

**The Major Invertebrate  
Pests and Weeds  
of Agriculture and Plantation Forestry  
in the Southern and Western Pacific**

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**ACIAR**

The Australian Centre for International Agricultural Research

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# Foreword

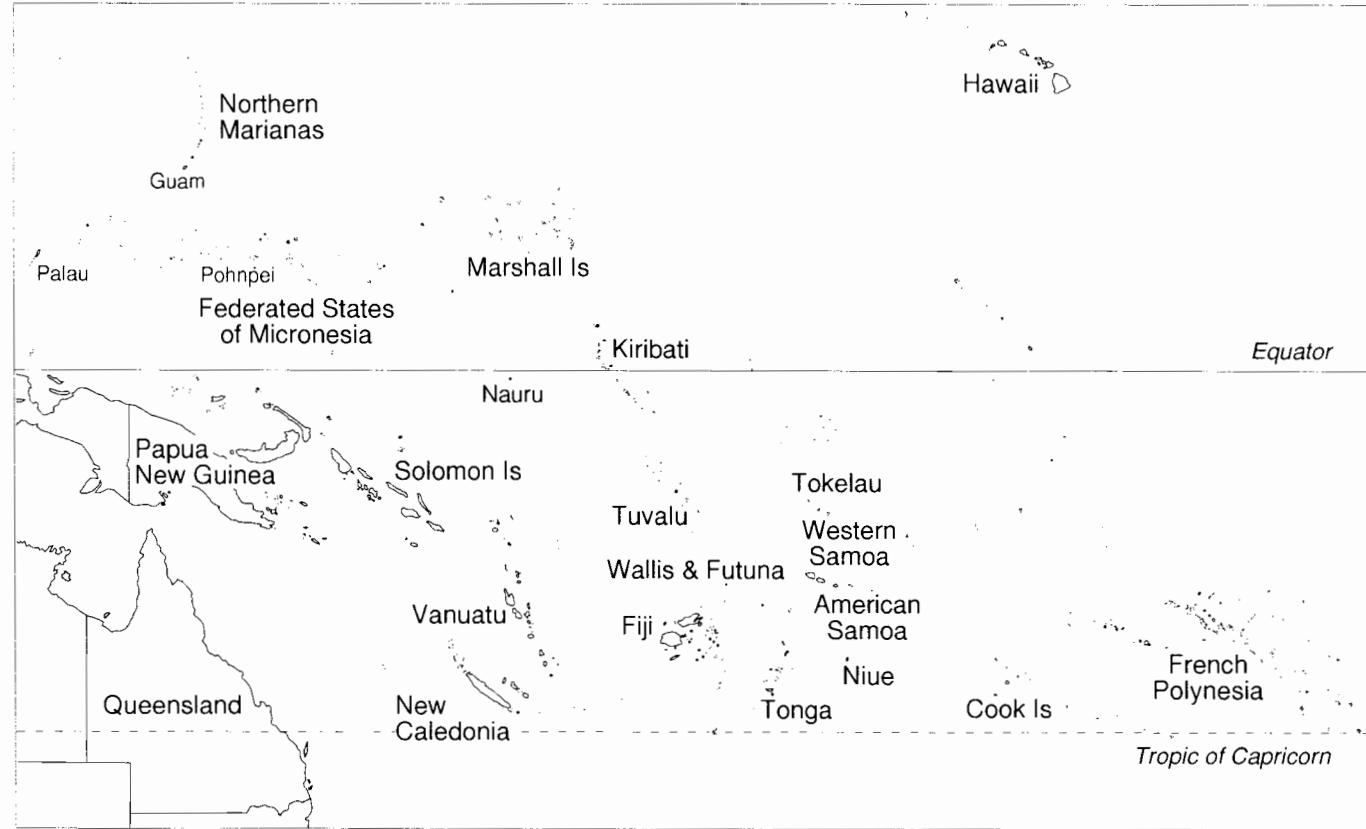
**S**INCE it was established in 1982, ACIAR has strongly supported sustainable and environmentally friendly crop production and protection. An approach that not only fits perfectly both requirements but leads to increases in the harvest of agricultural products is classical biological control. This form of control has particular relevance to the oceanic Pacific. The majority of the major pests and weeds have been introduced to the region and, for very good reasons, pesticide applications are the least attractive of the various methods of control. It is relevant also that a number of the pests and weeds have already been targets for often successful biological control projects in Hawaii, California, Australia or New Zealand.

The aim of the present monograph is to bring together what is known of the occurrence, distribution and relative importance of the major insect pests and weeds of agriculture and plantation forestry in the oceanic Pacific. Such information is essential if priority is to be given to the selection of the most appropriate regional targets for biological control. A first, somewhat limited survey in 1985 led to the publication by ACIAR of *Biological Control: Pacific Prospects* by D.F. Waterhouse and K.R. Norris, comprising a set of 55 dossiers on major Pacific pests and weeds. This and its two supplements (1989, 1993) providing an additional 11 dossiers, have contributed materially to the current greatly increased biological control activity in the Pacific. To take stock of the position a decade after the first Biological Control Workshop in the Pacific in Tonga, ACIAR commissioned Dr D.F. Waterhouse to undertake a comparative survey of the pests and weeds of agriculture and forest plantations, and their priority ratings. The results are summarised in a series of tables in this volume which is designed to complement ACIAR Monograph 21 (1993), *The Major Pests and Weeds of Agriculture in Southeast Asia: Distribution, Importance and Origin*, also by D.F. Waterhouse.

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Map of the Pacific area, showing the nations involved in the survey

# 1. Abstract

THE information assembled, and summarised in 22 tables, is intended to provide a database to facilitate the selection of appropriate target pests for classical biological control.

Agricultural experts provided the raw data on the distribution and importance of the pests of most concern to agriculture in the 18 participating nations in the southern and western Pacific. This enabled the identification of 157 major arthropod pests, two molluscs, one crustacean and 142 major weeds of agriculture.

Of the 160 invertebrate pests nominated, a subgroup of 46 species was rated as highly important. The majority of these are believed to be exotic to the region and thus potential targets for classical biological control. Indeed, at least 25 of these species have already been investigated elsewhere and a number of control successes reported. When countries listed their top 10 invertebrate pests in priority order, most species earlier rated as highly important continued to rate highly. The 10 highest-scoring agricultural insect pests were *Bactrocera* spp., *Cosmopolites sordidus*, *Spodoptera litura*, *Aphis gossypii*, *Cylas formicarius*, *Plutella xylostella*, *Crocidolomia pavonana*, *Liriomyza* spp., *Othreis fullonia* and *Helicoverpa armigera*.

Of the 142 major weeds of agriculture, 56 were rated as highly important; and the vast majority of these are believed to be exotic. Four

of the 56 have been targets elsewhere in successful or partially successful biological control projects. Information from the aggregated ratings and top 10 weed ratings provided the following highest-scoring weeds: *Cyperus rotundus*, *Lantana camara*, *Mimosa pudica*, *Mimosa invisa*, *Mikania micrantha*, *Stachytarpeha urticifolia*, *Bidens pilosa*, *Bidens alba*, *Eleusine indica* and *Sida rhombifolia*.

Although plantation forestry is in its infancy in most Pacific nations, information available on invertebrate pests and weeds is summarised in the same format as that for agriculture. On the basis of the limited information available, the five most important insect pests [*Crossotarsus externedentatus* (Curculionidae), *Hypsipyla robusta* (Pyralidae), *Uraba lignifera* (Nolidae), *Unaspis citri* (Diaspididae), and *Xyleborus perforans* (Scolytidae)] are exotic to the oceanic Pacific. By far the most important weeds are *Mikania micrantha* (Asteraceae) and *Merremia peltata* (Convolvulaceae), also both exotic to the region.

It is abundantly clear from the information provided that there are many very suitable biological control targets (both arthropod pests and weeds), and that progressive attention to them over coming decades will provide a highly valuable impetus to both agricultural production and plantation forestry in the oceanic Pacific.

