Davies60, Delobel92, Delobel-Tran93, Forsyth66, Pierrard62, Ratti-Rampini77
Tribolium castaneum	root, lonchocarpus (rotenone)	r	Downes-Williams50
Tribolium castaneum	root, orris	r	Gorham91, Sinha-Watters85
Tribolium castaneum	rubber	oc	Hayhurst-Britten42, Richards-Herford30
Tribolium castaneum	rubber seed cake	v	Haines81
Tribolium castaneum	rye	g	Gorham91, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	safflower	os	Gorham91, Strong-Okumura58, Wohlgemuth-Reichmuth83
Tribolium castaneum	sago	v	Delobel-Tran93, Sinha-Watters85
Tribolium castaneum	sago flour	v	Aitken75
Tribolium castaneum	seafood, dried	aninv	Archibald-Chalmers83
Tribolium castaneum	seed	se	Cotton-Good37
Tribolium castaneum	sesame seed	os	Archibald-Chalmers83, Cornes73, Howe-Freeman55, Kiritani59, Nayar et al76, Wohlgemuth-Reichmuth83, Zimmerman90
Tribolium castaneum	shallot, fried	v	Zimmerman90
Tribolium castaneum	sheanut	n	Cornes73, Cotterell52, Davies60, Howe-Freeman55
Tribolium castaneum	silkworm cocoon	aninv	Rajendran-Parveen05
Tribolium castaneum	sisal	v	Archibald-Chalmers83
Tribolium castaneum	snuff	v	Campbell89, Gorham91, Sinha-Watters85
Tribolium castaneum	sorghum (broomcorn)	g	Caliboso et al86, Casteels et al96, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Giles64, Gorham91, Gupta et al04, Haines74, 81; Mookherjee et al68, Patton31, Peng98, Sinha-Watters85, Stejskal06, Strong-Okumura58, Sukprakarn86,Walker79, Wohlgemuth-Reichmuth83
Tribolium castaneum	sorghum meal	gp	Pierrard62
Tribolium castaneum	soup mix, dried	oc	Zimmerman90
Tribolium castaneum	soy grit	pp	Sinha-Watters85
Tribolium castaneum	soybean	p	Archibald-Chalmers83, Caliboso et al86, Cornes73, Delobel-Tran93, Howe-Freeman55, Singh90, Wohlgemuth-Reichmuth83, Zimmerman90
Tribolium castaneum	soybean flour	pp	Hayhurst-Britten42, Singh90, Sinha-Watters85
Tribolium castaneum	soybean meal	pp	Archibald-Chalmers83, Caliboso et al86
Tribolium castaneum	spice	sea	Aitken75, Archibald-Chalmers83, Campbell89, Cotton-Good37, Hill02, Imura03, Kiritani59, Sarkate et al78, Sinha-Watters85

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	straw	v	Archibald-Chalmers83
Tribolium castaneum	sugar	v	Archibald-Chalmers83, Pierrard62
Tribolium castaneum	sultana, dried	df	Gorham91, Hayhurst-Britten42, Richards-Herford30
Tribolium castaneum	sunflower	os	Sinha-Watters85
Tribolium castaneum	sunflower seed	os	Athanassou74, Gorham91, Haines81, Okumura-Strong65, Stojanovic-Kosovac74, Weidner73
Tribolium castaneum	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Tribolium castaneum	sweet potato	r	Davies60
Tribolium castaneum	tamarind	v	Zimmerman90
Tribolium castaneum	tapioca	r	Archibald-Chalmers83, Delobel-Tran93, Gorham91
Tribolium castaneum	tapioca seed	se	Hayhurst-Britten42, Richards-Herford30
Tribolium castaneum	taro	r	Archibald-Chalmers83
Tribolium castaneum	tobacco leaf	v	Cornes73, Davies60, Livingstone-Reed36
Tribolium castaneum	tomato seed	se	Forsyth66, Mookherjee et al70
Tribolium castaneum	tomato, dried	v	Zimmerman90
Tribolium castaneum	turmeric	sea	Archibald-Chalmers83, Sarkate et al78
Tribolium castaneum	vegetable, preserved	v	Sarkate et al78
Tribolium castaneum	walnut	n	Archibald-Chalmers83, Calderon-Donahaye64, Sinha-Watters85
Tribolium castaneum	water chestnut powder	v	Zimmerman90
Tribolium castaneum	wheat	g	Archibald-Chalmers83, Athanassiou et al01, 03, 05, 06; Caliboso et al86, Cornes73, Davies60, Delobel-Tran93, Gorham91, Gupta et al04, Haines74, 81; Hayhurst-Britten42, Mookherjee et al68, Rao et al73, Sinha-Watters85, Strong-Okumura58, Trematerra-Gentile06, Wohlgemuth-Reichmuth83
Tribolium castaneum	wheat bran (pollard)	gp	Attia-Kamel66, Buchelos-Athanassiou98, Delobel-Tran93, Gorham91, Haines81, Pierrard62, Richards-Herford30, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium castaneum	wheat chaff	gp	Archibald-Chalmers83
Tribolium castaneum	wheat flour	gp	Archibald-Chalmers83, Attia-Kamel66, Buchelos-Athanassiou98, Calderon-Donahaye64, Caliboso et al86, Campbell89, Chittenden96, Cornes73, Davies60, Delobel-Tran93, Forsyth66, Gorham91, Haines81, Hayhurst-Britten42, Imura03, Pierrard62, Richards-Herford30, Sinha-Watters85, Strong-Okumura58
Tribolium castaneum	wheat flour mix	gp	Olsen81
Tribolium castaneum	wheat flour stick	gp	Zimmerman90
Tribolium castaneum	wheat germ meal	gp	Davies60
Tribolium castaneum	wheat meal	gp	Attia-Kamel66, Chittenden96, Hayhurst-Britten42
Tribolium castaneum	wheat, damp moldy	gs	Archibald-Chalmers83
Tribolium castaneum	wood	w	McFarlane63
Tribolium castaneum	wool	anv	Hayhurst-Britten42
Tribolium castaneum	yam	r	Delobel-Tran93, Gorham91, Iheagwam86, Sauphanor et al87
Tribolium castaneum	yam chip	rp	Gnonlonfin et al 08
Tribolium castaneum	yarn	t	Archibald-Chalmers83
Tribolium castaneum	yeast	v	Campbell89, Cotton-Good37, Sinha-Watters85
Tribolium confusum	acorn	n	Patton31
Tribolium confusum	almond meat	np	Gorham91, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	animal feed	oc	Allotey et al97, Campbell89, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	animal product	anv	Aitken75, Hayhurst-Britten42
Tribolium confusum	baking powder	oc	Campbell89, Chittenden96, Gorham91, Patton31
Tribolium confusum	bambara groundnut	p	Forsyth66
Tribolium confusum	barley	g	Buchelos-Katopodis95, Delobel-Tran93, Gorham91, Strong-Okumura58, Wohlgemuth-Reichmuth83
Tribolium confusum	barley flour	gp	Sinha-Watters85
Tribolium confusum	barley meal	gp	Wohlgemuth-Reichmuth83
Tribolium confusum	basketware, wicker	v	Hayhurst-Britten42

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium confusum	bean	p	Campbell89, Chittenden96, Gorham91, Kiritani59, Patton31, Richards-Herford30, Sinha-Watters85
Tribolium confusum	beet pulp	rp	Gorham91, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	biscuit	bg	Gorham91, Hayhurst-Britten42, Richards-Herford30
Tribolium confusum	biscuit meal	bg	Hayhurst-Britten42
Tribolium confusum	broad bean (fava bean, horsebean)	p	Gorham91
Tribolium confusum	cake	bg	Patton31
Tribolium confusum	cardamon	sea	Tawfik et al85
Tribolium confusum	carob (locust)	df	Aitken75
Tribolium confusum	cashew	n	Gorham91, Hayhurst-Britten42, Richards-Herford30
Tribolium confusum	cassava root meal	rp	Pierrard62, Wohlgemuth-Reichmuth83
Tribolium confusum	cereal (cereal product)	gp	Calderon-Donahaye64, Campbell89, Gorham91, Patton31, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	cheese	anv	Rajendran-Parveen05
Tribolium confusum	chocolate	bc	Campbell89, Delobel-Tran83, Gorham91, Sinha-Watters85
Tribolium confusum	citrus pulp, dried	dfp	Laudani et al59
Tribolium confusum	cocoa	bc	Archibald-Chalmers83, Gorham91, Patton31, Richards-Herford30
Tribolium confusum	cocoa bean	bc	Aitken75, Cornes73, Hayhurst-Britten42, Howe-Freeman55
Tribolium confusum	coffee bean	bc	Howe-Freeman55, Olsen81
Tribolium confusum	copra	osp	Howe-Freeman55
Tribolium confusum	copra meal	osp	Wohlgemuth-Reichmuth83
Tribolium confusum	copra oilcake	osp	Wohlgemuth-Reichmuth83
Tribolium confusum	coriander	sea	Tawfik et al85
Tribolium confusum	cotton	t	Hayhurst-Britten42, Patton31
Tribolium confusum	cottonseed	os	Attia-Kamel66, Delobel-Tran93, Gorham91, Howe-Freeman55, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	cottonseed hull	osp	Gorham91, Strong-Okumura58
Tribolium confusum	cottonseed meal	osp	Gorham91, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	cottonseed meal pellet	osp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium confusum	cottonseed oilcake	osp	Hayhurst-Britten42,
Tribolium confusum	cowpea	p	Cornes73, Haines81
Tribolium confusum	dallisgrass seed	se	Archibald-Chalmers83
Tribolium confusum	date	df	Donahaye-Calderon64
Tribolium confusum	dried fruit	df	Aitken75, Attia-Kamel66, Calderon-Donahaye64, Campbell89, Delobel-Tran93, Gorham91, Imura03, Sinha-Watters85
Tribolium confusum	ginger	sea	Campbell89, Chittenden96, Delobel-Tran93, Gorham91, Howe-Freeman55, Patton31, Tawfik et al85, Weidner73
Tribolium confusum	grain product	gp	Aitken75, Gorham91
Tribolium confusum	grain residue	res	Hayhurst-Britten42
Tribolium confusum	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Calderon-Donahaye64, Campbell89, Imura03, Gorham91, Yan et al10
Tribolium confusum	hay	v	Buchelos-Athanassiou98
Tribolium confusum	hemp (marijuana)	v	Campbell89
Tribolium confusum	herb	v	Archibald-Chalmers83
Tribolium confusum	herbarium specimen	v	Campbell89
Tribolium confusum	horse radish	v	Tawfik et al85
Tribolium confusum	insect, dried	aninv	Campbell89, Chittenden96, Gorham91
Tribolium confusum	kapok seed	se	Wohlgemuth-Reichmuth83
Tribolium confusum	kava	ffv	Archibald-Chalmers83
Tribolium confusum	kidney bean	p	Delobel-Tran93
Tribolium confusum	lentil (masur)	p	Attia-Kamel66
Tribolium confusum	linseed	os	Wohlgemuth-Reichmuth83
Tribolium confusum	linseed flake	osp	Hayhurst-Britten42
Tribolium confusum	linseed meal	osp	Wohlgemuth-Reichmuth83
Tribolium confusum	maize	g	Allotey et al97, Buchelos-Katopodis95, Campbell89, Chittenden96, Cornes73, Delobel-Tran93, Forsyth66, Gorham91, Haines74, 81; Hayhurst-Britten42, Richards-Herford30, Strong-Okumura58, Tadesse96,Wohlgemuth-Reichmuth83
Tribolium confusum	maize germ meal	gp	Wohlgemuth-Reichmuth83
Tribolium confusum	maize meal	gp	Davies60, Gorham91, Hayhurst-Britten42, Sinha-Watters85

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium confusum	maize starch	gp	Gorham91
Tribolium confusum	malt	gp	Attia-Kamel66
Tribolium confusum	malt culm	gp	Hayhurst-Britten42
Tribolium confusum	medicine, hawthorn berry	me	Weidner73
Tribolium confusum	medicine, herbal	me	Campbell89, Kamel58, Patton31
Tribolium confusum	medicine, passion flower	me	Weidner73
Tribolium confusum	medicine, slippery elm	me	Chittenden96, Sinha-Watters85
Tribolium confusum	milk, dried	anv	Gorham91, Imura03, Rajendran-Parveen05, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	millet	g	Cornes73, Forsyth66
Tribolium confusum	noodle	gp	Zimmerman90
Tribolium confusum	nut	n	Aitken75, Campbell89, Imura03, Sinha-Watters85
Tribolium confusum	oat	g	Delobel-Tran93, Gorham91, Hayhurst-Britten42, Strong-Okumura58, Wohlgemuth-Reichmuth83
Tribolium confusum	oat flour	gp	Gorham91
Tribolium confusum	oat, rolled	gp	Hayhurst-Britten42, Sinha-Watters85
Tribolium confusum	oatmeal	gp	Archibald-Chalmers83, Chittenden96, Gorham91, Hayhurst-Britten42
Tribolium confusum	oilcake	osp	Aitken75
Tribolium confusum	oilseed	os	Aitken75
Tribolium confusum	onion, dried	v	Ibrahim et al70
Tribolium confusum	paddy	g	Pires et al07
Tribolium confusum	palm kernel	os	Howe-Freeman55
Tribolium confusum	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Tribolium confusum	pastry wrapper	oc	Zimmerman90
Tribolium confusum	pea	p	Campbell89, Chittenden96, Delobel-Tran93, Patton31, Sinha-Watters85
Tribolium confusum	peanut	os	Archibald-Chalmers83, Arthur56, Attia-Kamel66, Bissell-DuPree46, Calderon-Donahaye64, Champ65, Chittenden96, Cornes73, Forsyth66, Gorham91, Hayhurst-Britten42, Howe-Freeman55Patton31, Redlinger-Davis82, Richards-Herford30
Tribolium confusum	peanut flake	osp	Hayhurst-Britten42
Tribolium confusum	peanut meal	osp	Wohlgemuth-Reichmuth83
Tribolium confusum	peanut oilcake	osp	Hayhurst-Britten42, Patton31

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium confusum	pecan	n	Gecan et al71, Gorham91, Okumura-Strong65
Tribolium confusum	pecan meat	np	Gecan et al71
Tribolium confusum	pepper, black	sea	White57
Tribolium confusum	pepper, cayenne	sea	Campbell89, Chittenden96, Gorham91, Patton31
Tribolium confusum	pepper, chilli	sea	Archibald-Chalmers83, Howe-Freeman55
Tribolium confusum	phane (edible caterpillar)	aninv	Rajendran-Parveen05
Tribolium confusum	prune	df	Archibald-Chalmers83
Tribolium confusum	pulse	p	Aitken75, Imura03
Tribolium confusum	pulse product	pp	Aitken75
Tribolium confusum	raisin	df	Donohoe39, Gorham91
Tribolium confusum	residue	res	Haines81
Tribolium confusum	rice	g	Archibald-Chalmers83, Attia-Kamel66, Davies60, Delobel-Tran93, Douglas41, Forsyth66, Gorham91, Haines74, Hayhurst-Britten42, Patton31, Richards-Herford30, Sinha-Watters85, Strong-Okumura58, Zimmerman90
Tribolium confusum	rice bran	gp	Wohlgemuth-Reichmuth83
Tribolium confusum	rice flour	gp	Sinha-Watters85
Tribolium confusum	rice meal	gp	Hayhurst-Britten42, Sinha-Watters85
Tribolium confusum	root, dried cassava (manioc)	r	Davies60, Delobel92
Tribolium confusum	root, lonchocarpus (rotenone)	r	Downes-Williams50
Tribolium confusum	root, orris	r	Chittenden96, Gorham91
Tribolium confusum	rye	g	Gorham91
Tribolium confusum	rye flour paste	gp	Sinha-Watters85
Tribolium confusum	safflower meal	osp	Gorham91, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	sago flour	v	Aitken75
Tribolium confusum	sesame seed	os	Davies60, Howe-Freeman55, Kiritani59, Wohlgemuth-Reichmuth83
Tribolium confusum	sesame seed meal	osp	Wohlgemuth-Reichmuth83
Tribolium confusum	sheanut	n	Howe-Freeman55
Tribolium confusum	snuff	v	Campbell89, Chittenden96, Gorham91, Patton31, Sinha-Watters85
Tribolium confusum	sorghum (broomcorn)	g	Cornes73, Forsyth66, Giles64, Haines81, Wohlgemuth-Reichmuth83
Tribolium confusum	soybean	p	Hayhurst-Britten42
Tribolium confusum	soybean meal	pp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium confusum	spice	sea	Aitken75, Allotey et al97, Campbell89, Delobel-Tran93, Imura03, Patton31, Sinha-Watters85
Tribolium confusum	sunflower seed	os	Sinha-Watters85, Weidner73
Tribolium confusum	sunflower seed meal	osp	Wohlgemuth-Reichmuth83
Tribolium confusum	sweet potato	r	Davies60
Tribolium confusum	tamarind	v	Tawfik et al85
Tribolium confusum	tanning extract	oc	Hayhurst-Britten42
Tribolium confusum	tobacco leaf	v	Livingstone-Reed36
Tribolium confusum	tobacco seed	se	Sinha-Watters85
Tribolium confusum	tomato seed	se	Patton31
Tribolium confusum	vegetable material, dried	v	Gorham91
Tribolium confusum	vetch seed	se	Gorham91, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	walnut meat	np	Archibald-Chalmers83, Gorham91, Sinha-Watters85, Strong-Okumura58
Tribolium confusum	wheat	g	Archibald-Chalmers83, Athanassiou et al01, 03, 05; Cornes73, Delobel-Tran93, Gorham91, Haines82, Hayhurst-Britten42, Richards-Herford30, Strong-Okumura58, Trematerra-Gentile06, Wohlgemuth-Reichmuth83
Tribolium confusum	wheat bran (pollard)	gp	Attia-Kamel66, Buchelos-Athanassiou98, Gorham91, Hayhurst-Britten42, Patton31, Sinha-Watters85, Strong-Okumura58, Wohlgemuth-Reichmuth83
Tribolium confusum	wheat feed	gp	Sinha-Watters85
Tribolium confusum	wheat flour	gp	Archibald-Chalmers83, Attia-Kamel66, Buchelos-Athanassiou98, Campbell89, Chittenden96, Delobel-Tran93, Gorham91, Haines81, Hayhurst-Britten42,Imura03, Patton31, Pierrard62, Sinha-Watters85
Tribolium confusum	wheat germ meal	gp	Davies60
Tribolium confusum	wheat meal	gp	Atta-Kamel66, Campbell89
Tribolium confusum	wheat screening	res	Hayhurst-Britten42
Tribolium confusum	wheat, cracked	gp	Chittenden96
Tribolium confusum	yeast	v	Campbell89
Tribolium destructor	alfalfa meal	v	Gorham91
Tribolium destructor	almond	n	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Tribolium destructor	animal feed	oc	Delobel-Tran93, Strong-Okumura58
Tribolium destructor	animal product	anv	Campbell89, Cotton-Good37, Gorham91
Tribolium destructor	cereal (cereal product)	gp	Haines81, Hayhurst-Britten42, Sinha-Watters85
Tribolium destructor	cotton	t	Gorham91
Tribolium destructor	dried fruit	df	Delobel-Tran93, Sinha-Watters85
Tribolium destructor	grain, cereal	g	Strong-Okumura58
Tribolium destructor	hazel nut	n	Delobel-Tran93
Tribolium destructor	oat, rolled	gp	Campbell89, Gorham91
Tribolium destructor	oilseed	os	Sinha-Watters85
Tribolium destructor	peanut	os	Delobel-Tran93
Tribolium destructor	potato flake	rp	Delobel-Tran93, Sinha-Watters85
Tribolium destructor	residue	res	Haines81
Tribolium destructor	seed	se	Campbell89, Cotton-Good37
Tribolium destructor	sorghum (broomcorn)	g	Cornes73, Haines81
Tribolium destructor	sunflower seed	os	Gorham91
Tribolium destructor	wheat bran (pollard)	gp	Calderon-Donahaye64, Gorham91
Tribolium destructor	wheat flour	gp	Calderon-Donahaye64, Campbell89, Cotton-Good37, Delobel-Tran93, Gorham91, Imura03, Strong-Okumura58
Tribolium destructor	wheat meal	gp	Campbell89, Cotton-Good37
Tribolium destructor	wheat semolina	gp	Gorham91
Tribolium destructor	wool	anv	Gorham91
Tribolium madens	barley	g	Okumura-Strong65
Tribolium madens	cowpea	p	Aitken75
Tribolium madens	grain, cereal	g	Cotton-Good37, Gorham91, Yan et al10
Tribolium madens	maize meal	gp	Gorham91
Tribolium madens	seed	se	Cotton-Good37, Gorham91
Tribolium madens	sunflower seed	os	Athanassou74
Tribolium madens	wheat	g	Okumura-Strong65
Tribolium madens	wheat bran (pollard)	gp	Aitken75
Tribolium madens	wheat flour	gp	Cotton-Good37, Delobel-Tran93, Gorham91
Tribolium madens	wheat meal	gp	Cotton-Good37
Trichophaga tapetzella	animal product	anv	Corbet-Tams43
Trichophaga tapetzella	bedding (blanket, spread)	t	Hinton56, Patton31
Trichophaga tapetzella	carpet	t	Corbet-Tams43, Hayhurst-Britten42, Patton31
Trichophaga tapetzella	cloth	t	Corbet-Tams43, Hayhurst-Britten42

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trichophaga tapetzella	cloth, felt	t	Patton31
Trichophaga tapetzella	feather	anv	Attia-Kamel66, Carter84, Hayhurst-Britten42, Hill02, Patton31
Trichophaga tapetzella	feather, down	anv	Imura03
Trichophaga tapetzella	fur	anv	Attia-Kamel66, Carter84, Corbet-Tams43, Hill02, Hinton56, Imura03, Patton31
Trichophaga tapetzella	furniture, upholstered	oc	Patton31
Trichophaga tapetzella	hair	anv	Carter84, Hayhurst-Britten42, Hill02, Patton31
Trichophaga tapetzella	hide, pelt or skin	anv	Hinton56, Patton31
Trichophaga tapetzella	tapestry	t	Patton31
Trichophaga tapetzella	vegetable material, dried	v	Corbet-Tams43
Trichophaga tapetzella	wall paper	wp	Attia-Kamel66
Trichophaga tapetzella	wool	anv	Attia-Kamel66, Carter84, Patton31, Rajendran-Parveen05, Hayhurst-Britten42, Imura03
Trigonogenius globosus	alfalfa seed (lucerne)	se	Gorham91, Okumura-Strong65
Trigonogenius globosus	animal feed	oc	Papp62, Papp-Okumura59, Strong-Okumura58
Trigonogenius globosus	animal product	anv	Papp62, Papp-Okumura59
Trigonogenius globosus	barley	g	Archibald-Chalmers83, Gorham91, Papp62, Papp-Okumura59, Strong-Okumura58
Trigonogenius globosus	bean	p	Gorham91, Papp62, Papp-Okumura59, Strong-Okumura58
Trigonogenius globosus	beet seed	se	Papp62, Papp-Okumura59, Strong-Okumura58
Trigonogenius globosus	brome grass seed	se	Gorham91, Okumura-Strong65
Trigonogenius globosus	caraway seed	se	Campbell89, Gorham91, Hinton41
Trigonogenius globosus	cereal (cereal product)	gp	Papp62, Papp-Okumura59
Trigonogenius globosus	cereal residue	res	Gorham91
Trigonogenius globosus	cloth	t	Archibald-Chalmers83, Gorham91
Trigonogenius globosus	copra meal	osp	Gorham91, Okumura-Strong65
Trigonogenius globosus	cotton	t	Gorham91
Trigonogenius globosus	cottonseed	os	Hayhurst-Britten42
Trigonogenius globosus	cottonseed meal	osp	Gorham91, Strong-Okumura58
Trigonogenius globosus	cottonseed meal cake	osp	Papp62, Papp-Okumura59, Strong-Okumura58

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trigonogenius globosus	cottonseed meal pellet	osp	Papp62, Papp-Okumura59, Strong-Okumura58
Trigonogenius globosus	dried fruit	df	Gorham91
Trigonogenius globosus	fertilizer	oc	Papp62, Papp-Okumura59
Trigonogenius globosus	grain, cereal	g	Archibald-Chalmers83
Trigonogenius globosus	hay	v	Archibald-Chalmers83
Trigonogenius globosus	herbarium specimen	v	Papp62, Papp-Okumura59
Trigonogenius globosus	insect, dried	aninv	Papp62, Papp-Okumura59
Trigonogenius globosus	liver meal, dried	anv	Gorham91, Papp62, Papp-Okumura59, Strong-Okumura58
Trigonogenius globosus	maize	g	Gorham91
Trigonogenius globosus	medicine, dandelion root	me	Archibald-Chalmers83, Wise56
Trigonogenius globosus	medicine, herbal	me	Cotton-Good37, Gorham91
Trigonogenius globosus	oat	g	Gorham91, Papp62, Papp-Okumura59, Strong-Okumura58
Trigonogenius globosus	oatmeal	gp	Hayhurst-Britten42
Trigonogenius globosus	pear, dried	df	Campbell89, Cotton-Good37, Gorham91, Hayhurst-Britten42, Hinton41, Patton31, Richards-Herford30
Trigonogenius globosus	pepper, red	sea	Papp62, Papp-Okumura59
Trigonogenius globosus	raisin	df	Donohoe39, Gorham91
Trigonogenius globosus	residue	res	Haines81
Trigonogenius globosus	rice	g	Gorham91, Haines81, Hayhurst-Britten42
Trigonogenius globosus	rice hull	gp	Okumura-Strong65
Trigonogenius globosus	rice meal	gp	Hayhurst-Britten42
Trigonogenius globosus	rye flour paste	gp	Hayhurst-Britten42
Trigonogenius globosus	seed	se	Papp62, Papp-Okumura59
Trigonogenius globosus	spice	sea	Gorham91
Trigonogenius globosus	sugar	v	Gorham91, Hayhurst-Britten42
Trigonogenius globosus	tartar, cream of (argol)	oc	Campbell89, Gorham91, Hayhurst-Britten42, Hinton41, Richards-Herford30
Trigonogenius globosus	vegetable ivory	v	Campbell89, Hayhurst-Britten42, Hinton41, Richards-Herford30
Trigonogenius globosus	wheat	g	Archibald-Chalmers83, Gorham91, Hayhurst-Britten42, Papp62, Papp-Okumura59, Strong-Okumura58, Wise56
Trigonogenius globosus	wheat bran (pollard)	gp	Hayhurst-Britten42

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trigonogenius globosus	wheat flour	gp	Archibald-Chalmers83, Gorham91, Wise56
Trigonogenius globosus	wheat semolina	gp	Archibald-Chalmers83, Wise56
Trinodes rufescens	peanut	os	Cornes73
Trinodes rufescens	silk	aninv	VijayVeer et al96
Trinodes rufescens	silkworm cocoon	aninv	Rajendran-Parveen05
Trogoderma angustum	almond	n	Nawrot-Klejdysz09
Trogoderma angustum	animal specimen, vertebrate	anv	Shaw99
Trogoderma angustum	chocolate	bc	Nawrot-Klejdysz09
Trogoderma angustum	grain, cereal	g	Nawrot-Klejdysz09
Trogoderma angustum	herbarium specimen	v	Shaw99
Trogoderma angustum	insect, dried	aninv	Beal54, Nawrot-Klejdysz09, Shaw99
Trogoderma angustum	meat, cured, dried or smoked	anv	Nawrot-Klejdysz09
Trogoderma angustum	wool	anv	Nawrot-Klejdysz09
Trogoderma glabrum	animal feed	oc	Hill02, Strong-Okumura58
Trogoderma glabrum	barley	g	Campbell89, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma glabrum	bean	p	Okumura-Strong65
Trogoderma glabrum	brome grass seed	se	Campbell89
Trogoderma glabrum	cereal (cereal product)	gp	Delobel-Tran93
Trogoderma glabrum	cottonseed meal	osp	Aitken75, Bezant56, Campbell89
Trogoderma glabrum	fishmeal	anv	Beal03
Trogoderma glabrum	grain, cereal	g	Gorham91, Hill02, USDA36-61
Trogoderma glabrum	insect, dried	aninv	Beal54, Delobel-Tran93
Trogoderma glabrum	maize	g	Beal54, Campbell89, Strong-Okumura58, Strong et al59, Peacock93, USDA36-61
Trogoderma glabrum	maize meal	gp	Gorham91
Trogoderma glabrum	milk, dried	anv	Beal03, Gorham91
Trogoderma glabrum	nut	n	Beal54, Bezant56
Trogoderma glabrum	oat, rolled	gp	Okumura-Strong65
Trogoderma glabrum	rice	g	Aitken75
Trogoderma glabrum	rice bran	gp	Aitken75
Trogoderma glabrum	sorghum (broomcorn)	g	Campbell89, USDA36-61
Trogoderma glabrum	soybean meal	pp	Campbell89, Strong-Okumura58, Strong et al59
Trogoderma glabrum	wheat	g	Bezant56, Campbell89, Peacock93, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma glabrum	wheat bran (pollard)	gp	Campbell89, Strong et al59, USDA36-61
Trogoderma glabrum	wheat flour	gp	Aitken75