## 2. Introduction

THE aim of this publication is to provide some of the data required to select the most relevant targets for classical biological control in the Pacific. The majority of the invertebrate pests, and almost all the weeds of importance in agriculture and plantation forestry in the oceanic Pacific, have been introduced into the region. Often they have not been accompanied by some of the key natural enemies which help to regulate their abundance in the region where each evolved and where their numbers are generally low. The introduction and establishment of these natural enemies in the Pacific, when it is safe to do so (Waterhouse 1991), is known as classical biological control. When biological control is successful, pest abundance is reduced to a level such that it is unnecessary or uneconomical to adopt any further control measures. Generally, the only requirement then is to avoid the unnecessary use of non-selective pesticides. Classical biological control may resolve the pest problem or it may need to be integrated with other measures.

Since the cost of a biological control project does not depend upon whether the pest is a major or minor one, it is highly desirable to choose a target with care in order, if it is successful, to maximise the economic and/or social returns. Four sets of information are desirable for each potential target pest, with as much precision as possible, so as to provide a basis for establishing priorities for action (Waterhouse and Norris 1987). This information is often a prerequisite for support from not only the government of the country or countries concerned, but especially potential donor agencies.

### 1. *Importance to your country of the crop(s) affected*

- (a) area of the crop(s)
- (b) export value(s)
- (c) value as a local staple crop
- (d) size of human population affected
- (e) proportion of human population affected
- (f) social importance of the crop(s)

### 2. *Importance to your country of the pest*

- (a) estimate of losses — actual, — potential
- (b) threshold of economic damage
- (c) costs of existing controls
- (d) environmental costs
- (e) social costs
- (f) quarantine considerations, if any

### 3. *Biological control*

- (a) previous successes against the same target, if any
- (b) additional facilities and staff required
- (c) estimated cost of a program and proposed country contribution (in kind)
- (d) estimated chances of success
- (e) conflicts of interest, if any

### 4. *Alternative methods of control*

*(Are they effective and economic?)*

- (a) chemical control
- (b) cultural control
- (c) resistant varieties
- (d) other methods.

Even in such a country as Australia it is often difficult to obtain reliable figures for some of these categories. Where there has already been successful biological control of a pest (and this applies to a significant number of Pacific pests), the chances are promising to very promising that the success can be repeated, particularly when the climate and other conditions are similar. It is extremely valuable, therefore, to assemble, in a

set of dossiers, information on the prospects for successful biological control of the most important of the potential target pests. Dossiers have now been published for 39 insect pests or groups of closely related pests, one mite, one mollusc and 42 weeds by Waterhouse (1993b, 1994) and Waterhouse and Norris (1987, 1989), and additional dossiers are in press.

An overriding factor in the selection process is whether or not the target is suitable for classical biological control. Suitability is low when little or no damage can be tolerated or when the pest is native. An additional requirement is introduced if it is desirable, or perhaps necessary (as it is in many instances from an aid donor point of view), to select top priority regional targets. To facilitate this process and so that Pacific nations can be better informed of the situation in neighbouring countries (sometimes an issue of quarantine importance), a series of five postal surveys of oceanic Pacific countries (excluding Hawaii) has been carried out commencing in 1985 and repeated in 1989, 1991, 1993 and 1995. Only the 1985 results (Waterhouse 1985; Waterhouse and Norris 1987) have been published.

For all countries in the region where this has been possible, information on the distribution and importance of invertebrate pests and weeds has been generously supplied by plant protection workers (acknowledged in Chapter 3) nominated by their respective directors of agriculture and by forestry authorities. This information has been supplemented in some instances with data from other sources, including the literature. However, the validity of the records and their completeness depend largely upon information supplied by country experts, although this has been cross-checked when possible.

It is probable that there are errors of both omission and commission. Experts within a single country may not agree on the importance of a particular pest, and perceptions change with changes in agricultural practices and in the relative values of the crops affected. As the author I would be most grateful if errors and omissions can be drawn to my attention; also of

additional ways in which the information might be assembled, so that it can best serve its main purpose of focusing on promising targets for classical biological control.

Correspondents were asked to supply information on pest seriousness (and distribution) on a very simple rating system (Waterhouse 1993a):

- +++ very widespread and very important
- ++ widespread and important
- + important locally
- P present, but not an important pest
- \* one of the top 10 invertebrate pests or top 10 weeds
- reported in the literature, but importance not known

The entry '•' has been used when the presence of a species in a country is mentioned in the literature, but without sufficient information to assign a rating of '+s'. A blank indicates that there is no information to indicate that the pest is present. Experience has shown that any more sophisticated system than this requires more information than is generally available in most countries and, furthermore, would attempt to achieve a degree of accuracy greater than that required for the present purpose.

Although a simple rating system based on personal assessments of the degree of importance of a pest has a very large subjective component, it nevertheless also contains a quantitative element. In examining whether use can be made of this element, it is necessary to be aware of inherent limitations of the system:

- (i) it has only a small number (four) of not-well-separated categories
- (ii) although the occurrence of infestation can generally be established fairly accurately, importance is far more difficult to evaluate. It is influenced mainly by cost of existing control measures and by reductions in yield or value of the product

- (iii) different experts in a country sometimes rate pests differently, because of varying perceptions of the damage caused.

Nevertheless, some advantages of the system are that it:

- (i) requires country experts to attempt a relative value judgment of a large number of pests;
- (ii) enables those experts to compare their perceptions with those of nearby countries, in the process exposing real or apparent anomalies whose resolution may be revealing;
- (iii) highlights regional problems which may benefit from collaborative action (perhaps with multilateral donor support); and
- (iv) directs attention to a pest of particular significance to an individual country, but not to adjacent countries, thereby focusing action on bilateral donor support.

Bearing in mind reservations that arise from the foregoing, it is instructive to examine whether some simple arithmetical clumping of the ratings will assist in a broad stratification of the pest problems in the oceanic Pacific.

In this exercise a political and information bias is introduced. As to the political bias, the ratings for nations small in size and population (e.g. Tuvalu, Tokelau) are given the same weight as those for large nations (e.g. Papua New Guinea, Fiji). As to information bias, the amount of detailed knowledge on pests held by any one of four countries (Guam, Papua New Guinea, Fiji, New Caledonia), possibly exceeds that of the aggregate of information available in the remaining countries.

Because a considerable number of species in some countries were, not surprisingly, assigned a triple-plus rating in the first survey, in later surveys countries were initially asked to place an asterisk against their top 10 invertebrate pests and their top 10 weeds; and, in the latest survey, to perform an even more challenging task, namely, to arrange their selected species in order of importance. The conclusions that can be drawn from this subjective exercise, and also

from abstracting from this data information on the top five pests and weeds in each country, are discussed in association with the relevant tables (4, 5, 6, 14, 15, 16). The two approaches reflect somewhat different evaluations made by country experts. The sum of the pluses provides a broad measure of the importance of the pest to the region and is not concerned with whether or not there are other pests also of great importance. The top 10 (and top 5) evaluations attempt to place in priority order the most important pests. Normally these are chosen from pests rating three pluses, of which there are often a considerable number. Indeed, there are 70 different invertebrate pests placed in their top 10 and 44 in their top five by at least one Pacific country (Tables 4, 5) and these (and particularly the latter 44) deserve special consideration.

In many Pacific countries native forests (where they exist: see row 4, Table 20) are being depleted at a rate which is unsustainable. Forestry plantations are thus growing in importance to meet increasing needs for timber and fuel. All countries, and especially those with limited areas available for plantations, will need to maintain losses due to pests and weeds as low as possible if they are to have commercially viable plantations. Some of the tree species in use or undergoing trials are native, but the more important are likely to be exotic. Each of these is liable to attack by damaging insect pests, some of which are potential targets for classical biological control. A few introduced weeds have also emerged as important competitors, particularly in nurseries and young plantations. Very little information is available on the distribution and relative importance of these insect pests and weeds, except for Papua New Guinea, Fiji, Solomon Islands and Guam. What is available is assembled in Tables 9 and 18 as a first step in reviewing their regional importance. It is hoped that this will lead to the progressive filling-in of the many gaps in the data presented. I am most grateful to Dr M.D. Kamath of the Department of Forestry, Fiji for sharing his extensive knowledge of forest insect pests of the region. I would be most grateful for any additional

input that would improve the accuracy and comprehensiveness of the tables.

It is not unusual for some pests to be known under different scientific names in different countries of the region. In such instances a preferred name has been adopted after advice from expert taxonomists and consultation with sources such as Wood (1992) and Zhang (1994). For convenience, alternative names that have been dropped are cross-referenced in the two main tabulations of preferred names, one for arthropods (Table 21), the other for weeds (Table 22). Where a (= ...) appears in relation to a scientific name, the name *not* in brackets is the preferred one for the particular pest species referred to in the Pacific. It is not intended to imply that the two are synonyms, as often they are not.