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma granarium	alfalfa hay	v	Sinha-Watters85, Strong-Okumura58, Strong et al59
Trogoderma granarium	alfalfa seed (lucerne)	se	Sinha-Watters85, Strong-Okumura58, Strong et al59
Trogoderma granarium	animal feed	oc	Strong-Okumura58, Strong et al59
Trogoderma granarium	bari (sundried pulse cake)	pp	Joshi-Srivastava64
Trogoderma granarium	barley	g	Calderon-Donahaye64, Delobel-Tran93, Hadaway56, Hayhurst-Britten42, McFarlane63, Patton31, Sinha-Watters85, Strong-Okumura58, USDA36-61
Trogoderma granarium	barley, rolled	gp	Strong-Okumura58, Strong et al59
Trogoderma granarium	bean	p	Hadaway56, Sinha-Watters85, Strong-Okumura58, USDA36-61, Whellan55
Trogoderma granarium	beet pulp, sugar	rp	Strong-Okumura58, Strong et al59
Trogoderma granarium	beet seed	se	Strong-Okumura58, Strong et al59
Trogoderma granarium	canary grass seed	se	Strong-Okumura58, Strong et al59
Trogoderma granarium	carpet	t	Archibald-Chalmers83
Trogoderma granarium	celery seed	se	Okumura-Strong65
Trogoderma granarium	cereal (cereal product)	gp	Gorham91, Haines81, Hill02, Peacock93
Trogoderma granarium	chickpea (Bengal gram, garbanzo)	p	Mookherjee et al70, USDA36-61
Trogoderma granarium	cocoa	bc	Hill02, Imura03
Trogoderma granarium	cocoa bean	bc	Howe-Freeman55
Trogoderma granarium	coffee	bc	USDA36-61
Trogoderma granarium	copra	osp	Delobel-Tran93, Howe-Freeman55, Sinha-Watters85
Trogoderma granarium	copra oilcake	osp	Haines81, Wohlgemuth-Reichmuth83
Trogoderma granarium	coriander seed	se	Delobel-Tran93, Okumura-Strong65
Trogoderma granarium	cottonseed	os	Cornes73, Howe-Freeman55, Strong-Okumura58, Strong et al59
Trogoderma granarium	cottonseed meal	osp	Sinha-Watters85, Strong-Okumura58, Strong et al59, Wohlgemuth-Reichmuth83
Trogoderma granarium	cowpea	p	Cornes73, Forsyth66, Sinha-Watters85
Trogoderma granarium	cucumber seed	se	Mookherjee et al70
Trogoderma granarium	cumin seed	se	Okumura-Strong65, USDA36-61
Trogoderma granarium	dried fruit	df	Delobel-Tran93, Sinha-Watters85
Trogoderma granarium	egg plant seed	se	Okumura-Strong65

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma granarium	fennel seed	se	Okumura-Strong65
Trogoderma granarium	flax seed	os	Sinha-Watters85, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma granarium	ginger	sea	USDA36-61
Trogoderma granarium	gourd seed	se	Mookherjee et al70
Trogoderma granarium	grain product	gp	Aitken75, Cotton-Good37
Trogoderma granarium	grain, cereal	g	Aitken75, Beal03, Cotton-Good37, Gorham91, Hill02, Imura03, Peacock93
Trogoderma granarium	gum dammar	v	Schulten-Roorda84
Trogoderma granarium	lentil (masur)	p	Okumura-Strong65, USDA36-61
Trogoderma granarium	lettuce	ffv	Archibald-Chalmers83
Trogoderma granarium	maize	g	Delobel-Tran93, Haines74, 81; Patton31, Sinha-Watters85Strong-Okumura58, Strong et al59
Trogoderma granarium	maize meal	gp	Strong-Okumura58, Strong et al59
Trogoderma granarium	malt	gp	Delobel-Tran93, Gorham91, Sinha-Watters85
Trogoderma granarium	medicine, hibiscus flower	me	Weidner73
Trogoderma granarium	medicine, senna	me	Okumura-Strong65
Trogoderma granarium	millet	g	Cornes73, Strong-Okumura58, Strong et al59
Trogoderma granarium	mung bean	p	Delobel-Tran93, USDA36-61
Trogoderma granarium	myrabolan	p	Okumura-Strong65
Trogoderma granarium	noodle	gp	Sinha-Watters85, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma granarium	nut	n	Delobel-Tran93
Trogoderma granarium	nut meal	np	Sinha-Watters85
Trogoderma granarium	nutmeg (mace)	sea	Okumura-Strong65
Trogoderma granarium	oat	g	Patton31, Sinha-Watters85, Strong-Okumura58, Strong et al59
Trogoderma granarium	oat straw	v	Strong et al59
Trogoderma granarium	oilcake	osp	Aitken75, Delobel-Tran93, Sinha-Watters85
Trogoderma granarium	oilseed	os	Aitken75, Hill02, Imura03, Peacock93, Schulten-Roorda84
Trogoderma granarium	paddy	g	Nayar et al76
Trogoderma granarium	palm kernel	os	Howe-Freeman55
Trogoderma granarium	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma granarium	pea	p	Archibald-Chalmers83, Delobel-Tran93, Hadaway56, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma granarium	peanut	os	Archibald-Chalmers83, Cornes73, Cotterell52, Delobel-Tran93, Howe-Freeman55, Nayar et al76, Okumura-Strong65, Schulten-Roorda84, Singh90, Sinha-Watters85, USDA36-61
Trogoderma granarium	peanut meal	osp	Wohlgemuth-Reichmuth83
Trogoderma granarium	peanut oilcake	osp	Hadaway56, Howe-Freeman55
Trogoderma granarium	peanut, shelled	osp	Wohlgemuth-Reichmuth83
Trogoderma granarium	pepper, chilli	sea	Okumura-Strong65, USDA36-61
Trogoderma granarium	pigeonpea (arhar, red gram)	p	Okumura-Strong65
Trogoderma granarium	pistachio nut	n	Okumura-Strong65
Trogoderma granarium	plantago seed	se	Okumura-Strong65
Trogoderma granarium	poppy head	v	Strong-Okumura58, Strong et al59
Trogoderma granarium	poppy seed	se	USDA36-61
Trogoderma granarium	potato flour	rp	Schmidt-Grabner87
Trogoderma granarium	pulse	p	Archibald-Chalmers83, Hill02, Schulten-Roorda84, Sinha-Watters85
Trogoderma granarium	pumpkin seed	se	Mookherjee et al70
Trogoderma granarium	rice	g	Delobel-Tran93, Hadaway56, Haines74, 81; Kim et al88, Nayar et al76, Patton31, Rao et al73, Sinha-Watters85, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma granarium	rice meal	gp	Hadaway56, McFarlane63
Trogoderma granarium	rye	g	Patton31, Sinha-Watters85
Trogoderma granarium	sago seed	se	Okumura-Strong65
Trogoderma granarium	seed	se	Archibald-Chalmers83
Trogoderma granarium	sesame seed	os	Cornes73, Howe-Freeman55, Nayar et al76, Okumura-Strong65, USDA36-61
Trogoderma granarium	sesame seed oilcake	osp	Wohlgemuth-Reichmuth83
Trogoderma granarium	sheanut	n	Howe-Freeman55
Trogoderma granarium	sisal	v	Archibald-Chalmers83
Trogoderma granarium	sorghum (broomcorn)	g	Awadallah et al82, Cornes73, Delobel-Tran93, Haines74, 81; Sinha-Watters85, Strong-Okumura58, Strong et al59, USDA36-61, Wohlgemuth-Reichmuth83

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma granarium	sorghum, rolled	gp	Strong-Okumura58, Strong et al59
Trogoderma granarium	soybean	p	Cornes73, Singh90, USDA36-61
Trogoderma granarium	soybean meal	pp	Okumura-Strong65
Trogoderma granarium	squash seed	se	Okumura-Strong65
Trogoderma granarium	Sudan grass seed	se	Strong-Okumura58, Strong et al59
Trogoderma granarium	sugar	v	Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma granarium	Swiss chard seed	se	Strong-Okumura58, Strong et al59
Trogoderma granarium	tapioca	r	USDA36-61
Trogoderma granarium	tomato seed	se	Sinha-Watters85, Strong-Okumura58, Strong et al59
Trogoderma granarium	turmeric	sea	Okumura-Strong65
Trogoderma granarium	vetch seed	se	Strong-Okumura58, Strong et al59
Trogoderma granarium	walnut meat	np	Strong-Okumura58, Strong et al59
Trogoderma granarium	watermelon seed	se	Strong-Okumura58, Strong et al59
Trogoderma granarium	wheat	g	Calderon-Donahaye64, Cornes73, Delobel-Tran93, Hadaway56, Hayhurst-Britten42, Mookherjee et al68, Patton31, Sinha-Watters85, Strong-Okumura58, Strong et al59, Trematerra-Gentile06, USDA36-61
Trogoderma granarium	wheat bran (pollard)	gp	Delobel-Tran93, Sinha-Watters85, Wohlgemuth-Reichmuth83
Trogoderma granarium	wheat flour	gp	Cornes73, Delobel-Tran93, Hadaway56, Okumura-Strong65, Sinha-Watters85, USDA36-61
Trogoderma grassmani	animal feed	oc	Strong et al59
Trogoderma grassmani	barley	g	Beal56, Strong et al59
Trogoderma grassmani	beet seed	se	Beal56, Strong et al59
Trogoderma grassmani	candy	oc	Beal56
Trogoderma grassmani	cereal (cereal product)	gp	Beal03
Trogoderma grassmani	chocolate nut candy	oc	Strong et al59
Trogoderma grassmani	clover seed	se	Beal56, Strong et al59
Trogoderma grassmani	cottonseed	os	Beal56, Strong et al59
Trogoderma grassmani	fishmeal	anv	Beal56, 03
Trogoderma grassmani	flax seed	os	Beal56, Strong et al59
Trogoderma grassmani	okra seed	se	Okumura-Strong65
Trogoderma grassmani	onion seed	se	Strong et al59
Trogoderma grassmani	pea	p	Okumura-Strong65

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma grassmani	potato, dried	r	Okumura-Strong65
Trogoderma grassmani	safflower	os	USDA36-61
Trogoderma grassmani	sorghum (broomcorn)	g	Strong et al59
Trogoderma grassmani	spinach seed	se	Strong et al59
Trogoderma grassmani	Sudan grass seed	se	Strong et al59
Trogoderma grassmani	sugar beet seed	se	Okumura-Strong65
Trogoderma grassmani	watermelon seed	se	Okumura-Strong65
Trogoderma grassmani	wheat	g	Strong et al59
Trogoderma inclusum	alfalfa meal	v	Strong et al59
Trogoderma inclusum	almond	n	Aitken75
Trogoderma inclusum	animal feed	oc	Delobel-Tran93, Hill02
Trogoderma inclusum	animal specimen	anv	USDA36-61
Trogoderma inclusum	barley	g	Strong et al59
Trogoderma inclusum	bean	p	Strong et al59
Trogoderma inclusum	beehive	aninv	Strong et al59
Trogoderma inclusum	beet pulp, sugar	rp	Strong et al59
Trogoderma inclusum	carob (locust)	df	Aitken75, Peacock93
Trogoderma inclusum	carob meal	dfp	Aitken75
Trogoderma inclusum	casein, dried	anv	Hedges-Lacey96
Trogoderma inclusum	cereal (cereal product)	gp	Delobel-Tran93
Trogoderma inclusum	cloth	t	Archibald-Chalmers83
Trogoderma inclusum	clover seed	se	Strong et al59
Trogoderma inclusum	copra meal	osp	Okumura-Strong65
Trogoderma inclusum	cottonseed	os	Aitken75, Peacock93
Trogoderma inclusum	cottonseed meal	osp	Aitken75
Trogoderma inclusum	cowpea	p	Delobel-Tran93
Trogoderma inclusum	cracker	bg	Strong et al59
Trogoderma inclusum	cumin seed	se	Aitken75, USDA36-61
Trogoderma inclusum	currant	df	Aitken75
Trogoderma inclusum	dried fruit	df	Aitken75, Beal03, Delobel-Tran93, Peacock93
Trogoderma inclusum	fenugreek seed	se	Strong et al59
Trogoderma inclusum	fishmeal	anv	Delobel-Tran93
Trogoderma inclusum	gallnut	aninv	Aitken75
Trogoderma inclusum	grain, cereal	g	Beal03, Campbell89, Gorham91, USDA36-61
Trogoderma inclusum	herb	v	USDA36-61
Trogoderma inclusum	insect, dried	aninv	Hedges-Lacey96, Hill02
Trogoderma inclusum	kidney bean	p	Delobel-Tran93

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma inclusum	lentil (masur)	p	Aitken75
Trogoderma inclusum	maize	g	Hedges-Lacey96, Sedlacek et al98
Trogoderma inclusum	maize meal	gp	Hedges-Lacey96, Strong et al59
Trogoderma inclusum	milk, dried	anv	Delobel-Tran93, Gorham91
Trogoderma inclusum	millet	g	Strong et al59
Trogoderma inclusum	nut	n	Beal03, Gorham91, Peacock93
Trogoderma inclusum	oat	g	Strong et al59
Trogoderma inclusum	oilcake residue	res	Aitken75
Trogoderma inclusum	oilseed	os	Imura03
Trogoderma inclusum	pea	p	Strong et al59
Trogoderma inclusum	peanut	os	Redlinger-Davis82
Trogoderma inclusum	pepper, black	sea	White57
Trogoderma inclusum	pollen	v	Delobel-Tran93
Trogoderma inclusum	prune	df	Strong et al59
Trogoderma inclusum	raisin	df	Okumura-Strong65
Trogoderma inclusum	rice	g	Aitken75, Hedges-Lacey96, Peacock93, Strong et al59
Trogoderma inclusum	rice bran	gp	Aitken75, Peacock93
Trogoderma inclusum	rice, wild	g	Strong et al59
Trogoderma inclusum	safflower	os	Strong et al59
Trogoderma inclusum	sorghum (broomcorn)	g	Strong et al59
Trogoderma inclusum	soybean meal	pp	Aitken75, Peacock93
Trogoderma inclusum	Sudan grass seed	se	Strong et al59
Trogoderma inclusum	sugar	v	Strong et al59
Trogoderma inclusum	sunflower seed	os	Okumura-Strong65
Trogoderma inclusum	vetch seed	se	Strong et al59
Trogoderma inclusum	watermelon seed	se	Strong et al59
Trogoderma inclusum	wheat	g	Hedges-Lacey96, Strong et al59
Trogoderma inclusum	wheat bran (pollard)	gp	Strong et al59
Trogoderma inclusum	wheat flour	gp	Aitken75, Peacock93
Trogoderma inclusum	wool	anv	Hedges-Lacey96
Trogoderma ornatum	animal feed	oc	Strong et al59
Trogoderma ornatum	animal specimen	anv	Campbell89
Trogoderma ornatum	barley	g	Beal56, Campbell89, Strong et al59
Trogoderma ornatum	barley, rolled	gp	Strong et al59
Trogoderma ornatum	bean	p	Beal56, Strong et al59
Trogoderma ornatum	beehive	aninv	Wodsedalek12
Trogoderma ornatum	beet seed	se	Beal56, Campbell89

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma ornatum	beet, field and sugar	ffv	Strong et al59
Trogoderma ornatum	broad bean (fava bean, horsebean)	p	USDA36-61
Trogoderma ornatum	bulb, Indian tulip	r	Wodsedalek12
Trogoderma ornatum	cactus	v	Strong et al59
Trogoderma ornatum	cactus seed	se	Strong et al59
Trogoderma ornatum	canary grass seed	se	Beal56, Campbell89
Trogoderma ornatum	castor bean	se	Chittenden96, Wodsedalek12
Trogoderma ornatum	cereal (cereal product)	gp	Gorham91, Patton31, Wodsedalek12
Trogoderma ornatum	chickpea (Bengal gram, garbanzo)	p	Strong et al59
Trogoderma ornatum	cloth	t	Hedges-Lacey96
Trogoderma ornatum	clover seed, sweet	se	Okumura-Strong65
Trogoderma ornatum	cottonseed	os	Wodsedalek12
Trogoderma ornatum	cottonseed meal	osp	Strong et al59
Trogoderma ornatum	cottonseed meal pellet	osp	Beal56, Campbell89
Trogoderma ornatum	crotolaria seed	se	Okumura-Strong65
Trogoderma ornatum	dried fruit	df	Archibald-Chalmers83, Gorham91
Trogoderma ornatum	feather	anv	Wodsedalek12
Trogoderma ornatum	fishmeal	anv	Beal56, Campbell89
Trogoderma ornatum	flax seed	os	Chittenden96, Wodsedalek12
Trogoderma ornatum	fur	anv	Wodsedalek12
Trogoderma ornatum	grain, cereal	g	Chittenden96, Cotton-Good37
Trogoderma ornatum	herbarium specimen	v	Campbell89
Trogoderma ornatum	hide, pelt or skin	anv	Hedges-Lacey96, Wodsedalek12
Trogoderma ornatum	horse collar with straw stuffing	oc	Patton31
Trogoderma ornatum	insect, dried	aninv	Campbell89, Wodsedalek12
Trogoderma ornatum	kidney bean	p	USDA36-61
Trogoderma ornatum	maize	g	Strong et al59, Wodsedalek12
Trogoderma ornatum	millet	g	Chittenden96, Strong et al59, Wodsedalek12
Trogoderma ornatum	mustard seed	se	Okumura-Strong65
Trogoderma ornatum	nut	n	Wodsedalek12
Trogoderma ornatum	oat	g	Beal56, Campbell89
Trogoderma ornatum	peanut	os	Chittenden96
Trogoderma ornatum	peanut meal	osp	Chittenden96, Wodsedalek12
Trogoderma ornatum	peanut oilcake	osp	Chittenden96
Trogoderma ornatum	pepper	sea	USDA36-61
Trogoderma ornatum	pepper, cayenne	sea	Chittenden96, Wodsedalek12

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma ornatum	pumpkin seed	se	Chittenden96, Wodsedalek12
Trogoderma ornatum	raisin	df	Archibald-Chalmers83
Trogoderma ornatum	rice	g	Patton31, USDA36-61
Trogoderma ornatum	rice, wild	g	Strong et al59
Trogoderma ornatum	seed	se	Campbell89, Cotton-Good37, Gorham91
Trogoderma ornatum	silkworm cocoon	aninv	Wodsedalek12
Trogoderma ornatum	sorghum (broomcorn)	g	Beal56, Campbell89, Strong et al59
Trogoderma ornatum	spice	sea	Wodsedalek12
Trogoderma ornatum	walnut meat	np	Strong et al59
Trogoderma ornatum	wheat	g	Patton31, Strong et al59, Wodsedalek12
Trogoderma ornatum	wool	anv	Wodsedalek12
Trogoderma simplex	alfalfa pellet	v	Okumura-Strong65
Trogoderma simplex	alfalfa seed (lucerne)	se	Strong et al59
Trogoderma simplex	almond hull meal	np	Strong-Okumura58, Strong et al59
Trogoderma simplex	almond meat	np	Strong-Okumura58, Strong et al59
Trogoderma simplex	animal feed	oc	Strong-Okumura58, Strong et al59
Trogoderma simplex	barley	g	Strong-Okumura58, Strong et al59
Trogoderma simplex	barley meal	gp	Strong-Okumura58
Trogoderma simplex	barley, rolled	gp	Strong-Okumura58, Strong et al59
Trogoderma simplex	bean	p	Strong-Okumura58, Strong et al59
Trogoderma simplex	beehive	aninv	Strong-Okumura58, Strong et al59
Trogoderma simplex	beet seed	se	Strong et al59
Trogoderma simplex	bird feed	se	Strong et al59
Trogoderma simplex	blood meal	anv	Strong-Okumura58, Strong et al59
Trogoderma simplex	cabbage seed	se	Okumura-Strong65
Trogoderma simplex	cantaloupe seed (casaba)	se	Strong-Okumura58
Trogoderma simplex	castor bean	se	Okumura-Strong65
Trogoderma simplex	cereal (cereal product)	gp	Strong-Okumura58, Strong et al59
Trogoderma simplex	cottonseed	os	Strong-Okumura58, Strong et al59
Trogoderma simplex	cottonseed hull	osp	Strong-Okumura58, Strong et al59
Trogoderma simplex	cottonseed meal	osp	Strong-Okumura58, Strong et al59
Trogoderma simplex	date pollen	v	Strong-Okumura58, Strong et al59
Trogoderma simplex	egg, dried	anv	Strong-Okumura58, Strong et al59
Trogoderma simplex	fescue seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	fishmeal	anv	Strong-Okumura58, Strong et al59
Trogoderma simplex	flax seed	os	Strong-Okumura58, Strong et al59
Trogoderma simplex	gelatin capsule	oc	Campbell89
Trogoderma simplex	grain, cereal	g	Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma simplex	honeycomb (bee, wasp)	aninv	Okumura-Strong65
Trogoderma simplex	insect, dried	aninv	Beal54, 03
Trogoderma simplex	lettuce seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	maize	g	Strong-Okumura58, Strong et al59
Trogoderma simplex	maize meal	gp	Strong-Okumura58, Strong et al59
Trogoderma simplex	milk, dried	anv	Strong-Okumura58, Strong et al59
Trogoderma simplex	millet	g	Strong-Okumura58, Strong et al59
Trogoderma simplex	muskmelon seed	se	Strong et al59
Trogoderma simplex	oat	g	Strong-Okumura58, Strong et al59
Trogoderma simplex	oat, rolled	gp	Strong-Okumura58, Strong et al59
Trogoderma simplex	oatmeal	gp	Beal54
Trogoderma simplex	onion seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	pea	p	Okumura-Strong65
Trogoderma simplex	peanut	os	Strong et al59
Trogoderma simplex	pecan	n	Okumura-Strong65
Trogoderma simplex	pecan meat	np	Strong et al59
Trogoderma simplex	pepper seed	se	Strong et al59
Trogoderma simplex	popcorn	g	Strong-Okumura58
Trogoderma simplex	potato, dried	r	Okumura-Strong65
Trogoderma simplex	raisin	df	Strong-Okumura58, Strong et al59
Trogoderma simplex	rice	g	Strong-Okumura58, Strong et al59
Trogoderma simplex	rice meal	gp	Strong-Okumura58, Strong et al59
Trogoderma simplex	ryegrass seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	safflower	os	Strong-Okumura58, Strong et al59
Trogoderma simplex	sesame seed	os	Strong-Okumura58, Strong et al59
Trogoderma simplex	sesbania	v	Strong-Okumura58, Strong et al59
Trogoderma simplex	sorghum (broomcorn)	g	Strong-Okumura58, Strong et al59
Trogoderma simplex	soybean meal	pp	Strong-Okumura58, Strong et al59
Trogoderma simplex	squash seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	Sudan grass seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	sugar beet seed	se	Okumura-Strong65
Trogoderma simplex	sunflower seed	os	Strong-Okumura58, Strong et al59
Trogoderma simplex	tomato seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	vetch seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	walnut meat	np	Strong-Okumura58, Strong et al59
Trogoderma simplex	watermelon seed	se	Strong-Okumura58, Strong et al59
Trogoderma simplex	wheat	g	Strong-Okumura58, Strong et al59
Trogoderma simplex	wheat bran (pollard)	gp	Strong-Okumura58, Strong et al59

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma sternale	alfalfa hay	v	Beal56, Strong et al59
Trogoderma sternale	alfalfa pellet	v	Okumura-Strong65
Trogoderma sternale	almond hull	np	Strong-Okumura58, Strong et al59
Trogoderma sternale	almond meat	np	Strong-Okumura58
Trogoderma sternale	alta fescue grass seed	se	Beal56
Trogoderma sternale	animal feed	oc	Strong-Okumura58, Strong et al59
Trogoderma sternale	barley	g	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	barley meal	gp	Strong-Okumura58
Trogoderma sternale	barley, rolled	gp	Strong-Okumura58, Strong et al59
Trogoderma sternale	bean	p	Strong-Okumura58, Strong et al59
Trogoderma sternale	beehive	aninv	Strong-Okumura58, Strong et al59
Trogoderma sternale	beet pulp, sugar	rp	Strong-Okumura58, Strong et al59
Trogoderma sternale	beet seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	bentgrass seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	Bermuda grass seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	bluegrass seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	brome grass seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	brome grass seed, praire	se	Beal56
Trogoderma sternale	cabbage seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	cantaloupe seed (casaba)	se	Beal56, Strong-Okumura58
Trogoderma sternale	carrot seed	se	Okumura-Strong65
Trogoderma sternale	cauliflower seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	cereal (cereal product)	gp	Campbell89, Delobel-Tran93, Haines81, Strong-Okumura58, Strong et al59
Trogoderma sternale	chocolate nut candy	oc	Strong et al59
Trogoderma sternale	clover seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	coffee	bc	Okumura-Strong65
Trogoderma sternale	copra meal	osp	Okumura-Strong65
Trogoderma sternale	coriander seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	cottonseed	os	Strong-Okumura58, Strong et al59
Trogoderma sternale	cottonseed hull	osp	Strong-Okumura58, Strong et al59
Trogoderma sternale	cottonseed meal	osp	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	cottonseed meal cake	osp	Strong-Okumura58
Trogoderma sternale	cracker	bg	Strong-Okumura58, Strong et al59
Trogoderma sternale	cucumber seed	se	Beal56, Strong et al59
Trogoderma sternale	dog food	oc	Beal56
Trogoderma sternale	egg plant seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	fescue seed	se	Strong-Okumura58, Strong et al59

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma sternale	fig, dried	df	Strong-Okumura58
Trogoderma sternale	flax seed	os	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	fur	anv	Beal56
Trogoderma sternale	hay	v	Strong-Okumura58
Trogoderma sternale	honeycomb (bee, wasp)	aninv	Okumura-Strong65
Trogoderma sternale	insect, dried	aninv	Campbell89, Delobel-Tran93
Trogoderma sternale	kohlrabi seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	lettuce seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	lima bean	p	Beal56
Trogoderma sternale	linseed meal	osp	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	maize	g	Beal56, Haines81, Strong-Okumura58, Strong et al59
Trogoderma sternale	maize meal	gp	Strong-Okumura58, Strong et al59
Trogoderma sternale	meat scrap	anv	Strong-Okumura58, Strong et al59
Trogoderma sternale	milk, dried	anv	Strong-Okumura58, Strong et al59
Trogoderma sternale	millet	g	Strong-Okumura58, Strong et al59
Trogoderma sternale	muskmelon seed	se	Strong et al59
Trogoderma sternale	mustard seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	nasturtium seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	noodle	gp	Okumura-Strong65, Strong-Okumura58, Strong et al59
Trogoderma sternale	nut	n	Beal56, Campbell89
Trogoderma sternale	oat	g	Beal56
Trogoderma sternale	oat, rolled	gp	Strong-Okumura58, Strong et al59
Trogoderma sternale	orange peel	v	Beal56
Trogoderma sternale	pea	p	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	peanut	os	Arthur56, Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	pecan	n	Beal56, Strong-Okumura58
Trogoderma sternale	pecan husk	np	Beal56
Trogoderma sternale	pecan meat	np	Strong et al59
Trogoderma sternale	pepper seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	pepper, cayenne	sea	Strong-Okumura58
Trogoderma sternale	pepper, chilli	sea	Strong-Okumura58, Strong et al59
Trogoderma sternale	pine seed	se	Okumura-Strong65
Trogoderma sternale	potato, dried	r	Okumura-Strong65
Trogoderma sternale	prune	df	Strong-Okumura58, Strong et al59
Trogoderma sternale	pumpkin seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	raisin	df	Strong-Okumura58, Strong et al59

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma sternale	rice	g	Strong-Okumura58, Strong et al59
Trogoderma sternale	rice bran	gp	Aitken75
Trogoderma sternale	rice screening	res	Strong et al59
Trogoderma sternale	ryegrass seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	safflower	os	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	sesbania	v	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	silkworm cocoon	aninv	Rajendran-Parveen05, VijayVeer et al96
Trogoderma sternale	snapdragon seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	sorghum (broomcorn)	g	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	soybean meal	pp	Beal56
Trogoderma sternale	spinach seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	stock flower seed	se	Strong-Okumura58
Trogoderma sternale	Sudan grass seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	sugar beet seed	se	Okumura-Strong65
Trogoderma sternale	sunflower seed	os	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	timothy grass seed	se	Beal56
Trogoderma sternale	tomato seed	se	Beal56
Trogoderma sternale	trefoil seed	se	Strong-Okumura58, Strong et al59
Trogoderma sternale	veldt grass seed	se	Beal56
Trogoderma sternale	vetch seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	walnut	n	Beal56
Trogoderma sternale	walnut meat	np	Strong-Okumura58, Strong et al59
Trogoderma sternale	watermelon seed	se	Okumura-Strong65
Trogoderma sternale	wheat	g	Beal56, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma sternale	wheat bran (pollard)	gp	Beal56, Strong-Okumura58, Strong et al59
Trogoderma sternale	wheat flour	gp	Strong-Okumura58, USDA36-61
Trogoderma sternale	wheatgrass seed	se	Strong et al59
Trogoderma sternale	wool	anv	Strong et al59, Strong-Okumura58
Trogoderma variabile	alfalfa seed (lucerne)	se	Archibald-Chalmers83, Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	almond	n	USDA36-61
Trogoderma variabile	almond meal	np	Beal56
Trogoderma variabile	almond meat	np	Strong-Okumura58, Strong et al59
Trogoderma variabile	alta fescue grass seed	se	Beal56
Trogoderma variabile	animal feed	oc	Beal03, Campbell89, Hill02, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma variabile	animal specimen	anv	Imura03, Peacock93, Rajendran-Parveen05

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma variabile	barley	g	Beal56, Campbell89, Hill02, Strong-Okumura58, Strong et al59
Trogoderma variabile	bean	p	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	beef bullion cube	anv	Beal56, Peacock93, Strong-Okumura58, Strong et al59
Trogoderma variabile	beehive	aninv	Okumura-Strong65
Trogoderma variabile	beet seed	se	Beal56, Strong-Okumura58
Trogoderma variabile	bentgrass seed	se	Strong et al59
Trogoderma variabile	bird feed	se	Strong et al59
Trogoderma variabile	blood meal	anv	Okumura-Strong65
Trogoderma variabile	broad bean (fava bean, horsebean)	p	Beal54
Trogoderma variabile	brome grass seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	burnet seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	cake mix	oc	Okumura-Strong65
Trogoderma variabile	candy	oc	Strong-Okumura58
Trogoderma variabile	cantaloupe seed (casaba)	se	Beal56, Strong-Okumura58
Trogoderma variabile	cardamom	sea	USDA36-61
Trogoderma variabile	carrot seed	se	Okumura-Strong65, Strong et al59
Trogoderma variabile	cereal (cereal product)	gp	Beal03, Delobel-Tran93, Gorham91, Strong-Okumura58, Strong et al59
Trogoderma variabile	chestnut	n	Beal56
Trogoderma variabile	chickpea (Bengal gram, garbanzo)	p	Strong-Okumura58, Strong et al59
Trogoderma variabile	chocolate mint	oc	Okumura-Strong65
Trogoderma variabile	chocolate nut candy	oc	Strong et al59
Trogoderma variabile	cloth	t	Hedges-Lacey96
Trogoderma variabile	clover seed	se	Beal56, Okumura-Strong65, Strong-Okumura58, Strong etal59
Trogoderma variabile	cocoa	bc	Okumura-Strong65
Trogoderma variabile	cookie	bg	Strong-Okumura58, Strong et al59
Trogoderma variabile	copra	osp	Okumura-Strong65
Trogoderma variabile	cottonseed	os	Beal56, Strong-Okumura58, USDA36-61
Trogoderma variabile	cowpea	p	Okumura-Strong65
Trogoderma variabile	cucumber seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	cumin seed	se	Archibald-Chalmers83
Trogoderma variabile	dallisgrass seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	dandelion seed	se	Strong-Okumura58, Strong et al59

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma variabile	date pollen	v	Strong-Okumura58, Strong et al59
Trogoderma variabile	dog food	oc	Okumura-Strong65
Trogoderma variabile	egg noodle	oc	Strong et al59
Trogoderma variabile	egg plant seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	fescue seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	fig, dried	df	Okumura-Strong65
Trogoderma variabile	fishmeal	anv	Beal56, Gorham91, Peacock93, Strong-Okumura58
Trogoderma variabile	flax seed	os	Okumura-Strong65
Trogoderma variabile	fudge mix	oc	Strong-Okumura58, Strong et al59
Trogoderma variabile	fur	anv	Imura03
Trogoderma variabile	grain, cereal	g	Beal54, Yan et al10
Trogoderma variabile	herb	v	Archibald-Chalmers83, Peacock93
Trogoderma variabile	hide, pelt or skin	anv	Hedges-Lacey96
Trogoderma variabile	hominy grit	gp	Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma variabile	insect, dried	aninv	Beal54
Trogoderma variabile	jujube	df	Guilin et al99
Trogoderma variabile	junket	anv	Okumura-Strong65
Trogoderma variabile	lettuce seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	lima bean	p	Beal56
Trogoderma variabile	maize	g	Beal56, Gorham91, Sedlacek et al98, Strong-Okumura58, Strong et al59
Trogoderma variabile	maize meal	gp	Strong-Okumura58, Strong et al59
Trogoderma variabile	medicine, Chinese traditional	me	Guilin et al99
Trogoderma variabile	medicine, dandelion	me	Guilin et al99
Trogoderma variabile	melon seed	se	Beal56
Trogoderma variabile	milk, dried	anv	Beal56, Gorham91, Peacock93, Strong-Okumura58, Strong et al59
Trogoderma variabile	millet	g	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	museum collection	oc	Beal03
Trogoderma variabile	mushroom, dried	v	USDA36-61
Trogoderma variabile	muskmelon seed	se	Strong et al59
Trogoderma variabile	noodle	gp	Hill02, Okumura-Strong65, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma variabile	nut	n	Beal56, Campbell89, Delobel-Tran93, Gorham91

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma variabile	oat	g	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	oatmeal	gp	Beal54, Hill02
Trogoderma variabile	onion seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	pea	p	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	peach, dried	df	Strong-Okumura58, Strong et al59
Trogoderma variabile	peanut	os	Okumura-Strong65
Trogoderma variabile	pecan	n	Okumura-Strong65
Trogoderma variabile	pepper seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	pepper, chilli	sea	Strong-Okumura58, Strong et al59
Trogoderma variabile	pepper, dried	sea	Strong et al59
Trogoderma variabile	pistachio nut	n	Okumura-Strong65
Trogoderma variabile	pollen	v	Beal54, Campbell89, Hill02
Trogoderma variabile	popcorn	g	Beal56
Trogoderma variabile	potato chip	rp	Okumura-Strong65
Trogoderma variabile	pudding mix	v	Strong-Okumura58, Strong et al59
Trogoderma variabile	pulse	p	Beal56, Campbell89, Delobel-Tran93
Trogoderma variabile	pumpkin seed	se	Beal56, Okumura-Strong65, Strong et al59
Trogoderma variabile	raisin	df	Strong-Okumura58, Strong et al59
Trogoderma variabile	rice	g	Beal56, Gorham91, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma variabile	rice bran	gp	Strong-Okumura58, Strong et al59
Trogoderma variabile	rice, wild	g	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	rye	g	Strong-Okumura58, Strong et al59
Trogoderma variabile	ryegrass seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	safflower	os	Beal56, Schulten-Roorda84, Strong-Okumura58, Strong et al59
Trogoderma variabile	seed	se	Archibald-Chalmers83, Gorham91
Trogoderma variabile	sesbania seed	se	Campbell89, Strong-Okumura58
Trogoderma variabile	silk	aninv	Imura03
Trogoderma variabile	sorghum (broomcorn)	g	Strong-Okumura58, Strong et al59
Trogoderma variabile	soup mix, dried	oc	Okumura-Strong65, Strong-Okumura58, Strong et al59
Trogoderma variabile	soybean	p	Strong-Okumura58, Strong et al59
Trogoderma variabile	spice	sea	Strong-Okumura58, Strong et al59
Trogoderma variabile	spinach seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	squash seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	Sudan grass seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	sunflower seed	os	Archibald-Chalmers83, Beal56, Strong-Okumura58, Strong et al59

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma variabile	tapioca	r	Okumura-Strong65
Trogoderma variabile	tomato seed	se	Beal56, Strong-Okumura58, Strong et al59
Trogoderma variabile	tortilla, dry cooked	gp	Strong-Okumura58, Strong et al59
Trogoderma variabile	turnip seed	se	Okumura-Strong65
Trogoderma variabile	vetch seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	walnut	n	Beal56
Trogoderma variabile	walnut meat	np	Strong-Okumura58, Strong et al59
Trogoderma variabile	watermelon seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	wheat	g	Beal56, Campbell89, Gorham91, Hill02, Strong-Okumura58, Strong et al59, USDA36-61
Trogoderma variabile	wheat flour	gp	Hill02, Strong-Okumura58
Trogoderma variabile	wheat flour mix	gp	Strong et al59
Trogoderma variabile	wheatgrass seed	se	Strong-Okumura58, Strong et al59
Trogoderma variabile	yeast	v	Beal54
Trogoderma versicolor	animal product	anv	Cotton-Good37
Trogoderma versicolor	barley	g	Hadaway56
Trogoderma versicolor	bulb, Indian turnip	r	Hinton45
Trogoderma versicolor	castor bean	se	Hinton45
Trogoderma versicolor	cereal (cereal product)	gp	Cotton-Good37, Hinton45
Trogoderma versicolor	cottonseed meal	osp	Hinton45
Trogoderma versicolor	date	df	Calderon-Donahaye64, Donahaye-Calderon64
Trogoderma versicolor	dried fruit	df	Hinton45
Trogoderma versicolor	feather	anv	Hinton45
Trogoderma versicolor	fig	ffv	Calderon-Donahaye64, Hinton45
Trogoderma versicolor	fish, dried	anv	Hinton45
Trogoderma versicolor	flax seed	os	Hinton45
Trogoderma versicolor	grain, cereal	g	Buchelos-Athanassiou98, Cotton-Good37, Gorham91, Hinton45
Trogoderma versicolor	hickory nut	n	Hinton45
Trogoderma versicolor	insect, dried	aninv	Hadaway56, Hinton45
Trogoderma versicolor	maize	g	Gorham91, Hadaway56, Hinton45
Trogoderma versicolor	malt	gp	Hadaway56
Trogoderma versicolor	milk, dried	anv	Hadaway56
Trogoderma versicolor	millet	g	Hinton45
Trogoderma versicolor	nut	n	Gorham91, Hinton45
Trogoderma versicolor	peanut flour	osp	Hinton45
Trogoderma versicolor	peanut meal	osp	Hinton45

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Trogoderma versicolor	peanut oilcake	osp	Hinton45
Trogoderma versicolor	pepper, cayenne	sea	Hinton45
Trogoderma versicolor	pulse	p	Hinton45
Trogoderma versicolor	pumpkin seed	se	Hinton45
Trogoderma versicolor	raisin	df	Donohoe39, Hinton45
Trogoderma versicolor	rice	g	Douglas41, Gorham91, Hinton45
Trogoderma versicolor	rye	g	Hinton45
Trogoderma versicolor	seed	se	Gorham91
Trogoderma versicolor	silkworm cocoon	aninv	VijayVeer et al96
Trogoderma versicolor	sunflower seed	os	Stojanovic-Kosovac74
Trogoderma versicolor	wheat	g	Gorham91, Hadaway56, Hinton45
Trogoderma versicolor	wheat flour	gp	Buchelos-Athanassiou98
Trogoderma versicolor	wool	anv	Hadaway56, Hinton45
Typhaea haagi	bean	p	Nawrot-Klejdysz09
Typhaea haagi	dried fruit	df	Nawrot-Klejdysz09
Typhaea haagi	grain, cereal	g	Nawrot-Klejdysz09
Typhaea stercorea	almond	n	Okumura-Strong65
Typhaea stercorea	apple pomace	v	Strong-Okumura58
Typhaea stercorea	bamboo, dried leaf or shoot	v	Zimmerman90
Typhaea stercorea	barley	g	Archibald-Chalmers83, Attia-Kamel66, Buchelos-Katopodis95, Hinton45, Strong-Okumura58, Wohlgemuth-Reichmuth83
Typhaea stercorea	basketware, wicker	v	Archibald-Chalmers83
Typhaea stercorea	bean	p	Strong-Okumura58
Typhaea stercorea	bone	anv	Delobel-Tran93
Typhaea stercorea	brown sugar	v	Zimmerman90
Typhaea stercorea	cassava root chip	rp	Parker et al81
Typhaea stercorea	cassia	v	Zimmerman90
Typhaea stercorea	cereal (cereal product)	gp	Archibald-Chalmers83, Delobel-Tran93, Haines81, Hill02, Strong-Okumura58
Typhaea stercorea	chickpea (Bengal gram, garbanzo)	p	Haines74
Typhaea stercorea	cocoa	bc	Archibald-Chalmers83, Cotton-Good37, Delobel-Tran93, Hinton45
Typhaea stercorea	cocoa bean	bc	Aitken75, Cornes73
Typhaea stercorea	coffee	bc	Archibald-Chalmers83, Haines74
Typhaea stercorea	coffee bean	bc	Zimmerman90

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TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Typhaea stercorea	copra	osp	Aitken75
Typhaea stercorea	coriander	sea	Haines74
Typhaea stercorea	cotton gin trash	res	Strong-Okumura58
Typhaea stercorea	cottonseed	os	Davies60, Haines81, Strong-Okumura58
Typhaea stercorea	dairy product	anv	Archibald-Chalmers83
Typhaea stercorea	date	df	Archibald-Chalmers83, Calderon-Donahaye64, Donahaye-Calderon64
Typhaea stercorea	dried fruit	df	Aitken75, Delobel-Tran93
Typhaea stercorea	fig, dried	df	Calderon-Donahaye64, Okumura-Strong65
Typhaea stercorea	flax seed	os	Strong-Okumura58
Typhaea stercorea	food, decaying	sp	Hill02, Imura03
Typhaea stercorea	garlic	sea	Archibald-Chalmers83, Okumura-Strong65
Typhaea stercorea	grain product	gp	Aitken75
Typhaea stercorea	grain residue	res	Richards-Herford30, Strong-Okumura58
Typhaea stercorea	grain, cereal	g	Aitken75, Archibald-Chalmers83, Buchelos-Athanassiou98, Cotton-Good37, Yan et al10
Typhaea stercorea	grass seed	se	Archibald-Chalmers83
Typhaea stercorea	hay	v	Archibald-Chalmers83, Buchelos-Athanassiou98
Typhaea stercorea	hemp (marijuana)	v	Arnaud74
Typhaea stercorea	illipenut	os	Aitken75
Typhaea stercorea	kava	ffv	Archibald-Chalmers83
Typhaea stercorea	kidney bean	p	Delobel-Tran93
Typhaea stercorea	maize	g	Buchelos-Katopodis95, Caliboso et al86, Cornes73, Cotterell52, Davies60, Haines81, Hinton45, Sedlacek et al98, Strong-Okumura58, Tadesse96
Typhaea stercorea	maize cob	gp	Haines74
Typhaea stercorea	malt	gp	Guilin et al99
Typhaea stercorea	mango	ffv	Archibald-Chalmers83
Typhaea stercorea	medicine, Chinese angelica	me	Guilin et al99
Typhaea stercorea	medicine, Chinese traditional	me	Guilin et al99
Typhaea stercorea	milk, dried	anv	Archibald-Chalmers83
Typhaea stercorea	millet	g	Hinton45
Typhaea stercorea	nut	n	Aitken75, Delobel-Tran93, Hinton45
Typhaea stercorea	oat	g	Strong-Okumura58
Typhaea stercorea	oilcake	osp	Aitken75
Typhaea stercorea	oilseed	os	Aitken75

(*continued on next page*)

TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Typhaea stercorea	onion	ffv	Strong-Okumura58
Typhaea stercorea	orange pomace	v	Strong-Okumura58
Typhaea stercorea	paddy	g	Pires et al07
Typhaea stercorea	palm kernel	os	Cornes73
Typhaea stercorea	palm kernel meal	osp	Wohlgemuth-Reichmuth83
Typhaea stercorea	palm kernel oilcake	osp	Wohlgemuth-Reichmuth83
Typhaea stercorea	peanut	os	Archibald-Chalmers83, Arthur56, Champ65, Cornes73, Cotterell52, Cotton-Good37, Delobel-Tran93, Haines81, Hinton45, Pierrard62, Redlinger-Davis82
Typhaea stercorea	pecan meat	np	Gecan et al71
Typhaea stercorea	pepper, black	sea	White57
Typhaea stercorea	pepper, chilli	sea	Archibald-Chalmers83, Haines74, Zimmerman90
Typhaea stercorea	pepper, pod dried chilli	sea	Zimmerman87
Typhaea stercorea	pigeonpea (arhar, red gram)	p	Archibald-Chalmers83
Typhaea stercorea	raisin	df	Donohoe39, Okumura-Strong65
Typhaea stercorea	rice	g	Archibald-Chalmers83, Haines81, Pires et al07
Typhaea stercorea	root, dried cassava (manioc)	r	Archibald-Chalmers83, Delobel92, Delobel-Tran93, Ratti-Rampini77
Typhaea stercorea	rye	g	Wohlgemuth-Reichmuth83
Typhaea stercorea	sago flour	v	Aitken75
Typhaea stercorea	seed	se	Cotton-Good37
Typhaea stercorea	sesame seed	os	Cornes73
Typhaea stercorea	sheanut	n	Cornes73
Typhaea stercorea	sorghum (broomcorn)	g	Cornes73, Giles64
Typhaea stercorea	soybean	p	Delobel-Tran93, Hinton45
Typhaea stercorea	spice	sea	Archibald-Chalmers83, Delobel-Tran93
Typhaea stercorea	sunflower seed	os	Athanassov74, Stojanovic-Kosovac74
Typhaea stercorea	tobacco leaf	v	Cotton-Good37, Delobel-Tran93, Hinton45
Typhaea stercorea	wheat	g	Athanassiou et al01, Attia-Kamel66, Calderon-Donahaye64, Haines81, Hinton45, Patton31, Strong-Okumura58, Trematerra-Gentile06
Typhaea stercorea	wheat bran (pollard)	gp	Buchelos-Athanassiou98, Hinton45, Wohlgemuth-Reichmuth83

(*continued on next page*)

TABLE 5.1 Commodities reported to be infested by each insect species (*continued from previous page*)

Insect species	Commodity	Category	Source
Typhaea stercorea	wheat flour	gp	Buchelos-Athanassiou98, Cornes73, Hinton45
Typhaea stercorea	yam	r	Sauphanor et al87
Zabrotes subfasciatus	adzuki bean	p	Kingsolver04, Pierre-Pimbert81
Zabrotes subfasciatus	bambara groundnut	p	Forsyth66, Hill02, Kingsolver04
Zabrotes subfasciatus	bean	p	Haines74, 81; Hill02, Schulten-Roorda84, Singh90
Zabrotes subfasciatus	black gram (mash, urd)	p	Kingsolver04, Pierre-Pimbert81
Zabrotes subfasciatus	broad bean (fava bean, horsebean)	p	Attia-Kamel66, Kingsolver04, Pierre-Pimbert81, Shomar63
Zabrotes subfasciatus	chickpea (Bengal gram, garbanzo)	p	Anton et al97, Delobel-Tran93, Kingsolver04, USDA36-61
Zabrotes subfasciatus	cowpea	p	Anton et al97, Attia-Kamel66, Delobel-Tran93, Haines81, Hill02, Kingsolver04, Pierre-Pimbert81, Singh90, USDA36-61
Zabrotes subfasciatus	divi-divi	p	Attia-Kamel66, Pierre-Pimbert81
Zabrotes subfasciatus	hyaciath bean	p	Kingsolver04, Pierre-Pimbert81
Zabrotes subfasciatus	kidney bean	p	Anton et al97, Calderon-Donahaye64, Delobel-Tran93Haines81, Kingsolver04, Pierre-Pimbert81, USDA36-61
Zabrotes subfasciatus	lentil (masur)	p	Anton et al97
Zabrotes subfasciatus	lima bean	p	Delobel-Tran93, Haines81, Kingsolver04, USDA36-61
Zabrotes subfasciatus	maize	g	Tadesse96
Zabrotes subfasciatus	pea	p	Attia-Kamel66, Delobel-Tran93, Kingsolver04, Shomar63, Pierre-Pimbert81, USDA36-61
Zabrotes subfasciatus	pigeonpea (arhar, red gram)	p	Delobel-Tran93, Kingsolver04, Shomar63, USDA36-61
Zabrotes subfasciatus	pulse	p	McFarlane63
Zabrotes subfasciatus	scarlet runner bean	p	Kingsolver04, Pierre-Pimbert81
Zabrotes subfasciatus	soybean	p	Anton et al97, Delobel-Tran93, Kingsolver04
Zabrotes subfasciatus	tepary bean	p	Delobel-Tran93, Kingsolver04, Pierre-Pimbert81
Zabrotes subfasciatus	yard long bean	p	Kingsolver04

TABLE 5.2 Species-commodity combinations with 10 or more literature records

Species	Commodity	Category[a]	No. Records
Acanthoscelides obtectus	kidney bean	p	15
Ahasverus advena	cocoa	v	10
Ahasverus advena	copra	osp	14
Ahasverus advena	maize	g	12
Ahasverus advena	peanut	os	16
Alphitobius laevigatus	peanut	os	10
Anthrenus verbasci	insect, dried	aninv	10
Anthrenus verbasci	wool	anv	10
Araecerus fasciculatus	cocoa bean	v	11
Araecerus fasciculatus	coffee bean	v	11
Araecerus fasciculatus	maize	g	13
Araecerus fasciculatus	nutmeg (mace)	sea	11
Attagenus unicolor	wool	anv	12
Bruchus lentis	lentil (masur)	p	10
Bruchus pisorum	pea	p	12
Cadra cautella	cocoa bean	v	11
Cadra cautella	dried fruit	df	12
Cadra cautella	maize	g	14
Cadra cautella	peanut	os	19
Callosobruchus chinensis	chickpea (Bengal gram, garbanzo)	p	10
Callosobruchus chinensis	cowpea	p	13
Callosobruchus chinensis	mung bean	p	11
Callosobruchus chinensis	pea	p	11
Callosobruchus chinensis	pigeonpea (arhar, red gram)	p	12
Callosobruchus maculatus	chickpea (Bengal gram, garbanzo)	p	10
Callosobruchus maculatus	cowpea	p	23
Callosobruchus maculatus	lentil (masur)	p	10
Callosobruchus maculatus	mung bean	p	12
Callosobruchus maculatus	pea	p	14
Callosobruchus maculatus	pigeonpea (arhar, red gram)	p	11
Carpophilus dimidiatus	copra	osp	13
Carpophilus dimidiatus	date	df	10
Carpophilus dimidiatus	maize	g	19
Carpophilus dimidiatus	nutmeg (mace)	sea	11
Carpophilus dimidiatus	peanut	os	19
Carpophilus dimidiatus	rice	g	15
Carpophilus dimidiatus	sorghum (broomcorn)	g	10

(*continued on next page*)

[a] Category abbreviations are from Table 3.2

TABLE 5.2 Species-commodity combinations with 10 or more literature records (*continued from previous page*)

Species	Commodity	Category	No. Records
Carpophilus hemipterus	date	df	12
Carpophilus hemipterus	dried fruit	df	10
Carpophilus hemipterus	fig	ffv	10
Carpophilus hemipterus	maize	g	15
Caryedon serratus	peanut	os	14
Cathartus quadricollis	maize	g	14
Corcyra cephalonica	maize	g	14
Corcyra cephalonica	peanut	os	17
Corcyra cephalonica	rice	g	19
Cryptolestes ferrugineus	barley	g	10
Cryptolestes ferrugineus	maize	g	14
Cryptolestes ferrugineus	rice	g	14
Cryptolestes ferrugineus	wheat	g	16
Cryptolestes pusillus	coffee bean	v	10
Cryptolestes pusillus	maize	g	18
Cryptolestes pusillus	peanut	os	11
Cryptolestes pusillus	rice	g	19
Cryptolestes pusillus	root, dried cassava (manioc)	r	10
Cryptolestes pusillus	sorghum (broomcorn)	g	14
Cryptolestes pusillus	wheat	g	10
Dermestes ater	copra	osp	12
Dermestes ater	fish, dried	anv	13
Dermestes frischii	fish, dried	anv	13
Dermestes lardarius	fish, dried	anv	11
Dermestes maculatus	fish, dried	anv	17
Dermestes maculatus	hide, pelt or skin	anv	20
Dinoderus minutus	bamboo	v	11
Dinoderus minutus	maize	g	12
Ephestia elutella	dried fruit	gp	10
Ephestia kuehniella	wheat flour	gp	11
Gnatocerus cornutus	maize	g	10
Gnatocerus cornutus	wheat flour	gp	16
Gnatocerus maxillosus	maize	g	14
Lasioderma serricorne	cocoa bean	v	13
Lasioderma serricorne	ginger	sea	16
Lasioderma serricorne	peanut	os	13
Lasioderma serricorne	tobacco leaf	v	20
Lophocateres pusillus	rice	g	14

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TABLE 5.2 Species-commodity combinations with 10 or more literature records (*continued from previous page*)

Species	Commodity	Category	No. Records
Necrobia rufipes	copra	osp	18
Oryzaephilus mercator	copra	osp	10
Oryzaephilus mercator	peanut	os	18
Oryzaephilus surinamensis	barley	g	11
Oryzaephilus surinamensis	cereal (cereal product)	gp	12
Oryzaephilus surinamensis	dried fruit	df	13
Oryzaephilus surinamensis	maize	g	20
Oryzaephilus surinamensis	nut	n	10
Oryzaephilus surinamensis	peanut	os	14
Oryzaephilus surinamensis	rice	g	21
Oryzaephilus surinamensis	sorghum (broomcorn)	g	14
Oryzaephilus surinamensis	wheat	g	16
Oryzaephilus surinamensis	wheat bran (pollard)	gp	10
Palorus subdepressus	maize	g	12
Plodia interpunctella	dried fruit	df	10
Plodia interpunctella	grain product	gp	11
Plodia interpunctella	maize	g	18
Plodia interpunctella	nut	g	10
Plodia interpunctella	peanut	os	21
Plodia interpunctella	raisin	g	10
Plodia interpunctella	rice	g	10
Plodia interpunctella	wheat	g	12
Rhyzopertha dominica	barley	g	15
Rhyzopertha dominica	maize	g	23
Rhyzopertha dominica	rice	g	22
Rhyzopertha dominica	root, dried cassava (manioc)	r	10
Rhyzopertha dominica	sorghum (broomcorn)	g	18
Rhyzopertha dominica	wheat	g	23
Sitophilus granarius	barley	g	11
Sitophilus granarius	wheat	g	13
Sitophilus oryzae	barley	g	15
Sitophilus oryzae	maize	g	27
Sitophilus oryzae	paddy	g	10
Sitophilus oryzae	rice	g	28
Sitophilus oryzae	sorghum (broomcorn)	g	19
Sitophilus oryzae	wheat	g	20
Sitophilus zeamais	maize	g	22
Sitophilus zeamais	rice	g	12

(*continued on next page*)

TABLE 5.2 Species-commodity combinations with 10 or more literature records (*continued from previous page*)

Species	Commodity	Category	No. Records
Sitophilus zeamais	sorghum (broomcorn)	g	12
Sitophilus zeamais	wheat	g	10
Sitotroga cerealella	maize	g	16
Sitotroga cerealella	paddy	g	11
Sitotroga cerealella	rice	g	11
Sitotroga cerealella	sorghum (broomcorn)	g	12
Tenebroides mauritanicus	maize	g	17
Tenebroides mauritanicus	peanut	os	17
Tenebroides mauritanicus	rice	g	15
Tenebroides mauritanicus	wheat bran (pollard)	gp	10
Tineola bisselliella	wool	anv	10
Tribolium castaneum	barley	g	11
Tribolium castaneum	cereal (cereal product)	gp	11
Tribolium castaneum	cocoa bean	v	14
Tribolium castaneum	copra	osp	12
Tribolium castaneum	cottonseed	os	15
Tribolium castaneum	dried fruit	df	14
Tribolium castaneum	ginger	sea	10
Tribolium castaneum	maize	g	21
Tribolium castaneum	millet	g	11
Tribolium castaneum	peanut	os	26
Tribolium castaneum	rice	g	26
Tribolium castaneum	sorghum (broomcorn)	g	20
Tribolium castaneum	wheat	g	20
Tribolium castaneum	wheat bran (pollard)	gp	10
Tribolium castaneum	wheat flour	gp	19
Tribolium confusum	maize	g	15
Tribolium confusum	peanut	os	15
Tribolium confusum	rice	g	14
Tribolium confusum	wheat	g	13
Tribolium confusum	wheat flour	gp	13
Trogoderma granarium	peanut	os	11
Trogoderma granarium	rice	g	12
Trogoderma granarium	sorghum (broomcorn)	g	10
Trogoderma granarium	wheat	g	12
Typhaea stercorea	maize	g	10
Typhaea stercorea	peanut	os	11

TABLE 5.3 Numbers of records per literature source, percentages of unique records and geographical region or type of record

Source	No. records	%[a]	Region or type
Archibald-Chalmers83	960	31.1	Australia
Delobel-Tran93	832	16.9	
Strong-Okumura58	744	19.6	USA
Aitken75	721	34.0	Imports
Hayhurst-Britten42	620	20.7	Imports
Patton31	611	13.6	
Gorham91	512	19.4	USA
Campbell89	499	12.5	Canada
Haines81	347	15.8	Identification
Sinha-Watters86	340	10.3	Canada
Hill02	337	11.1	
Zimmerman90	317	38.3	Imports
Cotton-Good37	313	12.3	
Cornes73	310	14.1	Nigeria
Imura03	285	20.6	Japan, Korea
Hinton45	275	25.1	
Hedges-Lacey96	269	8.2	
Strong et al59	263	17.5	USA
Richards-Herford30	248	9.2	Imports
Wohlgemuth-Reichmuth83	248	32.4	Imports
Attia-Kamel66	234	21.2	Egypt
Okumura-Strong65	212	35.0	USA
Davies60	198	19.8	Uganda
Peacock93	188	18.3	
Forsyth66	177	10.1	Ghana
Richards-Thomson32	177	7.8	
Calderon-Donahaye64	166	10.3	Israel
Howe-Freeman55	159	22.8	Imports
Carter84	155	10.9	
USDA36-61	146	18.4	Imports
McFarlane63	140	20.5	Jamaica
Aitken84	139	33.2	Imports
Caliboso et al86	139	12.6	Philippines
Chittenden96	136	12.3	
Pierrard62	120	17.8	Burundi, Rwanda
Buchelos-Athanassiou98	114	17.4	Greece

(*continued on next page*)

[a] Percentages of records with a species-commodity combination that were not reported by another literature source.