Country abbreviations used at the top of some tables are:

Co I	Cook Islands
Fij	Fiji
Fr P	French Polynesia
FSM	Federated States of Micronesia
Gua	Guam
Kir	Kiribati
Mar I	Marshall Islands
NCa	New Caledonia
Niu	Niue
Pohn	Pohnpei
PNG	Papua New Guinea
A Sa	American Samoa
W Sa	Western Samoa
So I	Solomon Islands
Tok	Tokelau
Ton	Tonga
Tuv	Tuvalu

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Listed below are contributors to the 1995 survey. Over the previous decade there have also been many others who have generously supplied information from which the current tables have been constructed. I am most grateful to all involved

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## **4. Results**

Table 1 Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
<i>Abroma pumila</i> (Distant)	Hemiptera	Cicadidae		citrus, litchi, mango
<i>Achatina fulica</i> Bowdich	Gasteropoda	Achatinidae	giant African snail	many vegetables and ornamentals
<i>Acria</i> sp.	Lepidoptera	Xylorictidae	oil palm webworm	oil palm
<i>Acrocercops</i> sp.	Lepidoptera	Gracillariidae		sweet potato, phaseolus
<i>Adoretus sinicus</i> Burmeister	Coleoptera	Scarabaeidae	Chinese rose beetle	larvae: roots of many plants adults: leaves of many plants
<i>Adoretus versutus</i> Harold	Coleoptera	Scarabaeidae	rose beetle, Indian rose beetle	as above, especially cocoa and sugarcane
<i>Agonoxena argaula</i> Meyrick	Lepidoptera	Agonoxenidae	coconut flat moth	leaves of coconut and other palms
<i>Agonoxena pyrogramma</i> Meyrick	Lepidoptera	Agonoxenidae	coconut flat moth	as above
<i>Agrius convolvuli</i> (Linnaeus)	Lepidoptera	Sphingidae	sweet potato hawkmoth	sweet potato, taro, beans
<i>Agrotis ipsilon</i> (Hufnagel)	Lepidoptera	Noctuidae	greasy cutworm, black cutworm	polyphagous
<i>Aleurodicus dispersus</i> Russell	Hemiptera	Aleyrodidae	spiraling whitefly	papaya, guava, polyphagous
<i>Aleurotrachelus trachoides</i> (Back)	Hemiptera	Aleyrodidae	chilli whitefly	chilli, taro, tomato, sweet potato
<i>Amblypelta cocophaga</i> China	Hemiptera	Coreidae	fruit spotting bug	coconut, cocoa, rubber, cassava, mango, papaya
<i>Amblypelta lutescens</i> (Distant)	Hemiptera	Coreidae	fruit spotting bug	coconut, cocoa, rubber, cassava, mango, papaya
<i>Amblypelta papuensis</i>	see <i>A. lutescens</i>			
<i>Amrasca devastans</i> (Distant)	Hemiptera	Cicadellidae	cotton leafhopper	cotton
<i>Amrasca biguttula</i>	see <i>A. devastans</i>			
<i>Aonidiella aurantii</i> (Maskell)	Hemiptera	Diaspididae	California red scale	citrus, breadfruit, coconut, banana, papaya
<i>Aphis craccivora</i> Koch	Hemiptera	Aphididae	cowpea aphid	legumes, citrus, mango, breadfruit
<i>Aphis gossypii</i> Glover	Hemiptera	Aphididae	melon aphid, cotton aphid	cucurbits, Solanaceae, polyphagous
<i>Aspidiella hartii</i> (Cockerell)	Hemiptera	Diaspididae	yam scale	yam, ginger, taro, sweet potato
<i>Aspidiotus destructor</i> Signoret	Hemiptera	Diaspididae	coconut scale, transparent scale	coconut, polyphagous
<i>Aulacophora</i> spp.	Coleoptera	Chrysomelidae	pumpkin beetles	cucurbits
<i>Austracris</i> spp.	Orthoptera	Acrididae	grasshoppers	polyphagous
<i>Axiagastus cambelli</i> Distant	Hemiptera	Pentatomidae	coconut flower bug	coconut
<i>Bactrocera</i> spp.	Diptera	Tephritidae	fruit fly	most fruit, some vegetables
<i>Baeturia papuensis</i> de Boer	Hemiptera	Cicadidae	grass cicada	sugarcane roots, coffee
<i>Bemisia argentifolii</i> Bellows & Perring	Hemiptera	Aleyrodidae	silverleaf whitefly	polyphagous
<i>Bemisia tabaci</i> (Gennadius)	Hemiptera	Aleyrodidae	cotton whitefly, tobacco whitefly	polyphagous
<i>Brachyplatys pacificus</i> Dallas	Hemiptera	Plataspididae	dwarf shield bug	legumes, polyphagous

**Table 1** (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
<i>Brevicoryne brassicae</i> (Linnaeus)	Hemiptera	Aphididae	cabbage aphid	Cruciferae
<i>Brontispa longissima</i> (Gestro)	Coleoptera	Chrysomelidae	coconut leaf hispa	coconut
<i>Brontispa mariana</i> Spaeth	Coleoptera	Chrysomelidae	coconut leaf hispa	coconut
<i>Brontispa palauensis</i> (Esaki & Chuju)	Coleoptera	Chrysomelidae	coconut leaf hispa	coconut
<i>Bruchophagus muli</i> Bouček & Brough	Hymenoptera	Eurytomidae	lime gall wasp	citrus
<i>Cassida circumdata</i> (Herbst)	Coleoptera	Chrysomelidae	green tortoise beetle	sweet potato
<i>Cassida compuncta</i> (Bohemian)	Coleoptera	Chrysomelidae	tortoise-shell beetle	sweet potato
<i>Ceroplastes rubens</i> Maskell	Hemiptera	Coccidae	pink wax scale	citrus, polyphagous
<i>Chilo terrenellus</i> Pagenstecher	Lepidoptera	Pyralidae	sugarcane internode borer	sugarcane
<i>Chloropulvinaria</i> (= <i>Pulvinaria</i> ) <i>psidii</i> (Maskell)	Hemiptera	Coccidae	green shield scale	citrus, coffee, polyphagous
<i>Chrysodeixis eriosoma</i> (Doubleday)	Lepidoptera	Noctuidae	green semi-looper, corn semi-looper	corn, legumes, tomato, capsicum, cabbage
<i>Chrysomphalus aonidum</i> (Linnaeus)	Hemiptera	Diaspididae	purple scale, circular black scale	citrus, coconut, papaya
<i>Coccus celatus</i> De Lotto	Hemiptera	Coccidae	coffee green scale	coffee
<i>Coccus viridis</i> (Green)	Hemiptera	Coccidae	green scale	coffee, polyphagous
<i>Coenobita</i> spp. (Crustacea)		Coenobitidae	hermit crab	vegetables
<i>Cosmopolites sordidus</i> (Germar)	Coleoptera	Curculionidae	banana weevil borer	banana, sugarcane
<i>Crocidolomia binotalis</i>	see <i>C. pavonana</i>			
<i>Crocidolomia pavonana</i> (Geyer)	Lepidoptera	Pyralidae	cabbage cluster caterpillar	cabbage
<i>Cryptophlebia pallimfibriata</i> Bradley	Lepidoptera	Tortricidae	fruit borer	<i>Inocarpus edulis</i> (ivi), avocado
<i>Cylas formicarius</i> (Fabricius)	Coleoptera	Apionidae	sweet potato weevil	sweet potato
<i>Deanolis albizonalis</i> (Hampson)	Lepidoptera	Pyralidae	red banded mango borer	mango
<i>Dermolepida nigrum</i> (Nonfried)	Coleoptera	Scarabaeidae		banana leaves
<i>Dialeurodes citrifolii</i> (Morgan)	Hemiptera	Aleyrodidae	cloudy winged whitefly	citrus
<i>Diaphania indica</i> (Saunders)	Lepidoptera	Pyralidae	cucumber moth	cucumber, cotton
<i>Diocalandra taitense</i> (Guérin-Méneville)	Coleoptera	Chrysomelidae	spathe weevil	coconut
<i>Dysmicoccus brevipes</i> (Cockerell)	Hemiptera	Pseudococcidae	pineapple mealybug	pineapple, polyphagous
<i>Dysmicoccus neobrevipes</i> Beardsley	Hemiptera	Pseudococcidae	grey pineapple mealybug	pineapple, banana
<i>Earias fabia</i>	see <i>E. vittella</i>			