TABLE 5.3 (*continued from previous page*)

Source	No. records	%[a]	Region or type
Yan et al10	102	26.6	China
Guilin et al99	100	46.8	China
Rajendren-Parveen05	95	21.5	
Hinton41	94	8.7	
Okumura-Savage74	93	33.1	USA
Beal56	91	18.7	USA
Haines74	89	16.0	Identification
Nayar et al76	88	16.2	India
Kingsolver04	87	13.0	
Kiritani59	86	27.7	Imports
Olsen81	77	33.0	Imports
Halstead93	72	13.3	
Hinton56	72	24.2	
Solis99	70	28.6	Imports
Cotterell52	69	1.4	Nigeria
Schulten-Roorda84	69	16.9	Imports
Weidner73	65	40.9	Germany
Corbet-Tams43	57	9.5	
Roesler73	56	17.6	
Walker79	54	5.3	Swaziland
Fisher50	52	23.5	North America
Papp62	51	3.8	North America
Tawfik et al85	51	41.4	Egypt

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CHAPTER 6

STORED-PRODUCT MITES

Fewer mite species (Class Acari) than insect species (280 vs 1663) have been reported to be associated with stored commodities. In general, with good pest management, mite infestations are less likely than insect infestations to result in economic losses. However, mites can damage commodities and reduce seed germination (Gulati et al. 1999, Mahmood et al. 2011, 2012; Parkinson 1990, Solomon 1946, White et al. 1979, Zdarkova 1996, Zdarkova and Reska 1976). For 280 mite species that have been reported to be associated with stored products, common names, taxonomy, geographic distribution, commodities infested and available life history studies are listed in Table 6.1.

Fewer mite than insect species have been given common names. Hughes (1961, 1976) and Smiley (1987) provide the most comprehensive keys for stored-product mites. Like insects, some of the names of mite species have been changed and there are many synonyms. Some of these changes have been controversial. For example, *Sancassania* Oudemans 1916 was named before *Caloglyphus* Berlese 1923, but the genus is known only in the hypopal stage and some have been reluctant to accept the change (Timms et al. 1981). Hughes (1976) provides a key for identifying the developmental stages and distinguishing adult males from adult females of the Astigmatid mites. Mites have been reported to be associated with 425 commodities. Forty-five mite species have been reported to be associated with more than ten commodities (Table 6.2). Twenty two of these mite species have been reported to be associated with more than 20 commodities. Life histories of 54 mite species have been studied. Barker (1993) discussed the transport of mites by stored-product insects (phoresy).

Mites reported to be associated with stored commodities are from 48 families (Table 6.3). Thirty seven of these families are in the Order Acariformes. Thirteen of these families are oribatid mites. The majority (228 out of 280) of the mite species associated with stored products is in the Order Acariformes. Many of the mites associated with stored products are predators on insects and other mites. Species of the Order Parasitiformes (Par) and the families Acarnophenacidae, Bdellidae, Cheyletidae, Cunaxidae, Pyemotidae, Stigmaeidae, and Tydeidae of the Order Acariformes (Aca) are often predators. These families include nearly 50% of the total number of mite species that have been reported to be associated with stored products. Also, Papadopoulou (2006) found that the acarid mite, *Tyrophagus putrescentiae* reduced *Lasioderma serricorne* population by 20%.

Table 6.4 links old genus names with more recent genus names. Table 6.1 lists mite species by their most recent genus name so Table 6.4 can be helpful when a user has only the old genus name for a species. Many species were originally named *Acarus*, *Glycyphagus* or *Tyroglyphus* and later placed in another genus.

TABLE 6.1 Mite species associated with stored products

Acarophenax assanovi Livshits and Mitrofanov 1974

Taxonomy: Aca: Acarnophenacidae

Distribution: Russia

Commodities (1): grain

Acarophenax dermestidarum Rack 1959

Taxonomy: Aca: Acarnophenacidae, also has been in family Pyemotidae

Key: Rack 1959

Distribution: Germany

Life history: Rack 1959

Acarophenax lacunatus Cross and Krantz 1964

Taxonomy: Aca: Acarnophenacidae, also has been in the family Pyemotidae.

Key: Cross and Krantz 1964, Steinkraus and Cross 1993

Distribution: Iraq, United States

Commodities (1): wheat

Life history: Faroni et al. 2001, Oliveira et al. 2007

Acarophenax mahunkai Steinkraus and Cross 1993

Taxonomy: Aca: Acarnophenacidae

Key: Steinkraus and Cross 1993

Distribution: United States

Life history: Steinkraus and Cross 1993

Acarophenax tribolii Newstead and Duval 1918

Taxonomy: Aca: Acarnophenacidae, also has been in the family Pyemotidae.

Key: Cross and Krantz 1964, Hughes 1976, Rack 1959, Steinkraus and Cross 1993

Distribution: Australia, Brazil, Canada, Egypt, England, Greece, India, Indonesia, United States

Commodities (5): flour meal, grain (3), maize cob (rotting), peanut, rice

Facilities: farm, market, off-farm storage

Acaropsella filipina Corpuz-Raros 1998

Taxonomy: Aca: Cheyletidae

Key: Corpuz-Raros 1998

Distribution: Philippines

Commodities (2): feedmill debris, soybean

Acaropsella konoi Tseng 1977

Taxonomy: Aca: Cheyletidae

Distribution: Taiwan

Commodities (4): bean, grain, kaoliang, wheat

Acaropsellina docta (Berlese 1886)

Taxonomy: Aca: Cheyletidae, originally *Cheyletus docta* Berlese 1886, syn. *Acaropsis docta* Berlese 1886

Key: Corpus-Raros 1998, Summers and Price 1970, Volgin 1987

Distribution: Czech Republic, England, Egypt, Greece, India, Iraq, Ireland, Italy, Netherlands, Philippines, Poland, Russia, United States

Commodities (17): animal feed, barley (4), clover seed, cottonseed, cocoa bean, ginger, grain (4), herb, maize, oat, oat grass, protein mix, soybean, sweeping, wheat (4), wheat flour, wheat flour sweeping

Facilities: commercial grain storage, farm (2), flour mill, off farm storage, provender warehouse

Life history: Al-Badry et al. 1980, Somchoudhury and Mukherjee 1971a

Acaropsellina sollers (Kuzin in Rohdendorf 1840)

Taxonomy: Aca: Cheyletidae, syn. *Acaropsis sollers* (Kuzin in Rohdendorf 1840), *Acaropsis callida* (Kuzin in Rohdendorf 1840)

Key: Hughes 1976, Summers and Price 1970, Volgin 1987

Distribution: Czech Republic, Egypt, England, Germany, Greece, Iran, Iraq, Poland, Russia, Scotland, Turkey, United States, Yemen, Wales

Commodities (16): barley (3), broad bean, buckwheat, buckwheat product, chickpea, cottonseed, dried fruit, grain (3), maize (1), poultry diet, protein mix, residue, rice, wheat (4), wheat flour, sweeping

Facilities: barn, cattle pens, farm, flour mill, off-farm storage

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Acaropsellina tyrophagus (El Badry 1969)

Taxonomy: Aca: Cheyletidae, originally *Acaropsis tyrophagus* El Badry 1969

Distribution: Egypt

Commodities (1): wheat (milled)

Acaropsellina volgini (Gerson 1967)

Taxonomy: Aca: Cheyletidae, syn. *Acaropsis aegyptiaca* Wafa and Soliman 1968

Key: Summers and Price 1970, Volgin 1987

Distribution: Egypt, Israel

Commodities (3): barley, cottonseed, wheat

Life history: Attiah and Soliman 1970, Wafa et al. 1970

Acarus chaetoxysilos Griffith 1970

Taxonomy: Aca: Acaridae

Distribution: England, Japan

Facilities: cheese store

Acarus farris (Oudemans 1905)

Taxonony: Aca: Acaridae, originally *Aleurobius farris* Oudemans 1905

Key: Griffith 1964, Hughes 1976, Smiley 1987

Distribution: Canada, China, Czech Republic, England, Germany, Iran, Ireland, Japan, Kenya, Netherlands, Poland, Scotland, United Kingdom, United States, Wales

Commodities (23): barley (3), barley (germinating), bread, buckwheat, buckwheat product, cereal, cheese, Chinese medicine, grain (7), grain residue, grass seed, hay, insect (dried), oat, potato, poultry feed, radish seed, rapeseed, soybean, soya meal, sugar beet seed, sweeping (2), wheat (3)

Facilities: cheese store, commercial grain storage, drier, farm, farm granary, farm milling machine, grinder, malthouse, mill

Life history: Sanchez-Ramos et al. 2007a, b

Acarus gracilis Hughes 1957

Taxonomy: Aca: Acaridae

Key: Griffith 1964, Hughes 1976

Distribution: Argentina, China, England, Germany, Greece, Primorskiy Kray, Taiwan, United Kingdom, Wales

Commodities (6): biscuit, bread, Chinese medicine, grain, grain residue, rice (2)

Facilities: farm

Acarus immobilis Griffith 1964

Taxonomy: Aca: Acaridae

Key: Griffith 1964, Hughes 1976

Distribution: China, Czech Republic, England, Germany, Greece, Ireland, Poland, Scotland, Turkey, United Kingdom, Wales

Commodities (11): baby food, biscuit, Chinese medicine, grain (3), cheese, grain, grain residue, sugar beet seed, sweepings, wheat, wheat flour

Facilities: cheese store, commercial grain storage, farm (2), farm milling machine, off-farm storage, provender warehouse, railcar

Acarus mirabilis Volgin 1965

Taxonomy: Aca: Acaridae

Distribution: China, Poland

Commodities (3) : buckwheat, buckwheat product, condiment

Acarus siro Linnaeus 1758

Common names: flour mite (Mehlmilbe (G), мучной клещ (R), ácaro de la harina (S)), grain mite, tyroglyphe de la farine (tyroglyphe of flour (F))

Taxonomy: Aca: Acaridae, syn. *Tyroglyphus farinae* Linnaeus 1758

Key: Attiah 1969, Griffith 1964, Hughes 1976, Smiley 1987, Zakhvatkin 1959

Distribution: Cosmopolitan. Australia, Canada, China, Croatia, Czech Republic, Egypt, England, Germany, Greece, Hong Kong, Iran, Iraq, Ireland, Japan, Philippines, Poland, Primorskiy Kray, Scotland, Singapore, Taiwan, Turkey, United Kingdom, United States, Wales

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Commodities (88): aquatic product, baby food, barley (7), barley sweeping, bean curd (2), beet seed (2), biscuit, bread, buckwheat, buckwheat product, cake, castor bean, cereal, cereal debris, cereal product, chaff, cheese (4), chicken feed, chicory, Chinese medicine (2), cinnamon, clover seed, coltsfood leaf and root, condiment, cottonseed (2), dill seed, dried fruit, dried vegetable, ergot, fenugreek, flax seed (2), fodder waste, grain (10), grain residue, grass seed (2), halva, hay, hemp seed (2), herb, kale seed, kohlrabi seed, lentil, lettuce seed, linseed, maize (3), lupine seed, maize groat, meat (dried), milk (dried), mint leaf, mushroom, nettle leaf, oat, oat flake, offal, oilseed cake, onion seed (2), pea (dried), pea flour, peanut (2), poppy seed (2), potato flour, processed food, protein poultry feed, radish seed, rapeseed (4), residue, rice (3), rice (husked), runch seed, sesame, shrimp (dried) (2), soup (dried), soybean, soybean meal, spinach seed, squid, dried (2), straw (2), sugar beet seed, sunflower seed (3), sweeping (2), wheat (10), wheat bran, wheat flour (4), wheat flour sweeping (2), wheat residue

Facilities: commercial grain storage, cheese storage, drier, empty grain bin, farm (2), farm, farm grarnary, farm grinder, farm milling machine, flour mill (3), flour warehouse, grain warehouse, oatmeal mill, mushroom growing cellar, off-farm storage, provender mill, provender warehouse, railcar, wheat cleaning area

Life history: Boczek 1957, Chmielewski 2000, Cunnington 1965, 1985, Hilsenhoff and Dicke 1963, Parkinson et al. 1991, Thind and Dunn 2002

Aeroglyphus robustus (Banks 1906)

Common names: warty grain mite

Taxonomy: Aca: Glycyphagidae

Key: Smiley 1987

Distribution: Canada

Commodities (2): grain, wheat

Life history: Barker 1967b

Aleuroglyphus formosana Tseng 1972

Taxonomy: Aca: Acaridae

Distribution: Taiwan

Commodities (1): wheat

Aleuroglyphus ovatus Troupeau 1878

Common names: brownlegged grain mite

Taxonomy: Aca: Acaridae, originally *Tyroglyphus ovatus* Troupeau 1878

Key: Attiah 1969, Hughes 1976, Smiley 1987, Zakhvatkin 1959

Distribution: Canada, China, Croatia, Czech Republic, Egypt, England, France, Germany, Greece, Hong Kong, Indonesia, Ireland, Japan, Netherlands, Poland, Philippines, Primorskiy Kray, Russia, South Korea, Taiwan, Thailand, Turkey, United States

Commodities (35): aquatic product, barley (3), bean, bean curd (2), candied fruit, carcadic, cheese, chicken meal, Chinese medicine, condiment, coriander, fish (dried product), fodder, grain (3), herb, lentil, livestock feed, macaroni, maize, maize meal, oat, pepper, pollard, poultry diet, processed food, residue, rice, rye, shrimp (dried) (3), sunflower seed, tiki-tiki, wheat (6), wheat bran, wheat bran (moldy), wheat flour (2)

Facilities: bread van, commercial grain storage, farm (3), off-farm storage

Life history: Hsin and Shen 1964, Xia et al. 2009

Aleuroglyphus siculus Fumouze and Robin 1867

Taxonomy: Aca: Acaridae

Key: Zakhvatkin 1959

Distribution: Azerbaijan

Facilities: farm granary

Alliea prasadi Corpuz-Raros 1998

Taxonomy: Aca: Cheyletidae

Key: Corpuz-Raros 1998

Distribution: Philippines

Commodities (1): peanut

Alliphis halleri (G. and R. Canestrini 1881)

Taxonomy: Par: Eviphididae

Distribution: Ireland

Facilities: bread van

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Alliphis siculus Oudemans 1905

Taxonomy: Par: Eviphididae

Distribution: Czech Republic

Commodities (1): grain

Ameroseius lanceosetis Livshitz and Mitrofanov 1975

Taxonomy: Par: Ameroseiidae

Distribution: China

Commodities (1): condiment

Ameroseius marginalis Fan and Li 1993

Taxonomy: Par: Ameroseiidae

Distribution: China

Commodities (5): condiment, dried fruit, dried vegetable, mushroom, processed food

Ameroseius plumigera (Oudemans 1930)

Taxonomy: Par: Ameroseiidae, syn. *Kleemannia plumigera* (Oudemans 1930), *Zercoseius gracei* Hughes 1948

Key: Hughes 1976, Smiley 1987

Distribution: Brazil, Canada, China, Egypt, England, Germany, Greece, Ireland, Netherlands, Poland, Taiwan, United Kingdom, Wales

Commodities (12): buckwheat, buckwheat product, condiment, dried fruit, dried vegetable, grain (3), hay (2), maize, mushroom, oat sifting, rice, rice (husked)

Facilities: commercial grain storage, farm (2), market, off-farm storage

Ameroseius plumosus (Oudemans 1902)

Taxonomy: Par: Ameroseiidae, originally *Seiulus plumosus* Oudemans 1902, syn. *Kleemannia plumosa* (Oudemans 1902), *Zercoseius macauleyi* Hughes 1948

Key: Hughes 1976, Smiley 1987

Distribution: Australia, Canada, China, Czech Republic, Egypt, England, Germany, Greece, Iceland, Ireland, Israel, Japan, Netherlands, Poland, Scotland, Taiwan, Thailand, United Kingdom, United States, Wales

Commodities (23): animal feed, bamboo shoot (2), biscuit, buckwheat, buckwheat product, confection, dried fruit, dried vegetable, fish (minced-dried), gin trash, grain (6), hay, maize, mushroom, peanut, pork (minced-dried), poultry diet, rice, rice (husked), seed cotton, shrimp (canned), sugar (red) (2), tuna (canned)

Facilities: commercial grain storage, farm (2), off-farm storage, warehouse

Ameroseius sichanensis Fan and Li 1993

Taxonomy: Par: Ameroseiidae, misspelled as *Ameroseius szechuanicus* in Li and Fan 1997

Distribution: China

Commodities (4): condiment, dried fruit, dried vegetable, mushroom

Androlaelaps casalis (Berlese 1887)

Taxonomy: Par: Laelapidae, originally *Iphis casalis* Berlese 1887, syn. *Haemolaelaps casalis* (Berlese), *Hypoaspis freemani* Hughes 1948. Has also been in family Dermanyssidae

Key: Hughes 1976, Smiley 1987

Distribution: Cosmopolitan. Australia, Canada, China, Czech Republic, Egypt, England, Greece, Indonesia, Iran, Ireland, Japan, Scotland, United Kingdom, United States, Wales

Commodities (15): aquatic product, barley (3), condiment, dried fruit, dried vegetable, grain (8), grain residue (2), grass seed, hay (2), mushroom, processed food, rice (2), sweeping (2), wheat (7), wheat residue

Facilities: commercial grain storage, drier, empty grain bin, farm, mill, off-farm storage, provender mill

Life history: Barker 1968b, Zaki et al. 1997

Androlaelaps fahrenholzi Berlese 1911

Taxonomy: Par: Laelapidae, originally *Laelaps glasgowi* Ewing 1825, syn. *Androlaelaps glasgowi* (Ewing 1925), *Haemolaelaps glasgowi* (Ewing 1925)

Distribution: United States

Commodities (1): grain

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Apostigmaeus pacificus* Summers 1964**

Taxonomy: Aca: Stigmaeidae

Distribution: Philippines

Commodities (5): cassava, rice, rice bran, rice (milled), soybean

***Arctoseius butleri* (Hughes 1948)**

Taxonomy: Par: Ascidae, syn. *Tristomus butleri* Hughes 1948

Key: Evans 1958, Hughes 1976

Distribution: Ireland, Scotland

Commodities (2): peach (rotten-dried), hay bale (wet)

Facilities: railcar, silo

***Arctoseius insularis* (Willmann 1952)**

Taxonomy: Par: Ascidae

Distribution: China

Commodities (4): condiment, dried fruit, dried vegetable, mushroom

***Armascinus taurus* (Kramer 1881)**

Taxonomy: Aca: Cunaxidae, syn. *Cunaxa taurus* (Kramer 1881)

Key: Smiley 1992

Distribution: Cosmopolitan. Canada, China, Costa Rica, Cuba, Czech Republic, England, France, Germany, Honduras, Ireland, Malaysia, Mexico, Panama, Philippines, Poland, South Africa, Taiwan, United States, Zaire

Commodities (5): barley meal, grain, grass seed, maize, oat

Facilities: commercial grain storage, farm

***Austroglycyphagus geniculatus* (Vitzthum 1919)**

Taxonomy: Aca: Glycyphagidae, syn. *Glycyphagus geniculatus* Vizthum 1919

Key: Hughes 1976, Zakhvatkin 1959

Distribution: Brazil, China, East Africa, England, Germany, Wales, Zaire

Commodities (3): Chinese medicine, grain, grain bin residue

Facilities: farm, market

***Austroglycyphagus kualalumpurensis* Faom and Nadchatram 1980**

Taxonomy: Aca: Glycyphagidae

Distribution: Philippines

Commodities (2): bean pollard, peanut

***Blattisocius dentriticus* (Berlese 1918)**

Taxonomy: Par: Ascidae, originally *Lasioseius dentriticus* Berlese 1918, syn. *Melichares dentriticus* (Berlese 1918)

Key: Chant 1963, Evans 1958, Haines 1978, Hughes 1976, Smiley 1987

Distribution: China, England, Hawaii, India, Indonesia, Israel, Ireland, Italy, Japan, Netherlands, Sri Lanka, United Kingdom, United States, Wales

Commodities (15): aquatic product, condiment, dried fruit, dried vegetable, grain, maize, meat product, mushroom, pollard, processed food, potato (sprouting), rice, tea, wheat, wheat flour

Facilities: farm

Life history: Rivard 1960; 1962a, b

***Blattisocius keegani* (Fox 1947)**

Taxonomy: Par: Ascidae

Key: Chant 1963, Evans 1958, Haines 1978, Hughes 1976

Distribution: Brazil, Canada, China, Czech, Egypt, England, Greece, Hawaii, India, Indonesia, Iraq, Ireland, Israel, Malaya, Mexico, Philippines, Poland, Puerto Rico, Senegal, South America, United States, Wales, West Africa

Commodities (22): apricot (dried), aquatic product, barley (3), beet seed, condiment, cotton, cottonseed, dried fruit (2), dried vegetable, feed mix, grain (5), maize (plate), mungo, mushroom, nutmeg, processed food, rice bran, soybean, sunflower seed, wheat (5), wheat bran, wheat flour (2)

Facilities: commercial grain storage, farm, flour mill, market, off-farm storage, provender warehouse

Life history: Barker 1967c

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Blattisocius mali Oudemans 1929

Taxonomy: Par: Ascidae, originally *Typhlodromus mali* Oudemans 1929, syn. *Melichares mali* (Oudemans 1929), *Blattisocius bakeri* (Chant 1963)

Key: Evans 1958, Haines 1978, Hughes 1976, Smiley 1987

Distribution: China, Egypt, England, Greece, India, Netherlands, Poland, Taiwan, Turkey

Commodities (13): apricot (dried) (2), bean, currant (dried), dried fruit, dried vegetable, grain(moldy), grass seed, mushroom, processed food, raisin, rice, sugar (red) (2)

Facilities: farm, flour mill, off-farm storage

Blattisocius quadridentatus Haines 1978

Taxonomy: Par: Ascidae

Key: Haines 1978

Commodities (1): chocolate bar

Blattisocius tarsalis (Berlese 1918)

Taxonomy: Par: Ascidae, originally *Lasioseius tarsalis* Berlese 1918, syn. *Melichares tarsalis* (Berlese 1918), *Blattisocius tineivorus* (Oudemans 1929)

Key: Chant 1963, Evans 1958, Haines 1978, Hughes 1976, Smiley 1987

Distribution: Australia, Brazil, Canada, China, Czech Republic, Ecuador, Egypt, England, Greece, Hawaii, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Mexico, Netherlands, North Africa, Peru, Philippines, Poland, Singapore, Switzerland, Turkey, United States, Venezuela, Wales

Commodities (32): apricot (dried), aquatic product, barley (2), buckwheat, buckwheat product, chocolate, condiment, corn soya meal, cotton seed, dried fruit (2), dried vegetable, feed corn, ginger, grain (7), grass seed, laying mash, legume, maize (3), lily bulb, mushroom, oat (rolled), peanut (2), processed food, raisin, rice (6), seed cotton, sugar, sugar beet seed, sunflower seed (2), sweeping, wheat (6), wheat flour (2)

Facilities: empty grain bin, farm, flour mill, market, off-farm storage, ship

Life history: Çobanoğlu et al. 2007; Ewing 1912, Hafez et al. 1988, Nielsen 1999, 2001

Blomia freemani Hughes 1948

Taxonomy: Aca: Glycyphagidae

Key: Bronswijk et al. 1973, Hughes 1976

Distribution: Brazil, China, Egypt, England, Greece, Ireland, Taiwan

Commodities (5): Chinese medicine, millet (2), rice, sweetpotato chip (dried), wheat

Facilities: commercial grain storage, dock silo, flour mill, market, warehouse

Blomia khalilovae Zakhvatkin 1949

Taxonomy: Aca: Glycyphagidae

Key: Bronswijk et al. 1973

Distribution: Azerbaijan

Commodities (2): barley, millet

Blomia kulagini Zakhvatkin 1936

Taxonomy: Aca: Glycyphagidae

Key: Bronswijk et al. 1973, Zakhvatkin 1959

Distribution: Japan, Russia

Commodities (1): wheat

Facilities: granary

Blomia tjibodas (Oudemans 1910)

Taxonomy: Aca: Glycyphagidae, originally *Glycyphagus tjibodas* Oudemans 1910

Key: Bronswijk et al. 1973

Distribution: Germany, Java

Facilities: farm grarnary, farm milling machine, stable

Blomia thori Zakhvatkin 1936

Taxonomy: Aca: Glycyphagidae

Key: Bronswijk et al. 1973, Zakhvatkin 1959

Distribution: Azerbaijan, Russia

Commodities (2): flax seed, grain product

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Blomia tropicalis Bronswijk, Cock and Oshima 1973

Taxonomy: Aca: Glycyphagidae

Key: Bronswijk et al. 1973

Distribution: India, Indonesia, Japan, Myanmar, Philippines, Taiwan, Venezuela

Commodities (1): rice

Facilities: tobacco factory

Bothrocheyla pavlovskii (Volgin 1963)

Taxonomy: Aca: Cheyletidae, originally *Neoeucheyla pavlovskii* Volgin 1963, syn. *Eucheyletia pavlovskii* (Volgin 1963)

Key: Summers and Price 1970

Distribution: Czech Republic, Russia

Commodities (1): sweeping

Camisia segnis (Hermann 1804)

Taxonomy: Aca: Camisiidae

Distribution: United States

Commodities (1): grain

Carpoglyphus lactis (Linnaeus 1758)

Common names: dried fruit mite (ciron des fruits secs (F), Backobstmilbe (G), сухофруктовый клещ (R), ácaro de las frutas secas (S)), carpoglyphe des figues (carpoglyphe of fig (F)), Milchmilbe (milk mite (G)), Rosinenmilbe (raisin mite (G))

Taxonomy: Aca: Carpoglyphidae, originally *Acarus lactis* Linnaeus 1758

Key: Hughes 1976, Smiley 1987

Distribution: Cosmopolitan. Argentina, Australia, Canada, China, Czech Republic, Egypt, Greece, Hong Kong, Indonesia, Ireland, Korea, Mexico, North America, Philippines, Poland, Singapore, Taiwan, Turkey

Commodities (38): apricot (dried) (2), bean curd (2), biscuit, buckwheat, buckwheat product, candied fruit, caramel, cheese (2), cocoa bean (2), coconut (fermented), confection (2), date (red), dried fruit, dried fruit (moldy), fig (dried) (2), fish (minced-dried), grain (2), herb, honey, honey comb, jam (fermenting), peanut (2), plum (dried), pollen, potato (rotting), processed food, prune (dried), raisin, shrimp (dried) (2), soybean sauce, soybean paste, sugar (crude), sugar (red) (2), sugar (white) (2), tamarind, wheat flour, wheat flour (old), wine cork