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
<i>Earias vittella</i> (Fabricius)	Lepidoptera	Noctuidae	rough bollworm, shoot and fruit borer	aibika, okra
<i>Epilachna</i> spp.	Coleoptera	Coccinellidae	leaf-eating ladybirds	legumes, cucurbits, Solanaceae
<i>Epitrix hirtipennis</i> (Melsheimer)	Coleoptera	Chrysomelidae	tobacco flea beetle	tomato, eggplant, potato
<i>Erionota thrax</i> (Linnaeus)	Lepidoptera	Hesperiidae	banana skipper	banana
<i>Eurycantha</i> sp.	Orthoptera	Phasmatidae	oil palm stick insect	oil palm
<i>Euscepes postfasciatus</i> (Fairmaire)	Coleoptera	Curculionidae	Indian sweet potato weevil	sweet potato
<i>Fabritiilis (= Leptoglossus) gonagra</i> (Fabricius)	Hemiptera	Coreidae	squash bug, leaf-footed plant bug	cucurbits, citrus, polyphagous
<i>Furcaspis oceanica</i> Lindinger	Hemiptera	Diaspididae	red coconut scale	coconut, pandanus
<i>Graeffea crouanii</i> (Le Guillou)	Orthoptera	Phasmatidae	coconut stick insect	coconut, pandanus
<i>Halticus tibialis</i> Reuter	Hemiptera	Miridae	sweet potato flea mirid	sweet potato, beans, cucumber
<i>Helicoverpa armigera</i> (Hübner)	Lepidoptera	Noctuidae	cotton bollworm, corn earworm	polyphagous
<i>Heliothis armigera</i>	see <i>Helicoverpa armigera</i>			
<i>Hellula</i> spp.	Lepidoptera	Pyralidae	cabbage centre grubs	brassicas
<i>Helopeltis clavifer</i> (Walker)	Hemiptera	Miridae	cocoa mirid	cocoa
<i>Heteropsylla cubana</i> Crawford	Hemiptera	Psyllidae	leucaena psyllid	leucaena
<i>Hippotion celereio</i> (Linnaeus)	Lepidoptera	Sphingidae	taro hawkmoth	taro, sweet potato, tobacco
<i>Homoeosoma</i> sp.	Lepidoptera	Pyralidae		
<i>Hymenia recurvalis</i> (Fabricius)	Lepidoptera	Pyralidae	Hawaiian beet webworm	sweet potato, tomato, corn, silver beet
<i>Hypothenemus hampei</i> (Ferrari)	Coleoptera	Scolytidae	coffee berry borer	coffee
<i>Icerya aegyptiaca</i> (Douglas)	Hemiptera	Margarodidae	breadfruit mealybug	breadfruit
<i>Icerya purchasi</i> Maskell	Hemiptera	Margarodidae	cottony cushion scale	citrus, polyphagous
<i>Icerya seychellarum</i> (Westwood)	Hemiptera	Margarodidae	Seychelles scale	citrus, breadfruit
<i>Laevicaulis alte</i>	(Gasteropoda)		slug	vegetables, garden plants
<i>Lamprosema diemenalis</i> Guenée	Lepidoptera	Pyralidae	bean leafroller	beans, corn
<i>Lamprosema octasema</i>	see <i>Nacoleia octasema</i>			
<i>Lepidiota reuleauxi</i> (Brenske)	Coleoptera	Scarabaeidae	white grub	sugarcane roots
<i>Leptocoris oratorius</i> (Fabricius)	Hemiptera	Alydidae		rice
<i>Leptoglossus gonagra</i> (Fabricius)	see <i>F. gonagra</i>			
<i>Leptoglossus australis</i>	see <i>F. gonagra</i>			

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
<i>Leucoptera</i> spp.	Lepidoptera	Lyonetiidae	winged bean, blotch miner	beans
<i>Lipaphis erysimi</i> (Kaltenbach)	Hemiptera	Aphididae	mustard aphid	cabbage, tomato, radish
<i>Liriomyza</i> spp.	Diptera	Agromyzidae	leaf miners	vegetables
<i>Lygus muiri</i> Poppius	Hemiptera	Miridae		
<i>Mahasena corbetti</i> Tams	Lepidoptera	Psychidae	rough bugworm	oil palm
<i>Marasmia exigua</i> Butler	Lepidoptera	Pyralidae	rice leaf roller	rice
<i>Maruca vitrata</i> (Geyer)	Lepidoptera	Pyralidae	bean podborer	beans, pigeon pea, cowpea
<i>Maruca testulalis</i>	see <i>M. vitrata</i>			
<i>Mictis profana</i> (Fabricius)	Hemiptera	Coreidae	crusader bug	pigeon pea, citrus, eggplant
<i>Myndus taffini</i> Bonfils	Hemiptera	Cixiidae	foliar decay leafroller	coconut
<i>Mythimna separata</i> (Howarth)	Lepidoptera	Noctuidae	paddy armyworm	rice, sugarcane, sorghum, corn, tobacco
<i>Myzus persicae</i> (Sulzer)	Hemiptera	Aphididae	green peach aphid	polyphagous
<i>Nacoleia octasema</i> (Meyrick)	Lepidoptera	Pyralidae	banana scab moth	banana, pandanus
<i>Neotermes rainbowi</i> Hill	Isoptera	Kalotermitidae	coconut termite	coconut
<i>Neotermes</i> sp.	Isoptera	Kalotermitidae		tree crops, citrus
<i>Nezara viridula</i> (Linnaeus)	Hemiptera	Pentatomidae	green vegetable bug	vegetables
<i>Nilaparvata lugens</i> (Stål)	Hemiptera	Delphacidae	brown planthopper	rice
<i>Nisotra</i> spp.	Coleoptera	Chrysomelidae	shot hole beetles	aibika
<i>Noorda albizonalis</i>	see <i>Deanolis albizonalis</i>			
<i>Ochetomyrmex auropunctata</i>	see <i>Wasmannia auropunctata</i>			
<i>Omiodes diemenalis</i> (Guenée)	see <i>Lamprosema diemenalis</i>			
<i>Ophiomyia phaseoli</i> (Tryon)	Diptera	Agromyzidae	bean fly	beans
<i>Orchamoplatus mammaeferus</i> Quaintance and Baker	Hemiptera	Aleyrodidae	citrus whitefly	citrus
<i>Oribius</i> spp.	Coleoptera	Curculionidae	shot hole weevils	horticultural crops
<i>Oryctes rhinoceros</i> (Linnaeus)	Coleoptera	Scarabaeidae	rhinoceros beetle	coconut, palms
<i>Ostrinia furnacalis</i> (Guenée)	Lepidoptera	Pyralidae	corn borer	corn, sorghum, sugarcane, ginger
<i>Othreis fullonia</i> (Clerck)	Lepidoptera	Noctuidae	fruit piercing moth	most fruits, some vegetables
<i>Palmicultor palmarum</i> (Ehrhorn)	Hemiptera	Pseudococcidae	coconut mealybug	coconut, betel nut
<i>Pansepta teleturga</i> Meyrick	Lepidoptera	Oecophoridae	cocoa webworm	cocoa
<i>Pantorhytes</i> sp.	Coleoptera	Curculionidae	cocoa weevils	cocoa