Facilities: off-farm storage

Life history: Chao-peng 1979, Chmielewski 1971a, Okamoto 1984, 1986

Carpoglyphus monroi Hughes 1952

Taxonomy: Aca: Carpoglyphidae

Key: Hughes 1976

Distribution: England

Caudacheles lieni Tseng 1977

Taxonomy: Aca: Cheyletidae

Distribution: Taiwan

Commodities (1): bean

Chamobates incisus Van der Hammen 1952

Taxonomy: Aca: Chamobatidae

Distribution: Ireland

Facilities: bread van

Chelachecaropsis bakeri Attiah 1971

Taxonomy: Aca: Cheyletidae

Distribution: Egypt

Facilities: rice mill

Chelacheles hellenicus Eliopoulos and Papadoulis 2001

Taxonomy: Aca: Cheyletidae

Distribution: Greece

Commodities (1): floor litter

Facilities: flour mill

Chelacheles robustus Corpus-Raros 1998

Taxonomy: Aca: Cheyletidae

Key: Corpus-Raros 1998

Distribution: Philippines

Commodities (1): cassava flour

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Cheletomimus binus* Tseng 1973**

Taxonomy: Aca: Cheyletidae

Distribution: Taiwan

Commodities: betel nut, garlic, shallot (decaying)

***Cheletomimus bisetosa* Tseng 1977**

Taxonomy: Aca: Cheyletidae

Distribution: Taiwan

Commodities (2): bulb, shallot

***Cheletomimus bregetovae* (Volgin 1969)**

Taxonomy: Aca: Cheyletidae, originally *Dendrocheyla bregetovae* Volgin 1969, syn. *Hemicheyletia scitula* Corpus-Raros 1972

Key: Corpus-Raros 1998, Fain et al. 2002, Summers and Price 1970, Thewke and Enns 1979, Volgin 1987

Distribution: Armenia, Bulgaria, Philippines, Russia, Ukraine

Commodities (1): tobacco leaf (cured)

***Cheletominus wellsi* (Baker 1949)**

Taxonomy: Aca: Cheyletidae, syn. *Hemicheyletia wellsi* Baker 1949

Keys: Thewke and Enns 1979,

Distribution: Taiwan

Commodities (2): betel nut, shallot

***Cheletominus wellsina* (De Leon 1967)**

Taxonomy: Aca: Cheyletidae, syn. *Hemicheyletia arecana* Tseng 1972, *Hemicheyletia wellsina* (De Leon 1967)

Key: Corpuz-Raros 1998, Fain et al. 2002, Summers and Price 1970, Thewke and Enns 1979

Distribution: Cameroon, Malaysia, Philippines, Rwanda, Taiwan, Trinidad, United States

Commodities (1): betel nut

***Cheletomorpha lepidopterorum* (Shaw 1794)**

Taxonomy: Aca: Cheyletidae, originally *Acarus lepidopterorum* Shaw 1794, syn. *Cheyletus venustissimus* Koch 1839

Key: Corpus-Raros 1998, Hughes 1976, Smiley 1987, Volgin 1987

Distribution: Cosmopolitan. Australia, Canada, China, Czech Republic, England, France, Germany, Greece, India, Indonesia, Ireland, Italy, Japan, Kenya, Mexico, Nigeria, Philippines, Poland, Portugal, Russia, Taiwan, United States, Wales

Commodities (30): bean, candied fruit, Chinese medicine, condiment, cottonseed, dried fish, dried fruit, dried vegetable, garlic bulb, grain (4), hay, herb, honey, kaoliang, maize (4), maize residue, milk (dried), millet, millet debris, mushroom, oat, peanut (2), processed food, rice, rice (husked), rice (old), sugar, trefoil, vegetable (dehydrated), wheat (2)

Facilities: commercial grain storage, farm, off-farm storage, retail shop

Life history: Taha et al. 1988, Xia et al. 2007

***Cheletonella pilosa* Tseng 1977**

Taxonomy: Aca: Cheyletidae

Distribution: Taiwan

Commodities (3): kaoliang, millet, wheat

***Cheyletia papillifera* Volgin 1955**

Taxonomy: Aca: Cheyletidae

Key: Volgin 1987

Distribution: Czech Republic, Netherlands

Commodities (1): starch

***Cheyletogenes ornatus* (Canestrini and Fanzago 1876)**

Taxonomy: Aca: Cheyletidae, originally *Cheyletus ornatus* Canestrini and Fanzago 1876

Key: Corpus-Raros 1998, Volgin 1987

Distribution: Cosmopolitan. Australia, China, Egypt, Hawaii, Italy, Poland, Turkey, United States, West Indies

Commodities (2): apricot (dried), herb

Life history: Zaher and Soliman 1971, Zaher et al. 1981

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Cheyletus cacahuamilpensis Baker 1949

Taxonomy: Aca: Cheyletidae

Key: Fain and Bochkov 2001, Summers and Price 1970, Volgin 1987

Distribution: Cosmopolitan. Algeria, Greece, Mexico, Peru, South Africa, Ukraine

Facilities: flour mill, off-farm storage

Life history: Mohamed et al. 1982

Cheyletus carnifex Zachvatkin 1935

Taxonomy: Aca: Cheyletidae, syn. *Cheyletus aversor* Rohdendorf 1940

Key: Fain and Bochkov 2001, Hughes 1976, Summers and Price 1970, Volgin 1987

Distribution: Bulgaria, China, Czech Republic, Egypt, England, Germany, Greece, Iran, Ireland, Peru, Poland, Russia, Uganda, United States

Commodities (23): aquatic product, barley (2), beet seed, chicken feed, Chinese medicine, clover seed, condiment, cottonseed, flax seed, grain (4), grain product, grain residue, herb, maize flour, oat, protein mix, residue, rice, soya bran, sunflower seed, sweeping (3), wheat (3), wheat flour (2)

Facilities: farm, flour mill, off farm storage, o ld distillery silo

Cheyletus eruditus (Schrank 1781)

Common names: cheylète érudite (F), Getrideraubmilbe (grain preadacious mite (G)), хищный клещ (predacious mite (R))

Taxonomy: Aca: Cheyletidae, originally *Acarus eruditus* Schrank 1781, syn. *Cheyletus butleri* Hughes 1948, *Cheyletus seminivorus* Packard 1870

Key: Fain and Bochkov 2001, Hughes 1976, Smiley 1987, Volgin 1987

Distribution: Cosmopolitan. Australia, Canada, China, Croatia, Czech Republic, England, Germany, Greece, India, Ireland, Japan, Poland, Scotland, Taiwan, Turkey, United States, Wales

Commodities (53): animal feed, aquatic product, barley (4), barley debris, beet seed, buckwheat, buckwheat product, candied fruit, cheese, Chinese medicine, clover seed, condiment, confection, coriander seed, cotton seed, dried fruit, dried vegetable, grain (7), egg (dried), flax seed, grain, grain residue, grass seed (2), hemp seed, herb, kale seed, kohlrabi seed, lettuce seed, maize, mushroom, oat, onion seed, parsley seed, peanut, radish seed, rapeseed, residue, rice (2), runch seed, rye, seed cotton, soya flour, spinach seed, sugar beet seed, sugar (red) (2), sugar (white) (2), sunflower seed, swede seed, sweeping, wheat (7), wheat flour (2), wheat residue, wheat spillage

Facilities: bread van, commercial grain storage, drier, empty grain bin, farm, farm grinder, flour mill, off-farm storage, provender mill, provender warehouse, railcar

Life history: Barker 1991, Boczek 1959

Cheyletus malaccensis Oudemans 1903

Taxonomy: Aca: Cheyletidae, *Cheyletus egypticus* El Badry 1969, *Cheyletus fortis* Oudemans 1904, *Cheyletus monroi* Hughes 1948, *Cheyletus polymorphus* Volgin 1949

Key: Corpus-Raros 1998, Fain and Bochkov 2001, Hughes 1976, Smiley 1987, Summers and Price 1970, Volgin 1987

Distribution: Australia, Brazil, Canada, China, Colombia, Czech Republic, Ecuador, Egypt, England, Ethiopia, Germany, Greece, Grenada, India, Indonesia, Iran, Iraq, Ireland, Japan, Malaysia, Mali, Myanmar, New Guinea, Peru, Philippines, Poland, Portugal, Russia, Rwanda, Sierra Leone, Sri Lanka, Tadjikistan, Taiwan, Turkey, United States, Uganda, Venezuela, Wales, Yemen

Commodities (68): apple (dried), aquatic product (2), barley (4), biscuit, candied fruit, cereal, cocoa bean, coffee bean, condiment (2), copra, cotton seed, dried fruit (3), dried vegetable (2), fereek, fish (dried) (2), fish (minced-dried), fishmeal, fodder, fungus (dried), garden bean, garlic, grain (7), grain spillage, grass seed, ham (dried), legume, lentil, macaroni, maize (6), maize grit, malt flower, milk, mungo, mushroom (2), nutmeg, oat, onion bulb, onion seed, palay, illipenut (2), pollard, poultry diet, processed food (2), radish seed, residue, rice (5), rice (husked), rice (mled), rice (red), rice straw mat, seed cotton, shallot, sheanut, sorghum (2), soybean, soybean meal, soybean sauce (2), soybean spillage, sugar beet seed, sugar (red) (2), sugar (white), sunflower seed, tiki-tiki, tulip bulb, wheat (7), wheat bran, wheat flour (3), wheat (milled)

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Facilities: commercial grain storage, farm, flour mill, grain stores, grain warehouse, granary, market, off-farm storage, provender warehouse, ship

Life history: Cebolla et al. 2009, Palyvos and Emmanouel 2005, 2009, 2011; Rout and Misera 1987, Saleh et al. 1986, Zaher and Soliman 1971a, Yousef et al. 1982

Cheyletus trouessarti Oudemans 1902

Taxonomy: Aca: Cheyletidae

Key: Fain and Bochkov 2001, Hughes 1976, Summers and Price 1970, Volgin 1987

Distribution: Cosmopolitan. Azerbaijan, Canada, Czech Republic, England, France, Germany, Greece, Ireland, Japan, Netherlands, Poland, Russia, Scotland, Taiwan, Turkey, United States, Wales

Commodities (19): animal feed, barley (2), flax seed, grain (9), grain residue, grass seed, herb, kaoliang, maize flour, protein feeding mixture, rice, rice (husked), soya sweeping, sugar beet seed, sweeping, wheat (5), wheat bran, wheat flour, wheat flour sweeping, wheat residue

Facilities: barn, commercial grain storage, drier, empty grain bin, farm (2), farm grinder, flour mill, flour warehouse, provender mill, provender warehouse, railcar

Life history: Zhu et al. 2000

Cheyletus trux Rohdendorf 1940

Taxonomy: Aca: Cheyletidae, syn. *Cheyletus hendersoni* Baker 1949

Key: Fain and Bochkov 2001, Summers and Price 1970, Volgin 1987

Distribution: Belgium, Czech Republic, Greece, Poland, Russia, Switzerland, Ukraine, United States

Commodities (11): barley, cattle feed residue, flax seed, herb, lettuce seed, maize, millet, mummy, sweeping, wheat, wheat bran

Facilities: flour mill, off-farm storage

Chortoglyphus arcuatus (Troupeau 1879)

Taxonomy: Aca: Chortoglyphidae, originally *Tyroglyphus arcuatus* Troupeau 1879

Key: Attiah 1969, Zakhvatkin 1959

Distribution: Barbados, Belgium, Canada, China, Croatia, Czech Republic, Egypt, England, France, Germany, Greece, Hong Kong, Ireland, Italy, Netherlands, New Zealand, Poland, Russia, Taiwan, Thailand, Wales

Commodities (34): barley (3), barley sweeping, bean curd, cereal, Chinese medicine, clover seed (red), dried fruit, dried vegetable, grain (4), grass seed (2), hay, herb (2), lentil, maize (2), malt, millet, mushroom, oat (2), poppy seed, potato flour, poultry mix, residue, rice (4), rice (husked), rye (2), shrimp (dried), soya sweeping, squid (dried), sugar beet seed, sweeping, sweetpotato chip (dried), wheat (3), wheat flour, wheat flour sweeping

Facilities: barn, commercial grain storage, farm, farm grarnary, farm milling machine, flour mill, granary, off-farm storage, provender mill, provender warehouse, railcar, stable

Cosmochthonius foveolatus Beck 1962

Taxonomy: Aca: Cosmochthonidae

Distribution: China

Commodities (3): dried fruit, dried vegetable, mushroom

Cosmochthonius lanatus (Michael 1885)

Taxonomy: Aca: Cosmochthonidae

Distribution: China, Ireland

Commodities (4): condiment, dried fruit, dried vegetable, mushroom

Facilities: commercial grain storage, farm

Cosmochthonius reticulatus Grandjean 1947

Taxonomy: Aca: Cosmochthonidae

Distribution: China

Commodities (3): dried fruit, dried vegetable, mushroom

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Crytoplophora abscondita* Grandjean 1932**

Taxonomy: Aca: Protoplophoridae

Distribution: China

Commodities (3): dried fruit, dried vegetable, mushroom

***Ctenoglyphus canestrini* (Armanelli 1887)**

Taxonomy: Aca: Glycyphagidae, originally *Glycyphagus canestrini* Armanelli 1887

Key: Hughes 1976, Zakhvatkin 1959

Distribution: China, England, Hungary, Ireland, Italy, Russia, Wales

Commodities (4): Chinese medicine, grain, hay, spillage

Facilities: farm, oat mill, stable

***Ctenoglyphus hughesi* Attiah 1969**

Taxonomy: Aca: Glycyphagidae, according to Hughes (1976) should be in the genus *Diamesoglyphus*

Key: Attiah 1969

Distribution: Egypt

Commodities (1): wheat flour

***Ctenoglyphus palmifer* (Fumouze and Robin 1868)**

Taxonomy: Aca: Glycyphagidae, originally *Glycyphagus palmifer* Fumouze and Robin 1868

Key: Hughes 1976, Zakhvatkin 1959

Distribution: England, France, Germany, Ireland, Italy

Commodities (2): barley (damp), chaff, spillage

Facilities: farm, oat mill, stable

***Ctenoglyphus plumiger* (Koch 1835)**

Taxonomy: Aca: Glycyphagidae, originally *Acarus plumiger* Koch 1835

Key: Hughes 1976, Zakhvatkin 1959

Distribution: Australia, Canada, China, Czech Republic, England, France, Germany, Hungary, Ireland, Italy, Netherlands, Poland, Russia, Scotland, Wales

Commodities (19): animal feed, barley (damp), buckwheat, buckwheat product, Chinese medicine, condiment, dried fruit, dried vegetable, fishmeal, grain (2), grass seed (damp), hay, honey comb, mushroom, oat (damp), processed food, sweeping, wheat (damp), wheatfeed

Facilities: commercial grain storage, empty grain bin, farm, mill, provender warehouse

***Cunaxa capreolus* (Berlese 1890)**

Taxonomy: Aca: Cunaxidae, originally *Scirus capreola* Berlese 1890

Key: Smiley 1992

Distribution: Cosmopolitan. China, Egypt, Italy, Hong Kong, Japan, Mexico, Philippines, Spain, United States

Commodities (12): aquatic product, barley, broad bean, condiment, cuttlefish (dried), dried fruit, dried vegetable, mushroom, onion, sorghum, soybean, sunflower seed

Life history: Soliman et al. 1975, Zaher et al. 1975

***Cunaxa denheyeri* (Fan 1992)**

Taxonomy: Aca: Cunaxidae

Distribution: China

Commodities (5): aquatic product, condiment, dried fruit, dried vegetable, mushroom

***Cunaxa nankanaensis* Ashfaq et al. 2011**

Taxonomy: Aca: Cunaxidae

Key: Ashfaq et al. 2011

Distribution: Pakistan

Commodities (1): rice husk

Facilities: rice mill

***Cunaxa setirostris* (Hermann 1804)**

Taxonomy: Aca: Cunaxidae, originally *Scirus setirostris* Hermann 1804

Key: Smiley 1992

Distribution: Cosmopolitan. Australia, Brazil, Germany, Greece, Guam, India, Indonesia, Israel, Italy, Madeira, Morocco, Philippines, United States

Commodities (3): barley meal, grain, wheat

Facilities: farm, food store, off-farm storage

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Cunaxa sinensis* (Fan 1992)**

Taxonomy: Aca: Cunaxidae

Distribution: China

Commodities (5): aquatic product, condiment, dried fruit, dried vegetable, mushroom

***Cunaxa womersleyi* Baker and Hoffman 1948**

Taxonomy: Aca: Cunaxidae

Key: Smiley 1992

Distribution: Canada, China, Japan, Taiwan, United States

Commodities (6): condiment, dried fruit, dried vegetable, grain (2), mushroom, red bean (2)

***Cymbaeremaeus cymba* Nicolet 1885**

Taxonomy: Aca: Cymbaeremaeidae

Distribution: Turkey

Commodities (1): apricot (dried)

***Dermanyssus gallinae* (DeGeer 1778)**

Common names: bird mite (птичий клещ (R)), chicken mite (Hűhnermilbe (G), куринный клещ (R)), poultry mite, red mite (ácaro rojo (S)), blutsaugende Vogelmilbe (blood sucking bird mite (G)), dermanysse de poulaillers (dermanysse of poultry (F)), rote Vogelmilbe (red bird mite (G))

Taxonomy: Par: Dermanyssidae

Distribution: Cosmopolitan. United Kingdom, United States

Commodities (2): grain, sheepskin rug

***Dermatophagoides chelidonis* (Hull 1931)**

Taxonomy: Aca: Pyroglyphidae

Distribution: England, Wales

Commodities (1): grain

***Dermatophagoides farinae* Hughes 1961**

Common names: American house dust mite

Taxonomy: Aca: Pyroglyphidae

Key: Attiah 1969, Hughes 1976, Smiley 1987

Distribution: Argentina, China, Czech Republic, Egypt, England, Greece, Japan, Netherlands, Russia, Sierra Leone, Thailand, United States

Commodities (9): bean sauce, biscuit meal, Chinese medicine, maize, poultry and pig rearing meal, wheat, wheat bran, wheat flour (2), wheat pollard

Facilities: farm, flour mill, off-farm storage

Life history: Alexander et al. 2002, Arlian and Dippold 1996, Arlian et al. 1998, Colloff 1991, Hart 1998

***Dermatophagoides longior* (Berlese 1897)**

Taxonomy: Aca: Pyroglyphidae

Distribution: Czech Republic, England, France, Germany, Sweden

Commodities (2): barley sweeping, clover (dried)

***Dermatophagoides microceras* Griffiths and Cunnington 1971**

Taxonomy: Aca: Pyroglyphidae

Key: Hughes 1976, Smiley 1987

Distribution: China, England, Spain, United States

Commodities (1): Chinese medicine

***Dermatophagoides pteronyssinus* (Trouessart 1897)**

Common names: European house dust mite

Taxonomy: Aca: Pyroglyphidae, originally *Mealia pteronyssinus* Trouessart 1897

Key: Hughes 1976

Distribution: Barbados, Belgium, China, Denmark, England, Germany, Indonesia, Italy, Netherlands, Philippines, Poland, Russia, Singapore, Taiwan, Thailand, United Kingdom, United States, Wales

Commodities (16): biscuit, buckwheat, buckwheat product, cake, cereal, Chinese medicine, crabmeat (canned), fish (dried), hide dust, jackfruit, jackfruit (pickled), logan (dried), shrimp paste, shrimp (dried), shrimp (frozen), tamarind

Facilities: farm

Life history: Arlian et al. 1990, Colloff 1991, Hart 1998

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Diamesoglyphus intermedius* (Canestrini 1888)**

Taxonomy: Aca: Glycyphagidae, originally *Gycyphagus intermedius* Canestrini 1888, syn. *Ctenoglyphus intermedius* (Canestrini 1888)

Distribution: Germany

Commodities (1): hay

Facilities: farm

***Digamasellus presepum* Berlese 1918**

Taxonomy: Par: Digmasellidae

Distribution: England, Germany, Israel, Italy

Facilities: ship

***Eremaeus translamellatus* Hamer 1952**

Taxonomy: Aca: Eremaeidae

Distribution: Canada

Facilities: empty grain bin

***Eucheyletia flabellifera* (Michael 1878)**

Taxonomy: Aca: Cheyletidae, originally *Cheyletia flabellifera* Michael 1878

Key: Summers and Price 1970, Volgin 1987

Distribution: Canada, England, Ireland, Japan, Poland

Commodities (6): barley, buckwheat, buckwheat product, grain, oat spillage (old)

Facilities: cellar, commercial grain storage

***Eucheyletia taurica* Volgin 1963**

Taxonomy: Aca: Cheyletidae

Key: Hughes 1976, Summers and Price 1970, Volgin 1987

Distribution: England, Russia, Wales

Commodities (1): grain

Life history: Zdarkova and Horak 1997

***Eugamasus butleri* Hughes 1948**

Taxonomy: Par: Parasitidae

Distribution: England, Ireland, Scotland

Commodities (4): brewer grain, cereal, grass seed, sweeping

Facilities: farm, flour mill, provender mill, warehouse

***Eulaelaps stabularis* (C. L. Koch 1839)**

Taxonomy: Par: Laelapidae, originally *Gamasus stabularis* C. L. Koch 1839, also has been in family Haemogamasidae

Distribution: Cosmopolitan. Canada, Czech Republic, England, Ireland, Taiwan, United States

Commodities (4): grain, sweeping, warehouse debris, wheat

Facilities: commercial grain storage, farm

***Eupodes variegatus* C. L. Koch 1838**

Taxonomy: Aca: Eupodidae

Distribution: Canada

Facilities: empty grain bin

***Eupodes voxencollinus* Sig Thor 1934**

Taxonomy: Aca: Eupodidae

Distribution: China

Commodities (1): aquatic product

***Euroglyphus longior* (Trouessart 1897)**

Taxonomy: Aca: Pyroglyphidae, originally *Mealia maynei* Cooreman 1950

Key: Hughes 1976, Smiley 1987

Distribution: Egypt, England, France, Germany, Sweden, United States

Commodities (3): bean, granary debris, hide dust

Facilities: farm

***Euroglyphus maynei* (Cooreman 1950)**

Common names: small house-dust mite

Taxonomy: Aca: Pyroglyphidae, originally *Mealia maynei* Cooreman 1950, syn. *Mealia longior* Trouessart 1897

Key: Hughes 1976, Smiley 1987

Distribution: Belgium, China, Denmark, England, Germany, Indonesia, Italy, Japan, Netherlands, Thailand

Commodities (5): bean curd, Chinese medicine, cottonseed cake (decomposed), crabmeat (canned), shrimp (dried)

Facilities: farm, farm grarnary, farm milling machine

Life history: Colloff 1991, Hart 1998

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Fessonia papillosa* (Hermann 1804)**

Taxonomy: Aca: Smarididae

Distribution: China

Commodities (1): aquatic product

***Fuscuropoda marginata* (C. L. Koch 1939)**

Taxonomy: Par: Uropodidae, originally *Notaspis marginatus* C. L. Koch 1939)

Distribution: Australia, England, Germany, Ireland, Italy, Netherlands, Poland, United States, Wales, Yugoslovia

Commodities (6): buckwheat, buckwheat product, grain, grain (damp, moldy), spillage (damp, decaying), wheat residue (damp, moldy)

Facilities: farm, mill, ship, warehouse

Life history: Rohde 1959

***Gamasellodes bicolor* (Berlese 1918)**

Taxonomy: Par: Ascidae

Distribution: Iraq, Ireland

Commodities: rice, wheat

Facilities: bread van

***Glycyphagus aegyptiacus* Attiah 1969**

Taxonomy: Aca: Glycyphagidae

Key: Attiah 1969

Distribution: Egypt

***Glycyphagus bicaudatus* Hughes 1961**

Taxonomy: Aca: Glycyphagidae

Key: Hughes 1976

Distribution: Germany, Poland

Commodities (1): grass seed

Facilities: farm

***Glycyphagus domesticus* (DeGeer 1778)**

Common names: house mite (Hausmilbe (G)), glyciphage domestique (domestic glyciphage (F)), Wohnungsmilbe (flat mite (G)), домовый полосатый клещ (house striped mite) (R))

Taxonomy: Aca: Glycyphagidae, originally *Acarus domesticus* DeGeer 1778

Key: Hughes 1976, Zakhvatkin 1959

Distribution: Cosmopolitan. Australia, Canada, China, Czech Republic, Egypt, England, Europe, Germany, Greece, Ireland, Japan, Philippines, Poland, Scotland, Taiwan, Turkey, United Kingdom, United States, Wales

Commodities (44): animal feed, aquatic product, baby food, barley (2), barley (germinating), bean, biscuit, bread, buckwheat, buckwheat product, calf stomach (dried), cereal, cheese, Chinese medicine, condiment, dried fruit, dried vegetable, flax seed (2), grain, grass seed (2), ham, hay, hemp seed, herb, herring meal, malt, malt flower (dried), mushroom, oat, peanut, poppy seed, processed food, rapeseed, rice (2), spillage, squid (dried), stock fish, sugar beet, sugar beet seed, sunflower seed, tobacco, wheat (4), wheat flour (3), wheat flour sweeping

Facilities: bread van, cheese store, commercial grain storage, drier, farm, farm grarnary, farm milling machine, flour mill, grinder, house, off-farm storage, provender mill, provender warehouse, railcar, stable, warehouse

Life history: Barker 1968a, Chmielewski 2002, Matsumoto et al. 1995

***Glycyphagus ornatus* Kramer 1881**

Taxonomy: Aca: Glycyphagidae

Key: Hughes 1976, Zakhvatkin 1959

Distribution: China, Czech Republic, England, France, Germany, Ireland, Israel, Italy, Netherlands, Poland, Russia, Wales

Commodities (13): animal feed, Chinese medicine (2), grain, grass seed (2), hay, herb, oat, oilseed, processed food, sugar beet seed, wheat, wheat flour residue, wheat flour sweeping

Facilities: farm, grain stores, hay loft, stable

***Glycyphagus oryzae* Attiah 1969**

Taxonomy: Aca: Glycyphagidae

Key: Attiah 1969

Distribution: Egypt

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Glycyphagus privatus Oudemans 1903

Taxonomy: Aca: Glycyphagidae

Key: Hughes 1976

Distribution: China, Czech Republic, Ireland, Japan, Poland

Commodities (13): aquatic product, barley, Chinese medicine, clover seed, condiment, dried fruit, dried vegetable, flax seed, grain, grass seed (2), mushroom, sweeping, wheat

Facilities: dock silo, warehouse

Gohieria fusca (Oudemans 1902)

Common names: brown flour mite

Taxonomy: Aca: Glycyphagidae, originally *Glycyphagus fuscus* Oudemans 1902

Key: Attiah 1969, Smiley 1987, Zakhvatkin 1959

Distribution: Belgium, Canada, China, Czech Republic, Egypt, England, France, Germany, Greece, Ireland, Japan, Netherlands, New Zealand, Poland, Russia, Scotland, Taiwan, Turkestan, United States, Wales

Commodities (30): barley, bean (red), buckwheat, buckwheat product, Chinese medicine, dried fruit, dried vegetable, fish (dried), flax seed, fungus (dried), grain, grass seed, hemp seed, herb,kaoliang, malt, mushroom, poppy seed, protein poultry feed, rice, rice (husked), soybean sauce, soybean sweeping, sugar (packaged), sugar beet seed, wheat, wheat bran, wheat flour (packaged), wheat pollard, wheat flour sweeping

Facilities: farm, farm milling machine, flour mill, off-farm storage, food processing factories, provender mill, sweeping

Grallacheles bakeri (DeLeon 1962)

Taxonomy: Aca: Cheyletidae

Key: Corpus-Raros 1998, Volgin 1987

Distribution: Angola, Czech Republic, Hawaii, Ivory Coast, Japan, Philippines, Taiwan

Commodities (4): coffee bean, garlic bulb, grain, rice (husked)

Haemogamasus pontiger (Berlese 1904)

Taxonomy: Par: Laelapidae, originally *Laelaps pontiger* Berlese 1904, syn. *Haemogamasus oudemansi* Hirst 1914, also has been in family Haemogamasidae

Key: Hughes 1976

Distribution: Cosmopolitan. Argentina, Australia, Canada, China, Czech Republic, England, Ireland, Israel, Italy, Japan, Russia, Scotland, United Kingdom, United States, Wales

Commodities (9): barley (3), beet seed, grain (6), oat, rapeseed, sweeping, walnut, wheat (5), wheat flour

Facilities: commercial grain storage, empty grain bin, farm, flour mill, provender mill, provender warehouse, railcar, wheat elevator

Life history: Barker 1968c

Haplochthonius simplex Willmann 1930

Taxonomy: Aca: Haplochthoniidae

Distribution: China

Commodities (1): condiment

Hemicheyletia reticulata Jeffrey and Campbell 1975

Taxonomy: Aca: Cheyletidae

Keys: Thewke and Enns 1979

Distribution: Scotland

Facilities: cheese store at creamery, combine harvester, farm

Hemicheyletia tumidus Qayyum and Chaudhri 1979

Taxonomy: Aca: Cheyletidae

Distribution: Pakistan

Commodities (1): wheat

Facilities: grain market, warehouse

Hemicheyletia vescus Qayyum and Chaudhri 1979

Taxonomy: Aca: Cheyletidae

Distribution: Pakistan

Commodities (2): rice, wheat

Facilities: grain market

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Histiogaster carpio* Kramer 1881**

Taxonomy: Aca: Acaridae

Key: Zahkvatkin 1959

Distribution: China, China, United States

Commodities (1): grain (2)

***Histiostoma feroniarum* (Dufour 1839)**

Taxonomy: Aca: Histiostomidae, originally *Hypopus feroniarum* Dufour 1839

Distribution: Australia, Canada, China, England, France, Germany, Ireland, Italy, Netherlands, New Zealand, United States

Commodities (5): Chinese medicine, dried fruit, dried vegetable, grain (wet), mushroom (decaying)

Facilities: bread van, commercial grain storage, farm

Life history: Liana 2005

***Histiostoma humidiatus* (Vitzthum 1927)**

Taxonomy: Aca: Histiostomidae, originally *Anoetus humidiatus* Vitzthum 1927, also has been in family Anoetidae

Distribution: Taiwan

Commodities (1): garlic (rotting)

***Histiostoma onioni* Eraky and Shoker 1994**

Taxonomy: Aca: Histiostomidae

Distribution: Egypt

Commodities (1): onion

***Histiostoma pulchrum* (Kramer 1886)**

Taxonomy: Aca: Histiostomidae

Distribution: China

Commodities (3): dried fruit, dried vegetable, mushroom

***Histiostoma sarrai* Eraky and Shoker 1994**

Taxonomy: Aca: Histiostomidae

Distribution: Egypt

Commodities (1): onion

***Histiostoma sapromyzarum* (Dufour 1839)**

Taxonomy: Aca: Histiostomidae, originally *Hypopus sapromyzarum* Dufour 1839

Distribution: Australia, Bolivia, Brazil, England, France, Germany, Italy, Netherlands, Philippines

Commodities (3): fungi (decaying), hyacinth bulb (decaying), timber (damp)

***Hypoaspis aculeifer* (Canestrini 1884)**

Taxonomy: Par: Laelapidae, originally *Laelaps aculeifer* Canestrini 1884, also has been in family Dermanyssidae, subfamily Laelapinae

Key: Hughes 1976

Distribution: Canada, England, Germany, Ireland, Israel, Italy, Japan, Netherlands, North America, Russia, Sweden

Commodities (3): daffodil bulb, flour (caked), grain

Facilities: commercial grain storage

Life history: Barker 1969, Kevan and Sharma 1964, Ragusa et al. 1986, Ragusa and Zedan 1988

***Hypoaspis lubrica* Voigts and Oudemans 1904**

Taxonomy: Par: Laelapidae, syn. *Hypoaspis smithii* Hughes 1948, also has been in family Dermanyssidae, subfamily Laelapinae

Key: Hughes 1976

Distribution: Canada, China, Czech Republic, England, Ireland, Russia, United States, Wales

Commodities (6): condiment, grain (4), grain debris, oat (rotting), rice (rotten), wheat (2)

Facilities: commercial grain storage, farm, flour mill, oatmeal mill, railcar, warehouse

***Hypoaspis miles* (Berlese 1892)**

Taxonomy: Par: Laelapidae, originally *Laelaps miles* Berlese 1892, also has been in family Dermanyssidae, subfamily Laelapinae

Key: Hughes 1976

Distribution: Italy, Russia, Scotland, United States, West Indies

Commodities (2): oatmeal spillage (decaying), wheat residue

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Hypoaspis sardoa (Berlese 1911)

Taxonomy: Par: Laelapidae, syn. *Androlaelaps pilifer* Oudemans 1912, also has been in family Dermanyssidae, subfamily Laelapinae

Key: Hughes 1976

Distribution: England, Italy, Netherlands, Russia

Commodities (2): oat spillage (damp), sweeping

Facilities: warehouse

Hypoaspis sclerotarsus Costa 1968

Taxonomy: Par: Laelapidae, also has been in family Dermanyssidae, subfamily Laelapinae

Distribution: Egypt

Commodities (1): rice

Ker bakeri Zaher and Soliman 1967

Taxonomy: Aca: Cheyletidae

Distribution: Brazil, Cameroon, Czech Republic, Egypt

Commodities (1): coffee bean

Facilities: market

Ker mercedesae Corpus-Raros 1998

Taxonomy: Aca: Cheyletidae

Key: Corpus-Raros 1998

Distribution: Philippines

Commodities (1): cassava flour

Lardoglyphus angelinae Olsen 1982

Taxonomy: Aca: Acaridae

Distribution: Hong Kong

Commodities (1): fish (dried)

Lardoglyphus konoi (Sasa and Asanuma 1951)

Common names: driedfish mite, Speckmilbe (lard mite (G))

Taxonomy: Aca: Acaridae, originally *Hoshikadania konoi* Sasa and Asanuma 1951

Key: Hughes 1976, Smiley 1987

Distribution: Australia, China, England, Germany, Hong Kong, India, Indonesia, Japan, Malawi, Malaysia, Pakistan, Poland, Philippines, Singapore, Taiwan, Tanzania

Commodities (9): Chinese medicine, fish product (salted), fish (dried) (8), fish (minced-dried), pawn cracker, pawn (minced), shark fin (dried), shrimp (dried) (5), squid (dried) (2)

Facilities: food storehouses

Life history: Matsumoto et al. 1992

Lardoglyphus zacheri Oudemans 1927

Taxonomy: Aca: Acaridae

Key: Hughes 1976, Smiley 1987

Distribution: Australia, China, England, Germany, Hong Kong, Mexico, South America

Commodities (6): bone, butcher offal, Chinese medicine, fish (dried), hide, shark fin (dried)

Lasioseius allii Chant 1958

Taxonomy: Par: Ascidae, syn. *Lasioseius martini* Tseng 1971

Key: Chant 1963

Distribution: Portugal, South Africa, Taiwan

Commodities (3): garlic bulb, onion bulb, shallot

Lasioseius berlesi (Oudemans 1938)

Taxonomy: Par: Ascidae

Key: Chant 1963, Evans 1958

Distribution: Iraq

Commodities (1): rice

Life history: Walter and Lindquist 1989

Lasioseius penicilliger Berlese 1916

Taxonomy: Par: Ascidae

Key: Chant 1963, Evans 1958, Hughes 1976

Distribution: England, Ireland, Germany, Scotland, United States

Commodities (1): barley (damp)

Facilities: commercial grain storage, farm, mill

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Lasioseius sugawarai* Ehara 1964**

Taxonomy: Aca: Ascidae

Distribution: Taiwan

Commodities (1): pineapple fruit

***Leiodinychus krameri* (G and R. Canestrini 1882)**

Common names: tortoise mite

Taxonomy: Par: Uropodidae, *Uropoda krameri* G and R. Canestrini 1882

Key: Hughes 1976, Smiley 1987

Distribution: Cosmopolitan. Australia, Canada, China, Czech Republic, Indonesia, Ireland, Japan, Solomon Is., Sri Lanka, Taiwan, United States

Commodities (14): barley (damp, moldy, sprouting), condiment, copra, dried fruit, dried vegetable, grain (6), maize (damp, moldy, sprouting), maize residue, mushroom, peanut debris, pulse, rice, wheat (damp, moldy, sprouting), wheat bran

Facilities: commercial grain storage, farm, food store, mill, railcar, ship, warehouse

Life history: Radinovsky 1965a, b

***Lepidoglyphus destructor* (Schrank 1781)**

Common names: furniture mite, house mite, обыкновенный волосатый клещ (common hairy mite (R)), behaarte gemeine Speichermilbe (hairy common mite (G))

Taxonomy: Aca: Glycyphagidae, originally *Acarus destructor* Schrank 1781, *Glycyphagus destructor* (Schrank 1781)

Key: Hughes 1976, Zakhvatkin 1959

Distribution: Cosmopolitan. Canada, China, England, Iran, Iraq, Poland, Turkey

Commodities (64): animal feed, aquatic product, baby food, barley(8), barley residue, bean (green), beet seed, biscuit, bread, buckwheat, buckwheat product, calf stomach (dried), candied fruit, cereal, cheese, Chinese medicine (2), cocoa bean, condiment, cottonseed (2), dried fruit (2), dried vegetable, flax seed, gin trash, grain (7), grass seed (2), hide (dried), hay, hemp seed, herb, insect (dried), kale seed, kaoliang, lettuce seed, linseed, maize (3), malt, millet spillage, mushroom, oat (3), onion seed, poppy seed, poultry diet, processed food, protein mix, radish seed, rapeseed (3), residue, rice (5), rice (husked), rye (2), seed cotton, sorghum residue, soybean, straw, sugar beet seed (2), sunflower seed, sweeping (2), sweetpotato chip (dried), tea, vegetable (dried), wheat (14), wheat flour (3), wheat flour sweeping, wheat residue

Facilities: commercial grain storage, drier, empty grain bin, farm, farm granary, farm milling machine, flour mill, grinder, mill, off-farm storage, provender mill, provender warehouse, railcar

Life history: Barker 1983, Chmielewski 2001, Danielson et al. 2004, Miyamoto 1974, Parkinson et al. 1991, Thind and Dunn 2002

***Lepidoglyphus fustifer* (Oudemans 1903)**

Taxonomy: Aca: Glycyphagidae, originally *Glycyphagus fustifer* Oudemans 1903

Key: Hughes 1976, Zakhvatkin 1959

Distribution: China, Czech Republic, Ecuador, Germany, Hong Kong, Ireland, Poland, Russia

Commodities (15): bean curd, cottonseed (2), dried fruit, dried vegetable, fungus (dried), grain (3), grass seed, herb (2), maize, mushroom, poppy seed (2), rye, seaweed, sweeping, turnip seed

Facilities: farm

***Lepidoglyphus michaeli* Oudemans 1903**

Taxonomy: Aca: Glycyphagidae, originally *Glycyphagus michaeli* Oudemans 1903

Distribution: Bulgaria, Canada, China, Czech Republic, England, France, Germany, Hungary, Ireland, Italy, Netherlands, Poland, Russia, Sweden, Wales

Commodities (9): Chinese medicine (2), flax seed, fodder, grain (4), grass seed, hay, herb, oat, yeast

Facilities: farm, provender warehouse, stable

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Lepidoglyphus pilosus* Oudemans 1906**

Taxonomy: Aca: Glycyphagidae

Key: Zakhvatkin 1959

Distribution: Germany, Poland

Commodities (1): herb

***Lomelacarus faini* Fan and Li 1993**

Taxonomy: Aca: Glycyphagidae

Distribution: China

Commodities (4): condiment, dried fruit, dried vegetable, mushroom

***Lorryia nesziyyonensis* Gerson 1968**

Taxonomy: Aca: Tydeidae

Distribution: Greece

Facilities: farm, flour mill, off-farm storage

***Lorryia reticulata* (Oudemans 1928)**

Taxonomy: Aca: Tydeidae

Distribution: Canada, Japan

Commodities (1): wheat

***Macrocheles glaber* (Mueller 1860)**

Taxonomy: Par: Macrochelidae

Distribution: Iraq

Commodities (1): rice

***Macrocheles matrius* (Hull 1925)**

Taxonomy: Par: Macrochelidae

Key: Hughes 1976

Distribution: Australia, Canada, England, Finland, Germany, Iceland, Ireland, Italy, Poland

Commodities (3): floor debris, grain, grass seed

Facilities: farm

***Macrocheles muscaedomesticae* (Scopoli 1772)**

Taxonomy: Par: Macrochelidae

Distribution: Cosmopolitan. Australia, Canada, England, Philippines, Scotland, United States, Wales

Commodities (6): fish (dried) (2), grain (3), maize trash, onion bulb, peanut (moldy), wheat residue (rotting)

Facilities: flour mill, wheat elevator

***Macrocheles robustulus* (Berlese 1904)**

Taxonomy: Par: Macrochelidae

Distribution: Ethiopia

Commodities (1): cereal residue

***Madaglyphus javensis* Haines and Lynch 1987**

Taxonomy: Aca: Acaridae

Distribution: Indonesia, Java

Facilities: food store, rice mill

***Mediolata granaria* Gonzalez-Rodriguez 1965**

Taxonomy: Aca: Stigmaeidae

Commodities: Ireland

Facilities: farm

***Melichares agilis* Hering 1838**

Taxonomy: Par: Ascidae

Key: Evans 1958

Distribution: England, Germany, Netherlands, Poland, Taiwan, Turkey

Commodities (9): apricot (dried), beef (smoked), confection, dried fruit, grass seed, hog bladder, honey, sugar (red) (2), sugar (white)

***Mexecheles votandinii* Jeffrey 1976**

Taxonomy: Aca: Cheyletidae

Distribution: Scotland

Facilities: farm, whisky distillery

***Microtydeus hyalinus* Fan and Li 1992**

Taxonomy: Aca: Tydeidae

Distribution: China

Commodities (4): condiment, dried fruit, dried vegetable, mushroom

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Mycetoglyphus fungivorus* Oudemans 1932**

Taxonomy: Aca: Acaridae

Key: Hughes 1976

Distribution: China, England, Germany, Hungary, Russia, South Africa, United States

Commodities (4): celery waste, Chinese medicine, lettuce, radish (decaying)

***Nanacarus minutus* Oudemans 1901**

Taxonomy: Aca: HemisarcoptidaeDistribution: China

Commodities (5): dried fruit, dried vegetable, grain, mushroom, wheat

***Neophyllobius saxatilis* Halbert 1938**

Taxonomy: Aca: Neophyllobiidae

Distribution: Ireland

Facilities: farm

***Neoseiulus alpinus* (Schweizer 1922)**

Taxonomy: Par: Phytoseidae, originally *Amblyseius alpinus* Schweizer 1922, syn. *Neoseiulus aurescens* (Athias-Henriot 1961)

Distribution: Egypt

Commodities (1): rice

***Neoseiulus barkeri* (Hughes 1948)**

Taxonomy: Par: Phytoseidae, originally *Typhlodromus bakeri* Hughes 1948, syn. *Amblyseius bakeri* (Hughes 1948)

Key: Hughes 1976

Distribution: Canada, England, Germany, Greece, Ireland, Israel, North Africa, United States, Wales

Commodities (4): barley (germinating), grain (2), seed cotton, wheat

Facilities: commercial grain storage, farm, off-farm storage, provender warehouse, railcar, ship

Life history: Baier 1992, Bonde 1989

***Neoseiulus cucumeris* (Oudemans 1930)**

Taxonomy: Par: Phytoseidae, originally *Typhlodromus cucumeris* Oudemans 1930, syn. *Amblyseius cucumeris* (Oudemans 1930)

Distribution: Australia, India

Commodities (1): wheat (moldy)

Life history: Baier 1992, El Bardy and Zaher 1961, Marisa and Sauro 1990

***Nodele calamondin* Muma 1964**

Taxonomy: Aca: Cheyletidae

Key: Summers and Price 1970, Volgin 1969

Life history: Barker 1992

***Nodele mu* Haines 1988**

Taxonomy: Aca: Cheyletidae

Distribution: Java

Commodities (1): cassava

***Oakvillea elalea* Momen and Sinha 1991**

Taxonomy: Aca: Tydeidae

Key: Momen and Sinha 1991

Distribution: Canada

Commodities (3): barley, grain spill, oat

***Oppia clavipectinata* (Michael 1885)**

Taxonomy: Aca: Oppiidae

Distribution: England, Wales

Commodities (1): grain

***Oppia nitens* (C. L. Koch 1836)**

Taxonomy: Aca: Oppiidae

Distribution: Ireland

Facilities: farm

***Oribatula exilis* (Nicolet 1855)**

Taxonomy: Aca: Oribatulidae

Distribution: England, Wales

Commodities (1): grain

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Oribatula tibialis* (Nicolet 1855)**

Taxonomy: Aca: Oribatulidae

Distribution: Turkey

Commodities (1): apricot (dried)

***Orthotydeus kochi* Oudemans 1929**

Taxonomy: Aca: Tydeidae

Distribution: China

Commodities (6): aquatic product, condiment, dried fruit, dried vegetable, mushroom, processed food

***Oudemansicheyla denmarki* (Yunker 1961)**

Taxonomy: Aca: Cheyletidae, syn. *Cheletominus denmarki* Yunker 1961

Distribution: Taiwan

Commodities (1): betel nut

***Parachipteria punctata* (Nicolet 1855)**

Taxonomy: Aca: Archipteriidae

Distribution: England, Wales

Commodities (1): grain

***Paralycus chongqingensis* Fan and Li 1996**

Taxonomy: Aca: Pediculochelidae

Distribution: China

Commodities (6): aquatic product, condiment, dried fruit, dried vegetable, mushroom, processed food

***Paralycus longior* Fan and Li 1996**

Taxonomy: Aca: Pediculochelidae

Distribution: China

Commodities (5): aquatic product, candied fruit, dried fruit, dried vegetable, mushroom

***Paraneognathus wangae* (Fan and Li 1995)**

Taxonomy: Aca: Caligonellidae, syn. *Sinognathus wangae* Fan and Li 1995

Distribution: China

Commodities (5): condiment, dried fruit, dried vegetable, mushroom, processed food

***Paratriophtydeus coineau* Andre 1980**

Taxonomy: Aca: Tydeidae

Key: Momen and Sinha 1991

Distribution: Canada

Commodities (3): barley, oat, wheat

***Paratydaeolus canadensis* Momen and Sinha 1991**

Taxonomy: Aca: Tydeidae

Key: Momen and Sinha 1991

Distribution: Canada

Commodities (3): barley, oat, wheat

***Perafrotydeus meyerae* Baker 1970**

Taxonomy: Aca: Tydeidae

Distribution: China

Commodities (1): Chinese medicine

***Pergamasus truncus* Schweizer 1961**

Taxonomy: Par: Parasitidae

Distribution: Ireland

Facilities: farm

***Phauloppia lucorum* (C. L. Koch 1840)**

Common names: window sill mite

Taxonomy: Aca: Oribatulidae

Distribution: Bulgaria, England, Germany, Mediterranean Region, Russia, Wales

Commodities (3): barley, grain, wheat flour

***Pimeliaphilus podapolipophagus* Cunliffe 1952**

Taxonomy: Aca: Pterygosomatidae

Distribution: Malawi

Commodities (1): dried fish

***Primotydeus similis* Fan and Li 1992**

Taxonomy: Aca: Tydeidae

Distribution: China

Commodities (3): dried fruit, dried vegetable, mushroom

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TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Proctolaelaps hystrix* (Vitzhum 1923)**

Taxonomy: Par: Ascidae, originally *Lasioseius hystrix* Vitzhum 1923

Key: Evans 1958

Distribution: Australia

Commodities (1): wheat residue (decaying)

***Proctolaelaps pomorum* (Oudemans 1929)**

Taxonomy: Par: Ascidae, originally *Typhlodromus pomorum* Oudemans 1929

Key: Evans 1958, Hughes 1976

Distribution: Australia, Canada, England, Netherlands, Wales

Commodities (4): esparto grass, grain (2), oat, wheat

***Proctolaelaps pygmaeus* (Müller 1859)**

Taxonomy: Par: Ascidae, originally *Gamasus pygmaeus* Müller 1859, syn. *Proctolaclaps hypudaei* (Oudemans 1902)

Key: Evans 1958, Hughes 1976

Distribution: Cosmopolitan. Australia, Canada, China, Czech Republic, England, Iraq, Ireland, Japan, Taiwan, United States, Wales

Commodities (11): barley (2), barley (moldy), bulb (rotting), condiment, cyclamen leaf (dried), grain (5), rice, sweeping, timber (moldy), wheat (2), wheat (moldy)

Facilities: farm

***Proctolaelaps scolyti* Evans 1958**

Taxonomy: Par: Ascidae

Key: Evans 1958, Hughes 1976

Distribution: Egypt, England, Wales

Commodities: grain, onion (unsound)

***Proctotydeus sinhai* Momen 1990**

Taxonomy: Aca: Tydeidae

Key: Momen and Sinha 1991

Distribution: Canada

Commodities (3): rapeseed, wheat, wheat (broken)

***Pronematus bachewingi* Baker 1968**

Taxonomy: Aca: Tydeidae

Key: Baker 1968

Distribution: Indonesia, Peru

Commodities (1): seed

Facilities: food store

***Pronematus bonabii* Canestrinii 1886**

Taxonomy: Aca: Tydeidae

Distribution: England, Wales

Commodities (1): grain

***Pronematus davisi* Baker 1968**

Taxonomy: Aca: Tydeidae

Key: Baker 1968

Distribution: Indonesia

Facilities: food store

***Pseudopronematulus acus* Fan and Li 1992**

Taxonomy: Aca: Tydeidae

Distribution: China

Commodities (3): dried fruit, dried vegetable, mushroom

***Pseudotriophtydeus vegei* H. M. Andre 1980**

Taxonomy: Aca: Tydeidae

Distribution: Greece

Facilities: farm

***Pulaeus glebulentus* Den Heyer 1980**

Taxonomy: Aca: Cunaxidae

Key: Smiley 1992

Distribution: China, South Africa, West Transvaal

Commodities (1): aquatic product

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Pyemotes herfsi* (Oudemans 1936)**

Taxonomy: Aca: Pyemotidae, originally *Pediculoides herfsi* Oudemans 1936

Key: Hughes 1976

Distribution: Czech Republic, Egypt, England, Netherlands, Pakistan

Commodities (9): barley, bean, broad bean, cowpea, grain (2), maize, sorghum, watermelon seed, wheat (3)

***Pyemotes tritici* (La Greze-Fossot and Montagne 1851)**

Common names: grain itch mite, harvest mite, hay itch mite, straw itch mite, ciron ventru (mite potbellied (F)), пуэатый клещ (squabby mite (R)), Kugelbauchmilbe (ventricose mite (G))

Taxonomy: Aca: Pyemotidae, originally *Acarus tritici* La Greze-Fossot and Montagne 1851

Distribution: Botswana

Commodities (1): cowpea

Life history: Bruce 1984

***Pyemotes ventricosus* (Newport 1850)**

Taxonomy: Aca: Pyemotidae, originally *Heteropus ventricosus* Newport 1850, syn. *Pediculoides ventricosus* Newport 1850

Distribution: Australia, Canada, Greece, India, United States

Commodities (3): grain (3), legume, peanut

***Pygmephorus islandicus* Sellnick 1940**

Taxonomy: Aca: Pyemotidae

Distribution: Canada

Commodities (1): grain

***Pyroglyphus africanus* (Hughes 1954)**

Taxonomy: Aca: Pyroglyphidae, originally *Dermatophagoides africanus* Hughes 1954

Key: Hughes 1976

Distribution: Angola

Commodities (1): fishmeal

***Raphignathus conspicuus* (Berlese 1910)**

Taxonomy: Aca: Raphignathidae

Distribution: England, Ireland

Commodities (1): wheat

Facilities: commercial grain storage, farm

***Raphignathus gracilis* (Rack 1962)**

Taxonomy: Aca: Raphignathidae

Distribution: China

Commodities (2): aquatic product, condiment

***Raphignathus orientalis* Fan and Li 1993**

Taxonomy: Aca: Raphignathidae

Distribution: China

Commodities(2): aquatic product, condiment

***Rhizoglyphus costarricensis* Bonilla, Ochoa and Aguilar 1990**

Taxonomy: Aca: Acaridae

Distribution: Costa Rica

Commodities (1): rice

***Rhizoglyphus echinopus* Fumouze and Robin 1868**

Common names: bulb mite (gemeine acarien des bulbes (F), ciron des Bulbes (F), ácaro des bulbos (S)), potato root mite, tulip mite, Wurzelmilbe (common root mite (G)), луковый корневой клещ (onion root mite (R)), Kartoffelmilbe (potato mite (G))

Taxonomy: Aca: Acaridae, syn. *Rhizoglyphus callae* Oudemans 1924

Key: Attiah 1979, Hughes 1976

Distribution: Argentina, Australia, Brazil, Canada, China, Egypt, England, France, Germany, Greece, Hungary, India, Ireland, Japan, Korea, Netherlands, New Zealand, Poland, Romania, Russia, Scotland, Spain, Taiwan, Turkey, United Kingdom, United States, Wales

Commodities (13): bamboo shoots, bulb (2), Chinese medicine, fatty debris, flax seed, garlic, grain (3), herb, peanut, shallot, sunflower seed, wheat, wheat spillage (wet, decaying)

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TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Facilities: farm, lard factory, market, off-farm storage, railcar

Life history: Chmielewski 2003, Woodring 1969

Rhizoglyphus robini Claparede 1869

Common names: bulb mite

Taxonomy: Aca: Acaridae

Key: Hughes 1976

Distribution: Cosmopolitan. Canada, China, Egypt, England, Greece, Israel, Japan, Mexico, New Zealand, Philippines, Poland, Primorskiy Kray, South Korea, Taiwan, United States, Wales

Commodities (9): bamboo shoot, bulb (decaying), Chinese medicine, condiment, garlic, gin trash, grain, rice (husked), sweet potato tuber

Life history: Diaz et al. 2000, Gerson et al. 1983, Raut and Sarkar 1991

Rhysotritia ardua (C. L. Koch 1841)

Taxonomy: Aca: Euphthiracarudae

Distribution: Cosmopolitan. Canada, Europe, Iran, Japan, North America, Tahiti, Turkey

Commodities (2): sweeping, wheat flour

Facilities: mill

Sancassania anomalus (Nesbitt 1944)

Taxonomy: Aca: Acaridae, syn. *Caloglyphus anomalus* Nesbitt 1944

Distribution: United States

Commodities (1): navy bean

Life history: Barker, 1974, Woodring 1969

Sancassania berlesei (Michael 1903)

Common names: клещ Родионова (mite Rodionova (R)), Champignon-Modermilbe (mushroom musty mite (G)), Rodionow-Milbe (Rodionov mite (G))

Taxonomy: Aca: Acaridae, originally *Tyroglyphus berlesei* Michael 1903, syn. *Caloglyphus berlesei* (Michael 1903)

Key: Hughes 1961, Zakhvatkin 1959

Distribution: Probably cosmopolitan. Australia, Canada, China, Czech Republic, England, Germany, Iraq, Ireland, Italy, Netherlands, Philippines, Russia, Taiwan, United States, Wales

Commodities (22): banana, barley (2), biscuit, cereal spillage (decaying), Chinese medicine, condiment, confection, copra (2), fish (minced-dried), grain (6), grain residue (damp, moldy), linseed, maize, mushroom, orange, peanut, plum (dried), potato tuber (rotting), rice, rice (husked), wheat (3), wheat (rotting)

Facilities: farm

Life history: Chmielewski 2003, Rodriguez and Stepien 1973, Timms et al. 1981

Sancassania betae (Attiah 1969)

Taxonomy: Aca: Acaridae, syn. *Caloglyphus betae* Attiah 1969

Key: Attiah 1969

Distribution: Egypt

Sancassania hughesi (Samsinak 1966)

Taxonomy: Aca: Acaridae, syn. *Caloglyphus hughesi* (Samsinak 1966), *Cosmoglyphus hughesi* Samsinak 1966

Key: Hughes 1961

Distribution: Brazil, China, Germany, Indonesia, Japan, Myanmar, Thailand

Commodities (3): Chinese medicine, rice, tamarind

Facilities: farm, market

Sancassania krameri (Berlese 1881)

Taxonomy: Aca: Acaridae, originally *Tyroglyphus krameri* Berlese 1881, syn. *Acotyledon krameri* Berlese 1881, *Caloglyphus krameri* (Berlese 1881), *Cosmoglyphus krameri* (Berlese 1881)

Key: Hughes 1961, Zakhvatkin 1959

Distribution: Angola, Australia, Brazil, Egypt, England, India, Ireland, Italy, South Korea, Taiwan, Ukraine, Wales

Commodities: borecole, fungus (dried), grain (2), maize, onion, rice (husked), shallot, wheat, wheat flour

Facilities: farm

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TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Sancassania mycophagus* (Megnin 1874)**

Taxonomy: Aca: Acaridae, originally *Tyroglyphus mycophagus* Megnin 1874, syn. *Caloglyphus mycophagus* (Megnin 1874)

Key: Hughes 1961, Zakhvatkin 1959

Distribution: China, Egypt, England, France, Ireland, Taiwan, Turkey

Commodities (7): apricot (dried), Chinese medicine, condiment, garlic bulb (decaying), grain, mushroom, sugarcane

Facilities: commercial grain storage

***Sancassania oudemansi* (Zachvatkin 1937)**

Taxonomy: Aca: Acaridae, syn. *Acotyledon oudemansi* Zachvatkin 1937, *Caloglyphus oudemansi* (Zachvatkin 1937)

Distribution: Australia, Brazil, China, Czech Republic, England, Ethiopia, Greece, Indonesia, India, Italy, Java, Philippines, Russia, Sierra Leone, Sri Lanka, Thailand