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
<i>Papilio polytes</i> Linnaeus	Lepidoptera	Papilionidae	citrus swallowtail	citrus
<i>Papuana</i> sp.	Coleoptera	Scarabaeidae	taro beetle	taro, sweet potato, oil palm, banana
<i>Parlatorius</i> sp.	Hemiptera	Diaspididae	parlatorius scale	
<i>Pentalonia nigronervosa</i> Coquerel	Hemiptera	Aphididae	banana aphid	banana
<i>Pericyma cruegeri</i> (Butler)	Lepidoptera	Noctuidae	poinciana looper	poinciana
<i>Phthorimaea operculella</i> (Zeller)	Lepidoptera	Gelechiidae	potato tuber moth	potato
<i>Phyllocnistis citrella</i> Stainton	Lepidoptera	Gracillariidae	citrus leaf miner	citrus
<i>Phyllocoptura oleivora</i> (Ashmead)	Acarina	Eriophyidae	citrus rust mite	citrus
<i>Pinnaspis strachani</i> (Cooley)	Hemiptera	Diaspididae	lesser snow scale	citrus, yam, polyphagous
<i>Planococcus pacificus</i> Cox	Hemiptera	Pseudococcidae	Pacific mealybug	custard apple, cocoa
<i>Plutella xylostella</i> (Linnaeus)	Lepidoptera	Yponomeutidae	diamondback cabbage moth	crucifers
<i>Podagrion</i> (= <i>Nisotra</i> ) <i>basseliae</i>	Coleoptera	Chrysomelidae	flea beetle	aibika
<i>Polyphagotarsonemus latus</i> (Banks)	Acarina	Tarsonemidae	broad mite	vegetables, some fruits
<i>Pomacea lineata</i> Wagner	(Gasteropoda)	Ampullariidae	golden apple snail	polyphagous
<i>Prays citri</i> (Millière)	Lepidoptera	Yponomeutidae	citrus flower moth	citrus
<i>Promecothera opacicollis</i> Gestro	Coleoptera	Chrysomelidae	coconut leaf miner	coconut
<i>Pseudaulacaspis pentagona</i> Targioni-Tozzetti	Hemiptera	Diaspididae	passionfruit scale	passionfruit
<i>Pseudococcus</i> sp.	Hemiptera	Pseudococcidae		
<i>Pseudodioniella pacifica</i> China & Carvalho	Hemiptera	Miridae	cocoa mirid	cocoa
<i>Rhabdoscelus obscurus</i> (Boisduval)	Coleoptera	Curculionidae	sugarcane weevil	sugarcane, coconut, banana
<i>Rhopalosiphum maidis</i> (Fitch)	Hemiptera	Aphididae	maize aphid	corn, banana, sugarcane, sorghum
<i>Rhynchophorus bilineatus</i> (Montrouzier)	Coleoptera	Curculionidae	black palm weevil	coconut
<i>Rhiparidella sobrina</i> (Bryant)	Coleoptera	Chrysomelidae	banana scarring beetle	banana
<i>Riptortus</i> spp.	Hemiptera	Coreidae	bean pod suckers	beans, legumes
<i>Scapanes australis</i> (Boisduval)	Coleoptera	Scarabaeidae	scapanes	coconut, palms
<i>Scirpophaga excerptalis</i> (Walker)	Lepidoptera	Pyralidae	tip shoot borer	mature sugarcane
<i>Segestidea</i> spp.	Orthoptera	Tettigoniidae	coconut tree hoppers	coconut
<i>Selenothrips rubrocinctus</i> (Giard)	Thysanoptera	Thripidae	red banded thrips	mandarin, mango, cocoa, cashew
<i>Sesamia grisescens</i> Warren	Lepidoptera	Noctuidae	pink stem borer	rice, sugarcane
<i>Sessinia livida</i> (Fabricius)	Coleoptera	Oedemeridae	toddy bug, blister beetle	

Table 1 (cont'd) Major invertebrate pests of agriculture in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal crops attacked
<i>Sogatella furcifera</i> (Horváth)	Hemiptera	Delphacidae	grass planthopper	rice
<i>Solenopsis geminata</i> (Fabricius)	Hymenoptera	Formicidae	fire ant	(protect honeydew producers)
<i>Spodoptera exempta</i> (Walker)	Lepidoptera	Noctuidae	lawn armyworm	polyphagous
<i>Spodoptera litura</i> (Fabricius)	Lepidoptera	Noctuidae	cluster caterpillar	cabbage, polyphagous
<i>Spodoptera mauritia</i> (Boisduval)	Lepidoptera	Noctuidae	armyworm	rice, corn, sugarcane
<i>Sternochetus mangiferae</i> (Fabricius)	Coleoptera	Curculionidae	mango stone weevil	mango
<i>Syllepte derogata</i> (Fabricius)	Lepidoptera	Pyralidae	aibika leafroller	aibika, okra
<i>Tarophagus colocasiae</i> (Matsumura)	Hemiptera	Delphacidae	taro plant hopper	taro
<i>Tarophagus persephone</i> (Kirkaldy)	Hemiptera	Delphacidae	taro plant hopper	taro
<i>Tarophagus proserpina</i> Kirkaldy	Hemiptera	Delphacidae	taro plant hopper	taro
<i>Tetranychus cinnabarinus</i> Boisduval	Acarina	Tetranychidae	carmine or red spider mite	polyphagous
<i>Tetranychus lambi</i> Pritchard & Baker	Acarina	Tetranychidae	banana spider mite	banana, taro
<i>Tetranychus marianae</i> McGregor	Acarina	Tetranychidae	spider mite	cassava
<i>Tetranychus</i> spp.	Acarina	Tetranychidae		polyphagous
<i>Tetranychus urticae</i> Koch	Acarina	Tetranychidae	two-spotted mite	polyphagous
<i>Thosea</i> spp.	Lepidoptera	Limacodidae	cup moth	polyphagous on tree crops
<i>Thrips palmi</i> Karny	Thysanoptera	Thripidae	melon thrips	polyphagous
<i>Thrips tabaci</i> Lindeman	Thysanoptera	Thripidae	onion thrips	onion
<i>Tirathaba rufivena</i> (Walker)	Lepidoptera	Pyralidae	coconut spathe moth	coconut
<i>Toxoptera aurantii</i> (Boyer de Fonscolombe)	Hemiptera	Aphididae	black citrus aphid	citrus
<i>Trialeurodes vaporariorum</i> (Westwood)	Hemiptera	Aleyrodidae	greenhouse whitefly	cucurbits
<i>Ueana lifuana</i> (Montrouzier)	Hemiptera	Cicadidae		citrus, litchee, mango
<i>Unaspis citri</i> (Comstock)	Hemiptera	Diaspididae	white louse scale, citrus snow scale	citrus
<i>Wasmannia auropunctata</i> (Roger)	Hymenoptera	Formicidae	red fire ant	(protect honeydew producers)
<i>Xyleborus</i> spp.	Coleoptera	Scolytidae	stem borers	cocoa, tree crops

Table 2. The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. * <th>No. +s</th> <th>Order</th>	No. +s	Order		
<i>Abroma pumila</i>	Cicadidae								++											2				
<i>Achatina fulica</i>	Achatinidae			+	+	P			+++		+++	+	++					P	*	+++	2	14	31	
<i>Acria</i> sp.	Xylorictidae										++										2			
<i>Acrocercops</i> sp.	Gracillariidae	++																			2			
<i>Adoretus sinicus</i>	Scarabaeidae			++		+	-														3			
<i>Adoretus versutus</i>	Scarabaeidae	+++	+++	++								++	++			*	+++	P	+	4	17	24		
<i>Agonoxena argaula</i>	Agonoxenidae		+		++		*	++		+	+++		++	+	P	*	+	++	+++	+++	+	5	22	17
<i>Agonoxena pyrogramma</i>	Agonoxenidae				++					+	P			P		P		P			3			
<i>Agrius convolvuli</i>	Sphingidae	P	P	P		P	P		+		+		P	P	P	P	P	P			2			
<i>Agrotis epsilon</i>	Noctuidae	P	+	+		P			P		++		P		P	P	P	P	+	P	5	84=		
<i>Aleurodicus dispersus</i>	Aleyrodidae	+++	+++	P	P	P	P	*	+++	++		++	+	++	P	*	+	+++			3	20	20	
<i>Aleurotrachelus trachoides</i>	Aleyrodidae	+++																			3			
<i>Amblypelta cocophaga</i>	Coreidae											++			+++						5	84=		
<i>Amblypelta lutescens</i> (= <i>A. papuensis</i> )	Coreidae											+++									3			
<i>Amrasca devastans</i> (= <i>A. biguttula</i> )	Cicadellidae					++						+++									5	84=		
<i>Aonidiella aurantii</i>	Diaspididae	P	P				P	++	++	P	++		P	P		P		+		7	63=			
<i>Aphis craccivora</i>	Aphididae	P	*	+++	P	++	++	++			++		P	P		P	P	P		1	11	39		
<i>Aphis gossypii</i>	Aphididae	++	+++	++	++	+++	++	P	+	++	+	+	++	+	*	*	*	*	++	+++	+	6	32	4
<i>Aspidiella hartii</i>	Diaspididae	+++							+					+		*		+			7	63=		
<i>Aspidiotus destructor</i>	Diaspididae	+	++	+	+	+		++	+	P	P	P	P	P	P	*	++	+	2	13	35			
<i>Aulacophora</i> spp.	Chrysomelidae	+++		++	+++	*	+++	+++	+++	+	+++	+	+	+	+	+++	++	++	2	25	13			

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. * <th>No. +s</th> <th>Order</th>	No. +s	Order
<i>Austracis</i> spp.	Acrididae		P						+	P	++			+		P			+	5	84=	
<i>Axiagastus cambelli</i>	Pentatomidae										+			+			P			2		
<i>Bactrocera</i> spp.	Tephritidae	*	*	*	*	*	*	+		*	*	*	*	*	*	*	+++	*	*	13	41	1
<i>Baeutria papuensis</i>	Cicadidae										++									2		
<i>Bemisia argentifolii</i>	Aleyrodidae	+++	†	†		*			*	+++									3	9	46	
<i>Bemisia tabaci</i>	Aleyrodidae	++			*	+++	+++	++			P							P	3	10	41	
<i>Brachyplatys pacificus</i>	Plataspidae	++																		2		
<i>Brevicoryne brassicae</i>	Aphididae	++																		2		
<i>Brontispa longissima</i>	Chrysomelidae			*					+++		+++	+++	*	++	+++	*		+++	P	4	22	18
<i>Brontispa mariana</i>	Chrysomelidae				++												P			2		
<i>Brontispa palauensis</i>	Chrysomelidae					++														2		
<i>Bruchophagus mali</i>	Eurytomidae										++									2		
<i>Cassida compuncta</i>	Chrysomelidae	++																		2		
<i>Ceroplastes rubens</i>	Coccidae	P	P	+	*	+++	P	+		++	P	++	P	P				+	1	10	42	
<i>Chilo terrenellus</i>	Pyralidae											+++								3		
<i>Chloropulvinaria</i> (= <i>Pulvinaria psidii</i> )	Coccidae			+	+	+			P	+++	+			+			P		8	53=		
<i>Chrysodeixis eriosoma</i>	Noctuidae	P	P	P	++		*	++	+	P	P	P	P	P	P	P	P	++	1	7	63=	
<i>Chrysomphalus aonidum</i>	Diaspididae		P	P	+		P		+	P	P	P	P	P	P	P			2			
<i>Coccus celatus</i>	Coccidae	++									+++						P			5	84=	
<i>Coccus viridis</i>	Coccidae	P	P	+	++	++	P		++	+	+++	P	P	P		P	*	+++	P	1	15	30
<i>Coenobita</i> spp.	Coenobitidae				+		+	P							*	P		+	1	4		

† Very recently reported

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	No. +s	Order
<i>Cosmopolites sordidus</i>	Curculionidae	+++	+++	+++	+	+++	P		*	*	++	+++	++	++	++	+++		++	++	4	35	2
<i>Crocidolomia pavonana</i> (= <i>C. binotalis</i> )	Pyralidae	+++	*	+++	++	+++			+	*	+++	+++	++	++	++	*	+++	++	++	4	29	7
<i>Cryptophlebia pallimlimbriata</i>	Tortricidae		P	++			*				P										2	
<i>Cylas formicarius</i>	Apionidae	+++	*	+++	++	+++	++	P	*	++	++	+++	P	P	+++	*	+++	*	P	7	31	5
<i>Deanolis</i> (= <i>Noorda</i> ) <i>albizonalis</i>	Pyralidae										+++										3	
<i>Dermolepida nigrum</i>	Scarabaeidae										++										2	
<i>Dialeurodes citrifolii</i>	Aleyrodidae					++															2	
<i>Diaphania indica</i>	Pyralidae		P	P	++	+	*	+++											1	6	70=	
<i>Diocalandra taitensis</i>	Chrysomelidae		P	P			++										P			2		
<i>Dysmicoccus brevipes</i>	Pseudococcidae	+++	P	P	++	+++	+		+	++	+	P	+	+	P	P	P	++	P	17	25	
<i>Dysmicoccus neobrevipes</i>	Pseudococcidae	P				+	+					P	P								2	
<i>Earias vittella</i> (= <i>E. fabia</i> )	Noctuidae	P	+++			+			P	P	+++		P	*	+++	P		++		1	12	38
<i>Epilachna</i> spp.	Coccinellidae	*	+++	+++	++		P			+	++	*	++	+++	+++	++	P		3	10	41	
<i>Epitrix hirtipennis</i>	Chrysomelidae	+++																		3		
<i>Erionota thrax</i>	Hesperiidae					++					++									4		
<i>Eurycantha</i> sp.	Phasmatidae										++									2		
<i>Euscepes postfasciatus</i>	Curculionidae	++	P	++					+++	*	+++					*	+++	P	*	3	16	26
<i>Fabrichilis gonagra</i>	Coreidae	+++		P					+		+++	++	P	P			P			9	48=	
<i>Furcaspis oceanica</i>	Coccidae				*	+++	++												1	5	77=	

(++) equal to or less than a species score; (+) equal to or more than twice and not double the mean score; (+) greater than double the mean score.

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fiji	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order	
<i>Graeffea crouanii</i>	Phasmatidae	++	++	P					P	P		*	+++	+		*	++	P	P		2	12	36=
<i>Halticus tibialis</i>	Miridae				*	+++	+++	+++			+++				+++		P	+		2	16	27	
<i>Helicoverpa</i> (= <i>Heliothis</i> ) <i>armigera</i>	Noctuidae	+	+++	+	+++	+++	+		+++		++		+	++		*	+++	P	++	++	4	27	10
<i>Hellula</i> spp.	Pyralidae		++	P	+	+++			+	+	++	P	++	++	P	P					14	32=	
<i>Helopeltis clavifer</i>	Miridae										+++										3		
<i>Heteropsylla cubana</i>	Psyllidae	+	P	P	P	+	P		++	P	+++	P	P	P		P	P	P	P	7	63=		
<i>Hippotion celerio</i>	Sphingidae	+	P	P	P	+	P		+	P	++	++	+	+		+	P	P		10	43=		
<i>Homoeosoma</i> sp.	Pyralidae			++																2			
<i>Hymenia recurvalis</i>	Pyralidae		++																	2			
<i>Hypothenemus hampei</i>	Scolytidae		++	++					+++											1	7	59=	
<i>Icerya aegyptiaca</i>	Margarodidae				+	+	++	++												2	8	52	
<i>Icerya purchasi</i>	Margarodidae		P	P		P	P		++	++	P			++		P	P			6	72=		
<i>Icerya seychellarum</i>	Margarodidae	+	+	++		P	P		+	++	P	P	P	P		P	P	++		9	48=		
<i>Laevicaulis alte</i>	Gasteropoda						+	P				++									4		
<i>Lamprosema diemenalis</i>	Pyralidae	+	P	+					P	P	+			P		P				3			
<i>Lepidiota reuleauxi</i>	Scarabaeidae										++									2			
<i>Leptocoris oratorius</i>	Alydidae		P		P						+++	P								3			
<i>Leucoptera</i> spp.	Lyonetiidae										++									2			
<i>Lipaphis erysimi</i>	Aphididae										++									2			
<i>Liriomyza</i> spp.	Agromyzidae	*	+++	+++	*	+++	P	+	+	+++	+++	+	*	++	+++		++	++	4	29	7=		
<i>Lygus muiiri</i>	Miridae		++								++									2			
<i>Mahasena corbetti</i>	Psychidae										++									2			
<i>Marasmia exigua</i>	Pyralidae		+++			P							P							3			

\* equal to or less than those species which have been recorded from a single country or island group.