Commodities (16): bean curd, Brazil nut (damp), cereal, Chinese medicine, condiment, copra, dried fruit, dried vegetable, grain (2), hay, mushroom, maize, peanut (damp), sweeping, tamarind (2), wheat bran

Facilities: farm, flour mill, market, off-farm storage

***Sancassania redikorzevi* (Zakhvatkin 1937)**

Taxonomy: Aca: Acaridae, originally *Eberhardia redikorzevi* 1937, syn. *Acotyledon redikorzevi* (Zakhvatkin 1937), *Caloglyphus redikorzevi* (Zakhvatkin 1937)

Key: Zakhvatkin 1959

Distribution: England, Wales

Commodities (2): grain, seed (damp, germinating)

***Sancassania rhicoglyphoides* (Zakhvatkin 1937)**

Taxonomy: Aca: Acaridae, originally *Acotyledon rhizoglyphoides* Zachvatkin 1937, syn. *Acotyledon munroi* Hughes 1948, *Caloglyphus rhicoglyphoides* (Zakhvatkin 1937)

Key: Hughes 1961, Zakhvatkin 1959

Distribution: China, Egypt, Ireland, Japan, Russia, Taiwan

Commodities (8): broad bean, Chinese medicine, flax, grain, grape wine, maize, wheat, wheat spillage (decaying)

Facilities: commercial grain storage, farm, granary, railcar

***Sancassania rodionovi* (Zachvatkin 1935)**

Taxonomy: Aca: Acaridae, syn. *Caloglyphus rodionovi* Zachvatkin 1935

Key: Zakhvatkin 1959

Distribution: China, Germany, Primorskiy Kray, Russia, South Korea, Taiwan

Commodities (4): oatmeal, oilseed, onion (decomposing), wheat flour

Life history: Kheradmand et al. 2007

***Scapheremaesus palustris* Sellnick 1924**

Taxonomy: Aca: Cymbaeremaeidae

Distribution: Ireland

Facilities: flour mill

***Scheloribates laevigatus* (C. L.Koch 1836)**

Taxonomy: Aca: Oribatulidae, originally *Zetes laevigatus* C. L.Koch 1836

Distribution: England, France, Germany, Ireland, Japan, Netherlands, Russia, United States

Commodities: floor debris, grain, grain (moldy)

Facilities (3): oat mill, provender mill, warehouse

Life history: Woodring and Cross 1962

***Schwiebia mertzis* Woodring 1966**

Taxonomy: Aca: Acaridae

Distribution: Japan, Taiwan

Commodities (2): taro, yam root

***Spinibdella bifurcata* Atyeo 1960**

Taxonomy: Aca: Bdellidae

Key: Smiley 1987

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TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Distribution: Egypt, Japan, Mexico

Commodities (5): barley, broad bean, grain, maize, wheat flour

Life history: Soliman and Mohamed 1972

Spinibdella cronini (Baker and Balock 1944)

Taxonomy: Aca: Bdellidae, originally *Bdella cronini* Baker and Balock 1944

Distribution: China, Japan

Commodities (8): barley, condiment, dried fruit, dried vegetable, grain, mushroom, processed food, wheat

Spinibdella lignicola (G. Canestrini 1886)

Taxonomy: Aca: Bdellidae, originally *Bdella lignicola* Canestrini 1886

Distribution: Czech Republic, Egypt, Ireland, Poland, Taiwan

Commodities (6): garlic, grain (3), grass seed residue, sugar beet seed, sweeping, wheat

Facilities: commercial grain storage, farm, flour mill, flour warehouse

Steneotarsonemus spinki Smiley 1967

Common names: rice sheath mite

Taxonomy: Aca: Tarsonemidae

Distribution: Taiwan

Commodities (1): rice (husked)

Stigmaeus candidus Fan and Li 1993

Taxonomy: Aca: Stigmaeidae

Key: Noei 2007

Distribution: China, Iran

Commodities (6): condiment, dried fruit, dried vegetable, mushroom, rice, rice bran (decaying)

Stigmaeus elongatus Berlese 1886

Taxonomy: Aca: Stigmaeidae

Key: Noei et al. 2007

Distribution: Iran

Commodities (1): rice

Storchia annae Fan and Li 1993

Taxonomy: Aca: Stigmaeidae

Key: Noei et al. 2007

Distribution: China

Commodities (3): dried fruit, dried vegetable, mushroom

Storchia pacifica (Summers 1964)

Taxonomy: Aca: Stigmaeidae

Key: Noei et al. 2007

Distribution: China, Indonesia, Iran

Commodities (6): condiment, dried fruit, dried vegetable, mushroom, rice, rice bran (decaying)

Facilities: food store

Storchia robustus (Berlese 1885)

Taxonomy: Aca: Stigmaeidae

Key: Noei et al. 2007

Distribution: Greece, Iran

Commodities (2): rice, rice bran (decaying)

Facilities: farm, off-farm storage

Suidasia nesbitii Hughes 1948

Common names: scaly grain mite

Taxonomy: Aca: Suidasiidae, also has been in the family Acaridae

Key: Attiah 1969, Hughes 1976, Smiley 1987

Distribution: Australia, Belgium, China, Crete, Egypt, England, Finland, Greece, Hong Kong, Italy, Japan, North Africa, North America, Portugal, Senegal, Singapore, South Africa, South Korea, Taiwan, West Indies

Commodities (30): aquatic product, bird skin, caraway, carob, cayenne, cocoa, Chinese medicine (2), condiment, cottonseed, cowpea, date, dried fruit, dried vegetable, fereek, fig (dried), fish (dried), macaroni, meat product, mushroom, poultry mash, processed food, rice (2), salep, seed cotton, shrimp (dried), whale meat infested dermestid, wheat bran (2), wheat flour, wheat pollard, yeast powder

Facilities: farm, flour mill, off-farm storage

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TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Suidasia pontifica Oudemans 1905

Taxonomy: Aca: Suidasiidae, syn. *Suidasia medanensis* Oudemans 1924, also has been in the family Acaridae

Key: Hughes 1976, Smiley 1987

Distribution: Angola, Brazil, China, Colombia, Egypt, England, Germany, Greece, Hong Kong, India, Indonesia, Japan, North Africa, Philippines, Puerto Rico, Singapore, South Korea, Sumatra, Taiwan, Thailand, Yemen

Commodities (55): barley, bean, bean curd, bean pollard, bean sprout, biscuit, bread (fermenting), chilli powder, Chinese medicine, confection, copra (2), cowpea, feather, fish (dried) (2), fish (minced-dried), fish (pickled), fungus (dried), garlic, garlic bulb, ginger (dried), ham, hog feed, honey, hyacinth, insect (dried) (2), lily, logan (dried), maize (2), mango (rotting), meat (dried), milk (powdered), mungo (2), mushroom, onion, palay, peanut (3), pepper (pickled), pickle, residue, rice (2), rice bran, rice (milled), shallot, shark fin (dried), shrimp (dried) (2), soybean meal, soybean sauce, sugar (red) (2), sugar (white) (2), tea, tiki-tiki, tulip, wheat, wheat bran, wheat flour

Facilities: farm, flour mill, food store, market, off-farm storage

Life history: Mercado et al. 2001

Tarsonemus bilobatus Suski 1965

Taxonomy: Aca: Tarsonemidae

Distribution: China

Commodities (1): Chinese medicine

Tarsonemus confusus Ewing 1939

Taxonomy: Aca: Tarsonemidae

Distribution: Canada, China

Commodities (1): Chinese medicine, grain

Life History: Spiegelberg 1951

Tarsonemus floricolus Canestrini and Fanzago 1876

Taxonomy: Aca: Tarsonemidae

Distribution: Taiwan

Commodities (6): fish (dried), fish (minced-dried), maize, milk (dried), rice (husked), soybean sauce

Tarsonemus fusarii (Cooreman 1941)

Taxonomy: Aca: Tarsonemidae

Distribution: Philippines, Poland

Commodities (6): buckwheat, buckwheat product, rice bran, rice (milled), tiki-tiki, tobacco leaf (cured)

Tarsonemus granarius Lindquist 1972

Common names: granary mite

Taxonomy: Aca: Tarsonemidae

Key: Smilley 1987

Distribution: Brazil, British Isles, Canada, China, Czech Republic, England, Greece, Japan, Wales

Commodities (21): aquatic product, barley (2), candied fruit, carrot seed, cereal spillage, Chinese medicine, condiment, coriander seed, dried fruit, dried vegetable, grain (3), grass seed, kohlrabi seed, lettuce seed, onion seed, processed food, radish seed, rice, spinach seed, sweeping, wheat (5)

Facilities: farm, flour mill, market, off-farm storage

Tarsonemus rakoviensis Kropczynska 1965

Taxonomy: Aca: Tarsonemidae

Distribution: Poland

Commodities (1): sugar beet seed

Tarsonemus randsi Ewing 1939

Taxonomy: Aca: Tarsonemidae

Distribution: United States

Commodities (1): grain

Tarsonemus waitei Banks 1912

Taxonomy: Aca: Tarsonemidae, syn. *Tarsonemus setifer* Ewing 1939

Distribution: China, Greece

Commodities (6): Chinese medicine, cotton fiber, cottonseed, gin trash, seed cotton, wheat

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

***Tectocephalus velatus* (Michael 1880)**

Taxonomy: Aca: Carabodidae

Distribution: Turkey, United States

Commodities (2): apricot (dried), grain

***Terpnacarus glebulentus* Theron 1976**

Taxonomy: Aca: Terpnacaridae

Distribution: China

Commodities (6): aquatic product, candied fruit, condiment, dried fruit, dried vegetable, mushroom

***Thyreophagus entomophagus* (Laboulbene 1852)**

Common names: Sammlungsmilbe (collection mite (G)), коллекционный клещ (collection mite (R)), tyroglyphe des insectes (tyroglyphe of insects (F))

Taxonomy: Aca: Acaridae, originally *Acarus entomophagus* Laboulbene 1852

Key: Hughes 1976, Smiley 1987, Zakhvatkin 1959

Distribution: Canada, China, Czech Republic, England, France, Germany, Hong Kong, Ireland, Italy, Philippines, Poland, Russia, Taiwan, United Kingdom, United States

Commodities (13): baby food, betel nut (decaying), cake, cereal, Chinese medicine, ergot of rye, fish (dried) (2), garlic, ginger (pickled), grain, insect (dried), onion, wheat flour (2)

Facilities: bread van, farm, farm granary, farm milling machine, flour mill, provender mill, provender warehouse

Life history: Chmielewski 1984a

***Thyreophagus gallegoi* Portus and Gomez 1979**

Taxonomy: Aca: Acaridae, syn. *Tyrophagus gallegoi* Portus and Gomez

Distribution: China, Hong Kong, Indonesia, Philippines, Spain

Commodities (4): bean curd, condiment, hoisin sauce, wheat flour

Facilities: food store

***Trematura jacksonia* Hughes 1948**

Taxonomy: Par: Uropodidae

Distribution: England, Ireland

Commodities (3): grain residue, malting, yeast

Facilities: farm, oatmeal mill

***Trichoribates novus* (Sellnick 1929)**

Taxonomy: Aca: Cerotozetidae

Distribution: England, France, Germany, Ireland, Italy, Netherlands, Switzerland, United States

Facilities: farm

***Trichoribates trimaculatus* (Koch 1836)**

Taxonomy: Aca: Ceratozeitidae, originally *Murcia tirmaculatus* Koch 1836, syn. *Oribates setosus* Berlese 1887, *Trichoribates berlesei* Jacot 1929

Distribution: Canada, England, Wales

Commodities (1): grain (2)

***Tydaeolus sphaeroclaviger* Kuznetzov 1972**

Taxonomy: Aca: Tydeidae

Distribution: China

Commodities (5): condiment, dried fruit, dried vegetable, mushroom, processed food

***Tydeus australensis* Baker 1970**

Taxonomy: Aca: Tydeidae

Key: Baker 1970

Distribution: China, Indonesia

Commodities (7): aquatic product, candied fruit, condiment, dried fruit, dried vegetable, mushroom, processed food

Facilities: food store

***Tydeus bedfordiensis* (Evans 1952)**

Taxonomy: Aca: Tydeidae, syn. *Lorryia bedfordiensis* Evans 1952

Distribution: England, Ireland

Commodities (2): Chinese medicine, wheat

Facilities: bread van, commercial grain storage, farm, flour mill

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Tydeus brusti Momen and Sinha 1991

Taxonomy: Aca: Tydeidae

Key: Momen and Sinha 1991

Distribution: Canada

Commodities (2): grain spill, wheat

Tydeus hughesea Momen and Sinha 1991

Taxonomy: Aca: Tydeidae

Key: Momen and Sinha 1991

Distribution: Canada

Commodities (3): hay straw, oat, wheat

Tydeus interruptus Sig Thor 1932

Taxonomy: Aca: Tydeidae

Distribution: Australia, Canada, Czech Republic, England, Ireland, Norway, Poland, Scotland, United States, Wales

Commodities (9): barley (2), grain (5), grain debris, grain spillage, spinach seed, sugar beet seed, sweeping, wheat (3), wheat residue

Facilities: empty grain bin, flour mill

Tydeus kochi Oudemans 1928

Taxonomy: Aca: Tydeidae

Key: Baker 1970, Momen and Sinha 1991

Distribution: Canada, Egypt, Greece

Commodities (3): wheat, wheat bran, wheat flour

Facilities: farm, flour mill, off-farm storage

Tydeus manitobensis Momen and Sinha 1991

Taxonomy: Aca: Tydeidae

Key: Momen and Sinha 1991

Distribution: Canada

Commodities (2): rapeseed, wheat

Tydeus meyerae Baker 1970

Taxonomy: Aca: Tydeidae

Distribution: China

Commodities (1): Chinese medicine

Tydeus oregonensis Baker 1970

Taxonomy: Aca: Tydeidae

Key: Baker 1970, Momen and Sinha 1991

Distribution: China, Ireland

Commodities (9): barley (moldy), candied fruit, condiment, dried fruit, dried vegetable, mushroom, oat, processed food, wheat

Facilities: bread van, commercial grain storage, farm, flour mill, provender mill, provender warehouse, railcar

Tydeus reticulatus Oudemans 1928

Taxonomy: Aca: Tydeidae

Key: Momen and Sinha 1991

Distribution: Canada

Commodities (1): wheat

Tyroborus lini Oudemans 1924

Taxonomy: Aca: Acaridae

Key: Attiah 1969, Hughes 1976, Zakhvatkin 1959

Distribution: China, Egypt, England, Indonesia, Japan, Netherlands, New Zealand, Turkey, United States

Commodities (10): Chinese medicine, condiment, dried fruit, dried vegetable, grain (2), linseed (old), mushroom, processed food, wheat, wheat flour (old)

Facilities: food store

Tyrolichus casei Oudemans 1910

Common names: cheese mite (ciron du fromage (F), сырный клещ (R), ácaro del queso (S)), gemeine Käsemilbe (common cheese mite (G)), tyroglyphe du fromage (tyroglyphe of cheese (F))

Taxonomy: Aca: Acaridae

Key: Hughes 1976, Zakhvatkin 1959

Distribution: Cosmopolitan. Australia, Canada, China, Czech Republic, Germany, Ireland, Poland, Taiwan, United States

Commodities (19): barley, cheese (2), Chinese medicine (2), condiment, cottonseed, dogmeal, ergot of rye, grain (4), herb, honeycomb, honey comb (old), insect (dried) (2), meat (dried), peanut, pork (dried), rice (husked), sunflower seed, wheat, wheat flour (damp) (2)

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Facilities: farm, flour mill

Life history: Nangia and ChannaBasavanna 1989

Tyrophagus bambusae (Tseng 1973)

Taxonomy: Aca: Acaridae

Distribution: Taiwan

Commodities (1): bamboo shoots (rotting)

Tyrophagus brevicrinatus Robertson 1959

Taxonomy: Aca: Acaridae

Key: Hughes 1976, Johnston and Bruce 1965, Lynch 1989, Robertson 1959

Distribution: China, England, Germany, Ghana

Commodities (3): Chinese medicine, condiment, copra (2)

Facilities: farm

Tyrophagus castellanii (Hirst 1912)

Taxonomy: Aca: Acaridae

Commodities (1): grain

Life history: Rivard 1958, 1959

Tyrophagus dimidiatus Hermann 1804

Common names: mushroom mite

Taxonomy: Aca: Acaridae

Distribution: Australia, Poland, Taiwan, United States

Commodities (7): bean (green), fish (minced-dried), garlic, grain (2), ham, mushroom, sugar beet seed

Life history: Miura and Sasa 1961

Tyrophagus longior (Gervais 1844)

Common names: mold mite (Modermilbe (G), гнилостный клещ (R)), удлинённый клещ (elongate mite (R)), tyroglyphe allongé (elongated tyroglyphe (F)), längliche Mehlmilbe (long flour mite)

Taxonomy: Aca: Acaridae, originally *Tyroglyphus longior* Gervais 1844

Key: Hughes 1976, Johnston and Bruce 1965, Robertson 1959, Zakhvatkin 1959

Distribution: Cosmopolitan. Australia, Canada, China, Czech Republic, England, Germany, Greece, Iceland, India, Iran, Ireland, Japan, Netherlands, New Zealand, Poland, Primorskiy Kray, Scotland, Taiwan, United Kingdom, Wales

Commodities (39): animal feed, barley (3), beet root, biscuit, buckwheat, buckwheat product, cheese (3), Chinese medicine, cow hoof (decaying), cucumber, currant, Cyclamen seed, fish (minced-dried), flax seed, grain (6), grain residue, grass seed (2), ham (2), hay, herb, herring meal, hyacinth bulb, melon, mushroom, oat offal (damp), peach (dried-rotten), stock fish, raisin, rape seed, rye grass seed, sugar beet seed (2), sugar (red) (2), sugar (white) (2), sweeping (2), table jelly (fermenting), tobacco (fermenting), wheat (4), wheat bran, wheat flour (2)

Facilities: bread van, cheese factory, cheese store, commercial grain storage, drier, farm, farm grarnary, farm milling machine, flour mill, grinder, mill, off-farm storage, provender warehouse, railcar, slaughterhouse

Life history: Chmielewski 1984b, Parkinson et al. 1991, Thind and Dunn 2002

Tyrophagus miripes Athias-Henriot 1961

Taxonomy: Aca: Acaridae

Key: Johnston and Bruce 1965,

Distribution: Czech Republic, Indonesia

Commodities (2): grain, sweeping

Facilities: food store

Tyrophagus neiswanderi Johnston and Bruce 1965

Taxonomy: Aca: Acaridae

Key: Hughes 1976, Johnston and Bruce 1965, Robertson 1959

Distribution: China, Czech Republic, England, Germany, Ireland, Japan, Kenya, United States

Commodities (4): barley (2), Chinese medicine, Chrysanthemum cutting, grain (2)

Facilities: bread van, farm

Life history: Sánchez-Ramos et al. 2007a, b

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

Tyrophagus oudemansi Robertson 1959

Taxonomy: Aca: Acaridae

Key: Robertson 1959

Distribution: China, England, Germany, United States

Commodities (5): barley, Chinese medicine, grain, mushroom, rye

Tyrophagus palmarum Oudemans 1924

Taxonomy: Aca: Acaridae

Key: Hughes 1976, Johnston and Bruce 1965, Lynch 1989, Robertson 1959

Distribution: Cosmopolitan. China, Czech Republic, England, Germany, Ghana, Indonesia, Ireland, Netherland, New Zealand, Nigeria, Scotland, Taiwan, United Kingdom, Wales

Commodities (21): baby food, barley, biscuit, cheese (2), Chinese medicine (2), copra, flour sweeping, grain (2), ham, hay (2), honey bee comb, maize, palm kernel dust, pineapple fruit, rice, rice (husked), sausage, straw stack, sultana, tobacco, wheat

Facilities: bread van, cheese store, commercial grain storage, farm, farm grarnary, farm milling machine, flour mill, food store, grinder, provender mill, provender warehouse, railcar

Tyrophagus perniciosus Zachvatkin 1941

Taxonomy: Aca: Acaridae

Key: Hughes 1976, Johnston and Bruce 1965, Lynch 1989, Robertson 1959, Zakhvatkin 1959

Distribution: Australia, Bulgaria, China, Czech Republic, England, Germany, Greece, Ireland, Japan, Poland, Primorskiy Kray, Russia, Turkey

Commodities (14): apricot (dried), barley (3), cheese (2), Chinese medicine (2), flax seed, grain (2), grain product, hemp seed, herb, oat (3), oilseed sweeping, seed, sweeping, wheat

Facilities: bread van, commercial grain storage, farm, flour mill, granary, off-farm storage, provender mill, warehouse

Life history: Barker 1967

Tyrophagus putrescentiae (Schrank 1781)

Common names: copra itch mite, copra mite (Kopramilbe (G), копровый клещ (R)), mold mite, ácaro del coco (coconut mite (S)), ciron des champignons (mite of fungi (F))

Taxonomy: Aca: Acaridae, originally *Acarus putrescentiae* Schrank 1781, syn. *Tyrophagus noxius* Zach. 1935

Key: Attiah 1969, Hughes 1976, Johnston and Bruce 1965, Lynch 1989, Robertson 1959

Distribution: Cosmopolitan. Australia, Brazil, Canada, China, Croatia, Czech Republic, Egypt, England, Germany, Greece, Hong Kong, India, Indonesia, Iran, Iraq, Ireland, Japan, Kenya, Malawi, Nepal, Netherlands, Peru, Philippines, Poland, Singapore, South Korea, Swaziland, Taiwan, Thailand, Turkey, United Kingdom, United States, Venezuela, Wales

Commodities (142): apple (rotten), apricot kernel (2), aquatic product, baby food, bacon, bamboo shoot, banana (dried) (2), barley (10), barley (germinating), bean (2), bean curd, bee pollen, beet seed, biscuit, bread, broad bean, buckwheat, buckwheat product, cabbage (dried), cake, candied fruit, caraway, carob, carpet, carrot seed, cereal, cereal spillage (damp), cheese (4), chicken feed (2), chicory root, Chinese medicine (2), cocoa bean, common bean, condiment, copra (3), cotton fiber, cottonseed (2), cottonseed sweeping, cowpea, cumin, date, dried fruit, dried vegetable, egg (dried), feed pellet, fereek, fig (dried) (2), fish (dried), flax seed (2), fungus (dried), garlic, garlic bulb, ginger, gin trash, gladiolus corm, gluten, grain (8), grass seed (2), ham (3), herb, herring meal (2), insect (dried), jelly, kaoliang, lettuce seed, lily (rotting), logan (dried), maize (5), maize flour, maize (old), malt, malt spillage, marmalade, meat product, milk (powdered) (2), millet, mushroom (dried) (3), narcissus, nut, oat (2), onion (2), onion seed, palm kernel, parsley (dried), parsnip seed, Paspalum seed, peanut (5), pepper, pine seed, pineapple fruit, plum (dried), poppy seed, potato (old), potato (rotten), potato (sprouting), processed food, radish seed, raisin (3), rape seed, rape seed sweeping, residue (3), rice (6), rice (husked), rice (milled), runch seed, rye, sausage, seaweed (dried), seed cotton, shark fin (dried) (2), shrimp (dried), sorghum (2), soybean, soybean groat, soybean meal, squid (dried), starch, sugar beet seed, sugar (crude), sugar (red) (2), sugar (white) (2), straw mat, sultana, sunflower seed (2),

(*continued on next page*)

TABLE 6.1 Mite species associated with stored products (*continued from previous page*)

sweeping (2), sweet potato tuber, tansy leaf, tea, tobacco, tobacco leaf (cured) (2), tobacco seed, tomato relish, tulip, vegetable (pickled), vinegar, wheat (8), wheat bran (2), wheat flour (6), wheat flour sweeping, wheat spillage, yeast (dried), wool

Facilities: bread van, cheese store, corn processing plant, farm, farm grarnary, farm milling machine, flour mill, food store, market, mill, off-farm storage

Life history: Barker 1967a, Hilsenhoff and Dicke 1963, Kheradmand et al. 2007, Pakyari and Maghsoudlo 2011, Papadopoulou 2006, Rivard 1961, Sánchez-Ramos and Castañera 2001, 2005; Sánchez-Ramos et al. 2007a, b

Tyrophagus savasi Lynch 1989

Taxonomy: Aca: Acaridae

Key: Lynch 1989

Distribution: England

Commodities (5): barley, barley (rolled), biscuit, grain, honey

Tyrophagus similis Volgin 1949

Taxonomy: Aca: Acaridae

Key: Hughes 1976, Johnston and Bruce 1965, Robertson 1959

Distribution: Australia, Belgium, British Isles, China, England, Germany, Greece, Iceland, Japan, Korea, Netherlands, New Zealand, Turkey, United States, Wales

Commodities (7): apricot (dried), condiment, cottonseed, gin trash, grain, hay, seed cotton

Facilities: farm, off-farm storage

Life history: Al-Safadi 1991, Kasuga and Amano 2000, Kasuga and Honda 2006

Tyrophagus tropicus Robertson 1959

Taxonomy: Aca: Acaridae

Key: Hughes 1976, Johnston and Bruce 1965, Lynch 1989, Robertson 1959

Distribution: China, Czech Republic, England, Ghana, Indonesia, Lagos, New Britian, Nigeria, United States

Commodities (12): barley (2), candied fruit, Chinese medicine, condiment, copra, dried fruit, dried vegetable, grain, mushroom, palm kernel dust, rice, tobacco

Facilities: food store

Tyrophagus zachvatkini Volgin 1948

Taxonomy: Aca: Acaridae

Key: Attiah 1969, Johnston and Bruce 1965

Distribution: Egypt

Uropodella laciniata Berlese 1888

Taxonomy: Par: Uropodellidae, also has been in family Uropodidae

Distribution: England, Germany, Indonesia, Taiwan

Commodities (1): plant (decaying)

Facilities: beehive, food store

Uroseius acuminatus (C. L. Koch 1847)

Taxonomy: Par: Uropodidae

Distribution: England, Germany

Commodities (1): wheat (moldy)

Facilities: ship

Zachvatkiniola reticulata (Cunliffe 1962)

Taxonomy: Aca: Cheyletidae, syn. *Eucheyletia reticulata* (Cunliffe 1962)

Key: Summers and Price 1970, Volgin 1987

Distribution: China, Taiwan

Commodities (10): dried fruit, dried vegetable, grain, kaoliang, maize, mushroom, peanut, processed food, rice (husked), wheat

Zerconopsis remiger (Kramer 1876)

Taxonomy: Aca: Ascidae, originally *Gamasus remiger* Kramer 1876

Distribution: Ireland

Facilities: farm

(*continued on next page*)

TABLE 6.2 Ranking of stored-product mite species by number of commodities per species[a]

Tyrophagus putrescentiae (Schrank 1781)	142
Acarus siro Linnaeus 1758	88
Cheyletus malaccensis Oudemans 1903*	68
Lepidoglyphus destructor (Schrank 1781)	64
Suidasia pontifice Oudemans 1905	55
Cheyletus eruditus (Schrank 1781)*	53
Glycyphagus domesticus (DeGeer 1778)	44
Tyrophagus longior (Gervais 1844)	39
Carpoglyphus lactis (Linnaeus 1758)	38
Aleuroglyphus ovatus Troupeau 1878	35
Chortoglyphus arcuatus Troupeau 1879	34
Blattisocius tarsalis (Berlese 1918)*	32
Cheletomorpha lepidopterorum (Shaw 1794)*	30
Gohieria fusca Oudemans 1902	30
Suidasia nesbitii Hughes 1948	30
Acarus farris Oudemans 1905	23
Ameroseius plumosus (Oudemans 1902)*	23
Cheyletus carnifex Zachvatkin 1935*	23
Blattisocius keegani (Fox 1947)*	22
Sancassania berlesei (Michael 1903)	22
Tarsonemus granarius Lindquist 1972	21
Tyrophagus palmarum Oudemans 1924	21
Cheyletus trouessarti Oudemans 1902*	19
Ctenoglyphus plumiger (Koch 1835)	19
Tyrolichus casei Oudemans 1910	18
Acaropsellina docta (Berlese 1886)*	17
Acaropsellina sollers (Kuzin in Rohdendorf 1840)*	16
Dermatophagoides pteronyssinus (Trouessart 1897)	16
Sancassania oudemansi (Zachvatkin 1937)	16
Androlaelaps casalis (Berlese 1887)*	15
Blattisocius dentriticus (Berlese 1918)*	15
Lepidoglyphus fustifer (Oudemans 1903)	15
Leiodinychus krameri (G and R. Canestrini 1882)*	14
Tyrophagus perniciosus Zachvatkin 1941	14
Glycyphagus ornatus Kramer 1881	13
Glycyphagus privatus Oudemans 1903	13
Rhizoglyphus echinopus Fumouze and Robin 1868	13
Thyreophagus entomophagus (Laboulbene 1852)	13
Ameroseius plumigera (Oudemans 1930)*	12
Blattisocius mali Oudemans 1929*	12
Cunaxa capreolus (Berlese 1890)*	12
Tyrophagus tropicus Robertson 1959	12
Acarus mirabilis Volgin 1965	11
Proctolaelaps pygmaeus (Muller 1859)*	11
Zachvatkiniola reticulata (Cunliffe 1962)*	10

[a] Species names followed by * have been reported to be predators.