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
<i>Maruca vitrata</i> (= <i>M. testulalis</i> )	Pyralidae	*	*	+++	P	*	++	++	++	P	+++	+	+++	+	++		+	+	3	24	14=	
<i>Metriona circumdata</i>	Chrysomelidae				*	+++	P				P									1	3	
<i>Mictis profana</i>	Coreidae		++																	2		
<i>Myndus taffini</i>	Cixiidae								P									*	+++	1	3	
<i>Mythimna separata</i>	Noctuidae		+++						++		+	P	P	P	P		++			8	53=	
<i>Myzus persicae</i>	Aphididae	P	P			P			P		++	P	P							2		
<i>Nacoleia (=Lamprosema) octasema</i>	Pyralidae		+++						+++	+	++	*	*	+++	+	+++	*	+++	++	3	24	14=
<i>Neotermes rainbowi</i>	Kalotermitidae	*	+++														*	+++		2	6	68=
<i>Neotermes</i> sp.	Kalotermitidae		*	+++															1	3		
<i>Nezara viridula</i>	Pentatomidae	++	+	++	P	P	+		+	++	++	+	++	P	P	P	P			14	32=	
<i>Nilaparvata lugens</i>	Delphacidae		*	+++							++									1	5	77=
<i>Nisotra</i> spp.	Chrysomelidae										+++									3		
<i>Ophiomyia phaseoli</i>	Agromyzidae		++		P	+++					++	+	+	P	P	P	P			9	48=	
<i>Orchamoplatus mammaeferus</i>	Aleyrodidae	*	+++	+							P									1	4	10
<i>Oribius</i> spp.	Curculionidae									*	+++									1	3	
<i>Oryctes rhinoceros</i>	Scarabaeidae		*	+++						P	++	*	+++	*	+++	++			++	3	15	28
<i>Ostrinia furnacalis</i>	Pyralidae					*	+++			+++		P		P	P			+	1	7	59=	

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fiji	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	No. +s	Order		
<i>Othreis fullonia</i>	Noctuidae		++	P	*	+++	*	+++		++	++	P	*	+++	*	+++		*	++	+	8	27	9	
<i>Palmicultor palmarum</i>	Pseudococcidae			P			*	++		P	P					P	++		P	1	4			
<i>Pansepta teleturga</i>	Oecophoridae										++										2			
<i>Pantorhytes</i> sp.	Curculionidae										*	+++			P						1	3		
<i>Papilio polytes</i>	Papilionidae				+	+								++							4			
<i>Papuana</i> spp.	Scarabaeidae		*	+++				*	+		+	*	+++		*	+++			++	++	5	17	24	
<i>Parlatorius</i> sp.	Diaspididae	++		P	++													*	+++	1	7	59=		
<i>Pentalonia nigronervosa</i>	Aphididae	P	+	++	+	++			P	+	++	P	*	+++	+++	P	*	+	+++	++	+	4	26	11
<i>Pericyma cruegeri</i>	Noctuidae					*	+++					+++									1	6	70=	
<i>Phthorimaea operculella</i>	Gelechiidae	++	+						++		+						P				6	72=		
<i>Phyllocnistis citrella</i>	Gracillariidae		++		++	+					*	+++	+++	+++	++	P		P		*	++	2	18	21=
<i>Phyllocoptruta oleivora</i>	Eriophyidae	++	++	++		P			++	+			++					++	+		14	32=		
<i>Pinnaspis strachani</i>	Diaspididae	P	P	+		P	P		P	P	P		P	++	P	P	P	P	+++	+	1	7	59=	
<i>Planococcus pacificus</i>	Pseudococcidae	+	+	P		+	++		P	P	P		P	P	*	P	*	++	+++	+	2	12	36=	
<i>Plutella xylostella</i>	Yponomeutidae	*	*	*	++	+	+++		+++	+++	+++	*	+++	+		*	+++		++	P	9	30	6	
<i>Podagrion basselae</i>	Chrysomelidae													*	+++						1	3		
<i>Polyphagotarsonemus latus</i>	Tarsonemidae	+++			+	++	+++	P	++	+++	+		++	+		++		++	++	1	24	16		

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *s	No. +s	Order
<i>Pomacea lineata</i>	Ampullariidae										++										2	
<i>Prays citri</i>	Yponomeutidae				++																2	
<i>Promecotheca opacicollis</i>	Chrysomelidae													*	+++				P		1	3
<i>Pseudaulacaspis pentagona</i>	Diaspididae		++			P			P		+	P	P		P	P	P	P			4	
<i>Pseudococcus</i> sp.	Pseudococcidae																P	*	+++	1	3	
<i>Pseudodoniella pacifica</i>	Miridae										*	+++	+							1	4	
<i>Rhabdoscelus obscurus</i>	Curculionidae	+	P	+		+++			P	P	+++	+	+	+	P	P	P			10	43=	
<i>Rhopalosiphum maidis</i>	Aphididae	+	+	P		P			P		+	P	P		P	P	P	P	+		4	
<i>Rhynchophorus bilineatus</i>	Curculionidae										+++	P	P							3		
<i>Rhyparidella sobrina</i>	Chrysomelidae										++										2	
<i>Riptortus</i> spp.	Coreidae										*	+++		+						1	4	
<i>Scapanes australis</i>	Scarabaeidae										*	+++		*	+++					2	6	68=
<i>Scirpophaga excerptalis</i>	Pyralidae										++									2		
<i>Segestidea</i> spp.	Tettigoniidae										+++				P					3		
<i>Selenothrips rubrocinctus</i>	Thripidae		P	P	P	++					++		++				P			6	72=	
<i>Sesamia grisescens</i>	Noctuidae										++						P	P		2		
<i>Sessinia livida</i>	Oedemeridae			P			++							*	+++		P			1	5	77=
<i>Sogatella furcifera</i>	Delphacidae		++																	2		
<i>Solenopsis geminata</i>	Formicidae		P		P	+	+		P		++									1	5	77=
<i>Spodoptera exempta</i>	Noctuidae								++	+	++		+	P						6	72=	
<i>Spodoptera litura</i>	Noctuidae	++	+	++	++	*	+++	+++	++	++	++	+++	+++	*		++	P	P	++	4	34	3
<i>Spodoptera mauritia</i>	Noctuidae	P	++	P		+++	P		++		+	P	P			P	P	P		8	53=	

Table 2. (cont'd) The distribution and importance of the major invertebrate pests of agriculture in the southern and western Pacific (species scoring a total of at least ++).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	No. +s	Order
<i>Sternochetus mangiferae</i>	Curculionidae		+++	++		+	P		P								P			6	72=	
<i>Syllepte derogata</i>	Pyralidae		+				P				+++			+++						7	63=	
<i>Tarophagus colocasiae</i> **	Delphacidae	+++				+					++			*					P	1	9	47
<i>Tarophagus persephone</i> **	Delphacidae										++			+++						5	84=	
<i>Tarophagus proserpina</i> **	Delphacidae		+++			+			P	++	++	++	++			+	*	++	++	3	21	19
<i>Tetranychus cinnabarinus</i>	Tetranychidae					++	+	P												3		
<i>Tetranychus lambi</i>	Tetranychidae	++	+	+			P		+			+	+					++	++	11	40	
<i>Tetranychus marianae</i>	Tetranychidae		++			+	P		+		+	+	+	++				+		10	43=	
<i>Tetranychus</i> spp.	Tetranychidae	++		+		+	+			+++				P						8	53=	
<i>Tetranychus urticae</i>	Tetranychidae					+			*	++										1	5	77=
<i>Thosea</i> spp.	Limacodidae										++									2		
<i>Thrips palmi</i>	Thripidae		*	+++		*	+++			*	+++			+++	++				+	3	15	29
<i>Thrips tabaci</i>	Thripidae	+	P			P	P		P		P		+	+		P	P	P		3		
<i>Tirathaba rufivena</i>	Pyralidae		++							P	++		P	+	P	P	P	P		5	84=	
<i>Toxoptera aurantii</i>	Aphididae	++	+	+	P	++			P		+		+	P		P	P	P	+	9	48=	
<i>Trialeurodes vaporariorum</i>	Aleyrodidae				*	+++				++										1	5	77=
<i>Ueana lifuana</i>	Cicadidae									++										2		
<i>Unaspis citri</i>	Diaspididae		+++	+	P		P	P	+++	++	++	P	+	+		P	+++	*	2	18	21=	
<i>Wasmannia auropunctata</i>	Formicidae	++			P					*	++				P		P		*	2	7	58
<i>Xyleborus</i> spp.	Scolytidae		P	*	++			++	P		P				P			+	1	5	77=	

\*\* It is probable that clarification is needed of the records for the three *Tarophagus* spp. (Asche and Wilson, 1989).