TABLE 6.3 Families of mites associated with stored products

Order Acariformes
Suborder Astigmata or Sarcoptiformes
- Acaridae
- Carpoglyphidae
- Chortoglyphidae
- Glycyphagidae
- Hemisarcoptidae
- Histiostomidae
- Lardoglyphidae
- Pyroglyphidae
- Suidasiidae

Order Acariformes
Suborder Prostigmata or Trombidiformes
- Acarnophenacidae
- Bdellidae
- Caligonellidae
- Cheyletidae
- Cunaxidae
- Eupodidae
- Neophyllobiidae
- Pterygosomatidae
- Pyemotidae
- Raphignathidae
- Smarididae
- Stigmaeidae
- Tarsonemidae
- Terpnacaridae
- Tydeidae

Order Acariformes
Suborder Cryptostigmata or Oribatida
- Archipteriidae
- Camisiidae
- Carabodidae
- Cerotozetidae
- Chamobatidae
- Cosmochthonidae
- Cymbaeremaeidae
- Euphthiracarudae
- Haplochthoniidae
- Oppiidae
- Oribatulidae
- Pediculochelidae
- Protoplophoridae

Order Parasitiformes
Suborder Mesostigmata
- Ameroseiidae
- Ascidae
- Dermanyssidae
- Digmasellidae
- Eviphididae
- Laelaptidae
- Macrochelidae
- Parasitidae
- Phytoseidae
- Uropodellidae
- Uropodidae

TABLE 6.4 Mite genus name changes

Genus	New genus	Genus	New genus
Acaropsis	*Acaropsellina*	*Haemolaelaps*	*Androlaelaps*
Acarus	*Carpoglyphus*	*Hemicheyletia*	*Cheletomimus*
Acarus	*Cheletomorpha*	*Heteropus*	*Pyemotes*
Acarus	*Ctenoglyphus*	*Hoshikadania*	*Lardoglyphus*
Acarus	*Glycyphagus*	*Hypoaspis*	*Androlaelaps*
Acarus	*Lepidoglyphus*	*Hypoaspis*	*Laelaps*
Acarus	*Pyemotes*	*Hypopus*	*Histiostoma*
Acarus	*Thyreophagus*	*Iphis*	*Androlaelaps*
Acarus	*Tyrophagus*	*Kleemannia*	*Ameroseius*
Acotyledon	*Sancassania*	*Laelaps*	*Androlaelaps*
Aleurobius	*Acarus*	*Laelaps*	*Haemogamasus*
Amblyseius	*Neoseiulus*	*Lasioseius*	*Blattisocius*
Androlaelaps	*Hypoaspis*	*Lasioseius*	*Proctolaelaps*
Anoetus	*Histiostoma*	*Lorryia*	*Tydeus*
Bdella	*Spinibdella*	*Mealia*	*Dermatophagoides*
Caloglyphus	*Sancassania*	*Mealia*	*Euroglyphus*
Cheletominus	*Oudemansicheyla*	*Melichares*	*Blattisocius*
Cheyletia	*Eucheyletia*	*Murcia*	*Trichoribates*
Cheyletus	*Acaropsellina*	*Neoeucheyla*	*Bothrocheyla*
Cheyletus	*Cheyletogenes*	*Notaspis*	*Fuscuropoda*
Cheyletus	*Cheletomorpha*	*Oribates*	*Trichoribates*
Cosmoglyphus	*Sancassania*	*Pediculoides*	*Pyemotes*
Ctenoglyphus	*Diamesoglyphus*	*Scirus*	*Cunaxa*
Cunaxa	*Armascinus*	*Seiulus*	*Ameroseius*
Dendrocheyla	*Cheletomimus*	*Sinognathus*	*Paraneognathus*
Dermatophagoides	*Pyroglyphus*	*Tristomus*	*Arctoseius*
Eucheyletia	*Zachvatkiniola*	*Typhlodromus*	*Blattisocius*
Eucheyletia	*Bothrocheyla*	*Typhlodromus*	*Neoseiulus*
Gamasus	*Eulaelaps*	*Typhlodromus*	*Proctolaelaps*
Gamasus	*Proctolaelaps*	*Tyroglyphus*	*Aleuroglyphus*
Gamasus	*Zerconopsis*	*Tyroglyphus*	*Acarus*
Glycyphagus	*Austroglycyphagus*	*Tyroglyphus*	*Chortoglyphus*
Glycyphagus	*Blomia*	*Tyroglyphus*	*Sancassania*
Glycyphagus	*Ctenoglyphus*	*Tyroglyphus*	*Tyrophagus*
Glycyphagus	*Gohieria*	*Tyrophagus*	*Thyreophagus*
Glycyphagus	*Lepidoglyphus*	*Uropoda*	*Leiodinychus*
Gycyphagus	*Diamesoglyphus*	*Zercoseius*	*Ameroseius*
Haemolaelaps	*Androlaelaps*	*Zetes*	*Scheloribates*

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CHAPTER 7

PEST MANAGEMENT

This chapter provides an overview of pest management but does not provide specific pest management recommendations, because such recommendations require specific, in depth information about the insect species, insect density, commodity infested, facility infested, season and locality. We have cataloged aspects of insect pest management covered in 22 books to help readers find the answers for many of their pest management questions. Some books provide broad coverage (Table 7.1), some cover fewer topics in greater depth (Table 7.2) and others are very specialized covering only a few topics (Table 7.3). Topics briefly covered in these books are not included in these tables. The first three main headings are pest biology and identification, integrated pest management and monitoring. The other four headings list pest management methods under biological, chemical, legislative and physical methods. Together these 22 books have information on 41 pest management topics and represent more than 250 chapters. Most topics are covered in more than one book. Most of these books have many references to original research journal papers that can be consulted for more detail.

BASICS AND CONCEPTS

Pest management is applied ecology. Planning and implementing a pest management program requires consideration of all aspects of insect pest behavior, biology and ecology. The innovativeness of integrated pest management (IPM) is that it combines the applied ecology ideal with several decision-making tools, i. e., monitoring, economic threshold and cost-benefit analysis, to choose the best pest management method and optimal timing. It is called integrated pest management, because pest management programs often need to integrate several pest management methods and/or the management of several pest species. Formalization of IPM occurred as a response to the emergence of insecticide resistant pest populations resulting in control failures, and to the resurgence of insect pest populations after insecticides killed the natural enemies that had been successfully suppressing pest populations.

The tools available for making insect pest management decisions include sampling, cost-benefit analysis, expert systems, consultants and the predictions of computer simulation models (Hagstrum and Subramanyam 2000, 2006). Expert systems are computer programs that emulate an expert's ability to make pest management decisions. Estimating the current distribution and abundance of insect pest populations by sampling and using computer simulation models to predict future insect damage, distribution and abundance can increase the cost-effectiveness of pest management. Sampling methods and computer simulation models have been developed for many stored-product insect species. Expert systems and consultants can optimize the use of simple pest management methods and allow more complex pest management methods and cost-benefit analyses to be used.

Understanding the primary advantages of each insect pest management method can make choosing the best pest management method easier (Hagstrum and Subramanyam 2006). Residual insecticides and insect-resistant packaging provide long-term protection. Natural enemies, fumigation and heat penetrate into areas where insects hide. By eliminating hiding places of insects and reducing insect densities, sanitation and pest exclusion can increase the effectiveness of another method. Aeration of grain stored in bins and warehouses, ionizing radiation of stored commodities including grain, spices, and nuts; heat treatments and impact and pest removal used in food-processing facilities

can be more expensive than other pest management methods requiring long-term planning and expensive equipment purchases in addition to operating costs.

INSECT MONITORING

Insect sampling and monitoring are critical for making best pest management decision. Any sampling program must obtain a representative sample of the insect population. The alternative to estimating insect density by sampling is to count every insect and this is generally impractical. Sampling can provide information on insect density, species, age structure, spatial distribution, and population growth rate. Traps are convenient and can detect insect populations at low densities. However, pest management programs require an estimate of insect population density. Traps often do not provide a representative sample and are not very good at estimating insect density. This can be overcome by converting trap catch to insect density, but this may be complex.

Development of a sampling program requires decisions about 1) the sampling device or how it is used; 2) the timing and frequency of sampling; 3) the location, size, and number of the sample units; 4) the methods of extracting insects from commodities or detecting internal-feeding insects during the processing of sample units. These decisions are not independent of one another. For example, the size of a sample unit may be determined by the choice of a sampling device or method. Managers can determine the number of sampling units with insects (binomial sampling) or count the number of insects in each sample unit (enumerative). Binomial sampling often requires an examination of more sampling units than enumerative sampling, but less time is required for each sample unit. Fewer samples are generally required to determine whether insect density is above or below a certain threshold. The appropriate sampling plan may be unique for each situation.

INSECT IDENTIFICATION

Identification of insects to species can give a manager access to published information, usually from scientific literature, on the biology, ecology, and behavior of an insect species that is needed to develop the best pest management program. Identification is also important because the type and amount of insect damage varies among species. The best monitoring or pest management method and the developmental stage that is most vulnerable also differ among insect species. The susceptibility of insects to pesticides and the best application method may vary among insect species.

SELECTION OF METHOD AND TIMING FOR PEST MANAGEMENT

Selection of the best pest management method or methods depends upon many factors, such as the insect species, insect density, commodity infested, facility infested, season and location. The pest management program is likely to be different each time it is needed and for each location. Careful consideration of the pest biology as well as the attributes of each pest management program is important. Simulation models are available for many species that can be used to quantitatively compare effectiveness of different methods and timings. Sampling and monitoring are important to determine the current pest densities and whether the pest management was effective.

TABLE 7.1 Topics in books with broad coverage of stored-product insect pest management

Topic	Book[a]							
	H&S06	H12	Golob02	Gorham91	Baur84	S&H00	Krischik95	Heaps06
Pest biology and identification								
Insect biology	1	1	1	1				
Insect behavior	1			1	1			1
Insect ecology	1			1			1	
Insect identification	1				1		1	
Microbial pests		1	1	1				
Mycotoxins		1					1	
Mite pests				1				
Vertebrate pests		1	1	1			1	
Integrated pest management (IPM)	1	1		1			1	1
Pest management consultant-extension	1	1	1	1				
Pest management contractors					1			1
Decision aids	1		1			1		
Damage and losses							1	
Economics of pest management	1	1						
Combining pest management methods						1		
Resistance and management	1	1		1			1	
Food safety		1	1	1	1		1	
Worker safety			1		1		1	1
Monitoring	1					1		
Sampling	1	1	1				1	
Trapping	1	1	1		1		1	1
Attractants	1			1	1	1		1
Detection	1	1	1		1			
Visual inspection	1				1			1

(*continued on next page*)

[a] Hagstrum and Subramanyam 2006 (H&S06), Hagstrum et al. 2012 (H12), Golob et al. 2002 (Golob02), Gorham 1991 (Gorham91), Bauer 1984 (Baur84), Subramanyam and Hagstrum 2000 (S&H00), Krischik et al. 1995 (Krischik95), Heaps 2006 (Heaps06)

TABLE 7.1 (*continued from previous page*)

Topic	Book[a]							
	H&S06	H12	Golob02	Gorham91	Baur84	S&H00	Krischik95	Heaps06
Biological methods								
Natural enemies	1	1	1	1	1	1	1	1
Host plant resistance				1		1		
Chemical methods								
Fumigation	1	1	1	1	1		1	1
Controlled atmospheres	1	1	1	1	1	1	1	1
Insecticides	1	1	1	1	1		1	1
Botanicals			1			1		
Inert dusts			1			1		
Insect growth regulators (IGR)						1		
Legislative methods		1	1					
Physical methods				1				
Building and equipment design	1	1	1	1				1
Sanitation and pest exclusion	1	1		1		1		
Insect-resistant packaging	1	1	1	1	1	1		1
Impact and pest removal	1					1		
Aeration	1	1				1	1	
Extreme temperatures	1	1			1	1		1
Drying commodity		1	1					
Ionizing radiation	1		1	1	1	1		1
Total topics	26	23	21	21	16	16	16	15

TABLE 7.2 Books covering fewer stored-product insect pest management topics in greater depth

Topic	Book[a]								
	Sauer92	S&H96	Jayas95	M&P90	S&M73	M&H04	Reed06	Hill02	Ryan95
Pest biology and identification									
Insect biology	1	1		1		1		1	1
Insect behavior		1							
Insect ecology	1	1	1		1		1		
Insect identification	1								
Microbial pests	1		1	1	1		1		
Mycotoxins			1		1				
Mite pests			1					1	
Vertebrate pests	1		1	1	1	1		1	
Integrated pest management (IPM)	1			1		1			
Pest management consultant-extension			1						
Pest management contractors									
Decision aids			1						
Damage and losses	1							1	
Economics of pest management									
Combining pest management methods									
Resistance and management		1							
Food safety					1				
Worker safety						1			
Monitoring							1		1
Sampling		1		1					
Trapping						1			
Attractants						1			
Detection	1								
Visual inspection									

(*continued on next page*)

[a] Sauer 1992 (Sauer92), Subramanyam and Hagstrum 1996 (S&H96), Jayas et al. 1995 (Jayas95), Mills and Pedersen 1990 (M&P90), Sinha and Muir 1973 (S&M73), Moreland and Hedges 2004 (M&H04), Reed 2006 (Reed06), Hill 2002 (Hill02), Ryan 1995 (Ryan95)

TABLE 7.2 (*continued from previous page*)

Topic	Book[a]								
	Sauer92	S&H96	Jayas95	M&P90	S&M73	M&H04	Reed06	Hill02	Ryan95
Biological methods									
Natural enemies		1							
Host plant resistance									
Chemical methods									
Fumigation	1	1		1	1	1	1	1	1
Controlled atmospheres	1	1	1						
Insecticides	1	1	1	1	1	1	1	1	1
Botanicals									
Inert dusts									
Insect growth regulators (IGR)									1
Legislative methods									
Physical methods		1	1	1				1	1
Building and equipment design	1			1	1				
Sanitation and pest exclusion				1			1		1
Insect-resistant packaging									
Impact and pest removal									
Aeration	1	1	1	1			1		
Extreme temperatures		1							
Drying commodity	1		1		1		1		
Ionizing radiation		1							
Total topics	14	13	12	11	9	8	8	7	7

TABLE 7.3 Books that are very specialized covering only a few topics

Topic	Book[a]						
	I&I99	H&S09	Bond89	Hirsch91	N&N02	Snelson87	Vetter96
Pest biology and identification							
Insect biology		1					
Insect identification		1					
Integrated pest management (IPM)							
Food safety							1
Chemical methods							
Fumigation			1				
Insecticides						1	
Physical methods							
Building and equipment design	1						
Sanitation and pest exclusion	1						
Insect-resistant packaging				1			
Impact and pest removal	1						
Aeration					1		
Extreme temperatures	1						
Drying commodity							
Total topics	4	2	1	1	1	1	1

[a] Imholte and Imholte-Tauscher 1999 (I&I99), Hagstrum and Subramanyam 2009 (H&S09), Bond 1989 (Bond89), Hirsch 1991 (Hirsch91), Navarro and Noyes 2002 (N&N02), Snelson 1987 (Snelson87), Vetter 1996 (Vetter96)

AERATION

Aeration involves forced movement of outside air through a bulk-stored commodity to create a uniform temperature throughout the bulk. Cooling by aeration minimizes the growth of insect and mold populations and prevents spoilage and economic losses. Aeration is most commonly used for stored grain, but some warehouses have been designed so that they can be cooled by aeration in winter. Grain has traditionally been naturally cooled by low autumn temperatures. Now, however, by using automatic aeration controllers grain can be sufficiently cooled in temperate climates soon after a summer harvest to slow stored-product insect population growth and to keep insects from reaching unacceptable numbers before the grain can be cooled further by low autumn and winter temperatures. Reducing grain temperature from 27 to 22°C can halve the insect population growth rate. Cooling also slows the breakdown of residual insecticides. For high-value commodities, grain chillers can be used to aerate and cool commodities stored in bulk. The strengths and limitations of aeration as a pest management method are given in Table 7.4.

Effective aeration requires selection of an aeration fan and the placement of aeration ducts in order to provide even air flow. Monitoring the number of hours the fan runs or the grain temperature is necessary to be sure that the cooling front moves completely through the grain. Otherwise spoilage can occur where the cooling front stops.

BIOLOGICAL CONTROL

There are many natural enemies that reduce the numbers of stored-product insect pests. For 13 natural enemy and 19 insect pest species, natural enemies reduced the insect pest populations by 70 to 100% (Hagstrum and Subramanyam 2006). These natural enemies are self-perpetuating. The risk of natural enemies contaminating processed commodities is a concern, but their ability to find and greatly reduce residual stored-product insect pest populations is likely to reduce the overall risk of insect contamination. The strengths and limitations of biological control as a pest management method are given in Table 7.5.

Effective use of these natural enemies in an insect pest management program often requires some manipulation, mass-rearing and release, or use of natural enemies in combination with another insect-pest management method. Natural enemies need to be released while the insect pest population density is still low to prevent commodity

TABLE 7.4 Strengths and limitations of aeration

Factor	Strengths	Limitations
Protection	Reduce pest population, broad spectrum	Short-term (rewarming is a problem)
Risk	Low risk	Not moving front through grain can cause spoilage
Cost	Operating cost low	Capital investment
Complexity	Aeration controllers simplify	Monitoring fan hours or temperature important
Insect resistance	Not problem yet	

TABLE 7.5 Strengths and limitations of biological control

Factor	Strengths	Limitations
Protection	Find pests, self-perpetuating	Limited shelf life, narrow spectrum
Risk	Low risk	Contamination of commodity
Cost	Naturally occurring, registered for use	
Complexity	Pathogens sprayed like residual insecticides	Correct number and timing of natural enemy release is complex; releasing healthy natural enemies of correct species can be a challenge
Insect resistance	Not problem yet	

damage. Using too few will provide inadequate pest management and using too many is not cost-effective. A release rate of two parasitoids or predators for each adult host is generally recommended.

EXTREME TEMPERATURES

Temperatures over 60°C can result in insect death in seconds, temperatures between 50 and 60°C in hours to minutes, and temperatures between 43 and 46°C in hours. High temperatures can also cause insects to move around more. Cold kills insects more slowly than heat. Temperatures between 5 and 15°C delay insect development and are eventually lethal after very long exposures. Temperatures between –1 and 3°C can cause death in hours or days, while temperatures below –1°C can cause death more quickly. The temperatures to which insects are exposed while commodities are dried often are insufficient to completely disinfest the commodities. High temperatures can be used to disinfest flour mills and grain bins. Hot-air fluidized beds have been tested for disinfesting grain and grain chillers have been used to reduce insect population growth in raw commodities. The strengths and limitations of extreme temperatures as a pest management method are given in Table 7.6.

The efficacy of extreme temperatures against stored-product insect pests depends upon insect species and stage, exposure time, maximum temperature, heating or cooling rate and maintaining extreme temperatures throughout the commodity or facility.

FUMIGATION

Fumigants are toxic, volatile gases that can penetrate into commodities, equipment and the structure of buildings. The objective is to maintain a lethal concentration of a fumigant long enough to kill most insect species. Resistance to fumigants tends to develop slowly especially when fumigations kill all of the insects. Like residual insecticides, fumigants are inexpensive, are widely used commercially, and must be used according to label instructions. Modified atmospheres have been used less frequently than other fumigants. Unlike residual insecticides, fumigants leave little chemical residue after clearing, and provide no long-term protection. The strengths and limitations of fumigation as a pest management method are given in Table 7.7.

Effective fumigation depends upon the fumigant used and maintaining adequate concentration for sufficient time to kill insects. Sealing is important to maintaining concentration and recirculation has been used to achieve more

TABLE 7.6 Strengths and limitations of extreme temperature

Factor	Strengths	Limitations
Protection	Find pests, can be long-term, broad spectrum	Short-term
Risk	Low risk	Can damage building, equipment and commodity; reduce throughput
Cost	Seal less than for fumigation	Capital investment or rental fees
Complexity		Hard to achieve uniform temperature
Insect resistance	Not problem yet	

TABLE 7.7 Strengths and limitations of fumigation

Factor	Strengths	Limitations
Protection	Penetrating, quick acting, broad spectrum	Short-term
Risk	Low chemical residue	Worker safety
Cost	Low cost	Compliance with regulations expensive
Complexity	Application simple	Maintaining concentration difficult
Insect resistance		Has occurred

even distribution of the fumigant. Timing can be important because some insect species and developmental stages are more susceptible than others.

IMPACT AND PEST REMOVAL

Disinfestation by impact machines, aspiration, and sieving is routine in flour mills. Cleaning by aspiration and sieving is also used for raisins and peanuts. Insect mortality resulting from impact during grain handling is often unrecognized. The strengths and limitations of killing insect pests by impact and pest removal as a pest management method are given in Table 7.8.

Effectiveness of impact is influenced by the type of conveyor or setting on impact machine, and the effectiveness of pest removal by sieve or aspirator used. Insect mortality increases with the rotor speed of an impact machine and decreases with increased commodity throughput. Insect mortality is higher with pneumatic conveyors than other types.

IONIZING RADIATION

Ionizing radiation sterilizes or kills insects by damaging cells and producing free radicals that break chemical bonds. Radiation sensitivity is directly related to cell reproductive activity and inversely related to the degree of cell differentiation, so within a developmental stage, the susceptibility of an insect to ionizing radiation varies with age. The use of ionizing radiation for insect disinfestation has been approved in many countries. However, the survival of insects for a long time after irradiation is a problem, because these insects remain active and regulations consider these insects to be contaminants just like other live insects. The strengths and limitations of ionizing radiation as a pest management method are given in Table 7.9.

Using ionizing radiation requires exposing insects to an effective dose. The dose depends on the radiation-absorption characteristics of the commodity, the dose rate, and the duration of exposure. Gamma rays and x-rays penetrate deeper into commodities than accelerated electrons, but electron accelerators can irradiate commodities at higher rates.

RESIDUAL INSECTICIDES

Residual insecticides are inexpensive, broad-spectrum and they can be applied as a liquid or a dry powder to areas of storage or processing facility or to stored commodity. They can be effective for a period of months and must be applied according to label instructions. Fog, mist, aerosol, or smoke applications can kill flying insects and exposed

TABLE 7.8 Strengths and limitations of impact and pest removal

Factor	Strengths	Limitations
Protection	High insect mortality or pest removal, broad spectrum	Short-term
Risk	Low risk	Reduce quality of commodity
Cost	Low operating cost	Equipment is a capital investment
Complexity		Balance insect mortality or pest removal with loss of commodity
Insect Resistance	Not problem yet	

TABLE 7.9 Strengths and limitations of ionizing radiation

Factor	Strengths	Limitations
Protection	High insect mortality, broad spectrum	Short-term, delayed pest mortality
Risk		Worker safety, kills seeds
Cost	Low operating cost	High capital investment
Complexity		Monitoring dosage is important
Insect Resistance	Not problem yet	

crawling insects. Many insect species have become resistant. To slow the development of resistance, residual insecticides should only be used when absolutely needed, used correctly, and used in combination with other pest management methods that kill resistant insects. The strengths and limitations of residual insecticides as a pest management method are given in Table 7.10.

Effectiveness depends upon the insecticide used, dosage, formulation, and application method. The efficacy of insecticides is determined not by how much insecticide is applied, but by how much of it reaches the insect pests. Calibration is necessary to accurately determine application rate. The surface to which insecticides are applied can influence their efficacy. For different surfaces, formulation can be important in maximizing the amount of the applied insecticide reaching the insect pests. On sorptive surfaces, wettable powders can be used to prevent sorption of insecticide keeping it on the surface where it can be picked up by the insect pests. Most insecticide applications do not achieve uniform coverage and targeted applications can minimize the amount of insecticide used. Aerosol applications may reach only the insects that are moving around. Crack and crevice applications target insects in refuges. Behavioral resistance allows insects to avoid insect treated areas. The use of a combination of an insecticide and attractant can minimize the amount of insecticide used by attracting insects to a small treated area. For some insecticides delayed mortality and sublethal effects can be significant.

SANITATION AND PEST EXCLUSION

Sanitation reduces insect problems by reducing the amount of residual food available to insects. However, stored-product insects can develop, survive, and reproduce on very small amounts of food. Sanitation and pest exclusion can be improved by the design and maintenance of the building, grounds, and equipment. With good stock rotation (first in, first out), insect populations have less time to grow and become a source of cross infestation. Insect-resistant packaging and the inspection of incoming ingredients for insects also can reduce commodity contamination and cross infestation. Insect-resistant packaging protects commodities as commodities move through the marketing system. The strengths and limitations of sanitation and pest exclusion as pest management methods are given in Table 7.11.

TABLE 7.10 Strengths and limitations of residual insecticides

Factor	Strengths	Limitations
Protection	Long-term protection, quick acting, broad spectrum	Preventive, breakdown
Risk	Mammalian toxicity low	Residue on commodity, may be toxic to mammals above recommended dose, kills parasitoids and predators
Cost	Low cost of chemical	High registration cost
Complexity	Application simple	Calibration difficult
Insect resistance		Has occurred

TABLE 7.11 Strengths and limitations of sanitation and pest exclusion

Factor	Strengths	Limitations
Protection	Packaging gives long-term protection, broad spectrum	Cleaning and pest exclusion requires constant effort
Risk	Low risk	
Cost	Primary tools inexpensive	High labor cost
Complexity	Simple tools	Must be well coordinated
Insect resistance	Not problem yet	

Sanitation and pest exclusion can be effective with proper design of buildings and equipment. Building and equipment design requires long-term planning and capital expenditure. Thorough cleaning may require disassembly of equipment. Samples of processed food verify the effectiveness of methods. The time between inspections or cleanings or for complete stock rotation should be less than the four to six weeks insect generation time. Dust collection systems can reduce the food residues. Without effective intervention, stored-product insect populations will increase over time.

COMBINATION OF METHODS

Combinations of more than one insect pest management method can be advantageous when together they are more effective than either method alone. A disadvantage may be that two methods may be more expensive and complex to use than a single method. The most important justification for combining more than one method is to improve pest management. Using extreme heat and cold together can be advantageous because high temperatures work more rapidly than cold temperatures, but cold temperatures may be less likely to damage commodities during long exposure periods. Table 7.12 gives additional examples. Several of these examples use more than one type of stress or use a second method to prevent re-infestation when the first method does not provide long-term protection. Combinations may be justified when methods are most effective at different times, at different insect densities, or for different insect species. Combinations also may be justified as part of a resistance-management program to replace multiple applications of a single method.

TABLE 7.12 Combinations of pest management methods that have been evaluated[a]

Method 1	Method 2	Advantage of combination
Aeration	Natural enemies	Cooling by aeration reduces pest population growth more than host finding by natural enemies
Extreme temperature	Controlled atmospheres	Additional stress of controlled atmospheres increases effectiveness at high temperatures
Fumigation	Aeration	Cooling commodity after fumigation can prevent insects from repopulating
Fumigation	Controlled atmospheres	Additional stresses of controlled atmospheres increases the effectiveness of fumigation
Fumigation	Insect-resistant packaging	Packaging can prevent insects from re-infesting commodity after fumigation
Inert dust	Extreme temperature	Inert dusts cause insects to dehydrate faster at high temperature.
Insect-resistant packaging	Natural enemies	Natural enemies reduce number of insects available to enter a package.
Residual insecticide	Aeration	Cooling by aeration slows degradation and extends effectiveness of an insecticide
Residual insecticide	Pheromone	Pheromone attracts insects to insecticide-treated areas
Sanitation	Aeration	Removing residual grain from empty bins and grain cleaning followed by aeration reduces insect numbers more than each treatment used alone
Sanitation	Insect-resistant packaging	Sanitation reduces number of insects available to enter a package
Sanitation	Residual	Removing commodity residues increases insecticide effectiveness of insecticide

[a] From Hagstrum and Subramanyam (2000)

CONCLUSIONS

Development and implementation of site-specific pest management programs are important to prevent economic losses caused by insects associated with stored commodities and food-processing facilities. Key components of an effective pest management program are 1) correct identification of the target insect pest species, 2) understanding pest dynamics relative to environmental conditions to correctly time the intervention, 3) development of robust methods for sampling and monitoring insects, 4) establishment of a threshold for determining whether an intervention is warranted, 5) evaluation of effectiveness of pest intervention, and 6) use of multiple tactics to delay onset of resistance to pest management methods.

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