**Table 3** Aggregated ratings of the major invertebrate pests of agriculture in the region.

Order	No. of +s	Pest and + scores	No. times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
<b>30 and over</b>						
1.	41	<i>Bactrocera</i> spp.	13	+	+	+
2.	35	<i>Cosmopolites sordidus</i>	4	+	+	++
3.	34	<i>Spodoptera litura</i>	4	+	-	-
4.	32	<i>Aphis gossypii</i>	6	+	+	+++
5.	31	<i>Cylas formicarius</i>	7	+	-	-
6.	30	<i>Plutella xylostella</i>	9	+	+	++++
<b>25–29</b>						
7. =	29	<i>Crocidolomia pavonana</i>	4	+	-	+
7. =	29	<i>Liriomyza</i> spp.	4	+	+	++
9.	27	<i>Othreis fullonia</i>	8	+	+	+++
10.	27	<i>Helicoverpa armigera</i>	4	+	+	+
11.	26	<i>Pentalonia nigronervosa</i>	4	+	-	+
12.	25	<i>Epilachna</i> spp.	4	+	+	++
13.	25	<i>Aulacophora</i> spp.	2	+	-	-
<b>20–24</b>						
14. =	24	<i>Nacoleia octasema</i>	3	+	+	++
14. =	24	<i>Maruca vitrata</i>	3	+	-	+
16.	24	<i>Polyphagotarsonemus latus</i>	1	+	-	-
17.	22	<i>Agonoxena argaula</i>	5	+	+	+++
18.	22	<i>Brontispa longissima</i>	4	+	+	++ ++
19.	21	<i>Tarophagus proserpina</i>	3	+	-	++ ++
20.	20	<i>Aleurodicus dispersus</i>	3	+	+	++ ++
<b>15–19</b>						
21. =	18	<i>Phyllocnistis citrella</i>	2	+	+	++ +
21. =	18	<i>Unaspis citri</i>	2	-	+	++ +
23.	17	<i>Papuana</i> spp.	5	+	-	+
24.	17	<i>Adoretus versutus</i>	4	+	-	-
25.	17	<i>Dysmicoccus brevipes</i>	-	+	+	++
26.	16	<i>Euscepes postfasciatus</i>	3	-	-	-
27.	16	<i>Halticus tibialis</i>	2	-	-	-
28.	15	<i>Oryctes rhinocerus</i>	3	+	+	++ ++
29.	15	<i>Thrips palmi</i>	3	(+) <sup>a</sup>	-	-
30.	15	<i>Coccus viridis</i>	1	-	?	++

<sup>a</sup>Walker 1993.

(cont'd over)

Order	No. of +s	Pest and + scores	No. times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
1.	41	<i>Bactrocera</i> spp.	13	+	+	+
2.	35	<i>Cosmopolites sordidus</i>	4	+	+	++
3.	34	<i>Spodoptera litura</i>	4	+	-	-
4.	32	<i>Aphis gossypii</i>	6	+	+	+++
5.	31	<i>Cylas formicarius</i>	7	+	-	-
6.	30	<i>Plutella xylostella</i>	9	+	+	++++
<b>25–29</b>						
7. =	29	<i>Crocidolomia pavonana</i>	4	+	-	+
7. =	29	<i>Liriomyza</i> spp.	4	+	+	++
9.	27	<i>Othreis fullonia</i>	8	+	+	+++
10.	27	<i>Helicoverpa armigera</i>	4	+	+	+
11.	26	<i>Pentalonia nigronervosa</i>	4	+	-	+
12.	25	<i>Epilachna</i> spp.	4	+	+	++
13.	25	<i>Aulacophora</i> spp.	2	+	-	-
<b>20–24</b>						
14. =	24	<i>Nacoleia octasema</i>	3	+	+	++
14. =	24	<i>Maruca vitrata</i>	3	+	-	+
16.	24	<i>Polyphagotarsonemus latus</i>	1	+	-	-
17.	22	<i>Agonoxena argaula</i>	5	+	+	+++
18.	22	<i>Brontispa longissima</i>	4	+	+	++ ++
19.	21	<i>Tarophagus proserpina</i>	3	+	-	++ ++
20.	20	<i>Aleurodicus dispersus</i>	3	+	+	++ ++
<b>15–19</b>						
21. =	18	<i>Phyllocnistis citrella</i>	2	+	+	++ +
21. =	18	<i>Unaspis citri</i>	2	-	+	++ +
23.	17	<i>Papuana</i> spp.	5	+	-	+
24.	17	<i>Adoretus versutus</i>	4	+	-	-
25.	17	<i>Dysmicoccus brevipes</i>	-	+	+	++
26.	16	<i>Euscepes postfasciatus</i>	3	-	-	-
27.	16	<i>Halticus tibialis</i>	2	-	-	-
28.	15	<i>Oryctes rhinocerus</i>	3	+	+	++ ++
29.	15	<i>Thrips palmi</i>	3	(+) <sup>a</sup>	-	-
30.	15	<i>Coccus viridis</i>	1	-	?	++

**Table 3 (cont'd)** Aggregated ratings of the major invertebrate pests of agriculture in the region.

Order	No. of +s	Pest and + scores	No. times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
<b>10-14</b>						
31.	14	<i>Achatina fulica</i>	2	+	+	++++
32.	14	<i>Phyllocotrupa oleivora</i>	-	-	-	-
32. =	14	<i>Hellula spp.</i>	-	+	-	-
32. =	14	<i>Nezara viridula</i>	-	+	+	++++
35.	13	<i>Aspidiotus destructor</i>	2	+	+	++++
36. =	12	<i>Graeffea crouanii</i>	2	+	+	+++
36. =	12	<i>Planococcus pacificus</i>	2	-	-	+
38.	12	<i>Earias vittella</i>	1	-	-	-
39.	11	<i>Aphis craccivora</i>	1	+	+	++
40.	11	<i>Tetranychus lambi</i>	-	-	-	-
41.	10	<i>Bemisia tabaci</i>	3	(+) <sup>b</sup>	+	+
42.	10	<i>Ceroplastes rubens</i>	1	-	+	+++
43. =	10	<i>Hippotion celorio</i>	-	-	-	-
43. =	10	<i>Rhabdoscelus obscurus</i>	-	-	+	++
43. =	10	<i>Tetranychus marianae</i>	-	-	-	-
		Still invading				
46.	9	<i>Bemisia argentifolii</i>	3	(+) <sup>b</sup>	+	+

<sup>b</sup>De Barro 1995.

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**Table 4**

It is desirable to examine the validity of conclusions from the simple rating system (**Table 3**), in which the number of pests to which +++ was assigned was not limited in any one country in any way. The method adopted was to obtain from country experts a list of their top 10 pests in order of importance (**Table 4**) and to assign values as follows:

Priority	1 was assigned a value of	10
2	"	9
3	"	8
4	"	7
5	"	6
6	"	5
7	"	4
8	"	3
9	"	2
10	"	1

These values were then added for each species, to obtain the rating entered in the 'rating' column of **Table 4**. The great majority of the pests with a high rating by this method are the same as those with high scores in **Table 3**, although the order in which they appear differs somewhat. The main difference occurs when at least two countries give a particular pest that has a somewhat limited distribution a very high priority (e.g. *Papuana* sp., *Bemisia argentifolii*). This difference is valuable since it draws attention to the need to give special consideration to such species.

**Table 4** The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in top 10).

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order	
<i>Abroma pumila</i>	Cicadidae											1							1	2	20	16	
<i>Achatina fulica</i>	Achatinidae																						
<i>Acria</i> sp.	Xylorictidae																						
<i>Acrocercops</i> sp.	Gracillariidae																						
<i>Adoretus sinicus</i>	Scarabaeidae																						
<i>Adoretus versutus</i>	Scarabaeidae	3		8		3				2		9		3		3	3	7		4	16	24=	
<i>Agonoxena argaula</i>	Agonoxenidae													9					5	31	5		
<i>Agonoxena pyrogramma</i>	Agonoxenidae																						
<i>Agrius convolvuli</i>	Sphingidae																						
<i>Agrotis epsilon</i>	Noctuidae																						
<i>Aleurodicus dispersus</i>	Aleyrodidae	4						3							2				3	16	26		
<i>Aleurotrachelus trachoides</i>	Aleyrodidae																						
<i>Amblypelta cocophaga</i>	Coreidae																						
<i>Amblypelta lutescens</i> (= <i>A. papuensis</i> )	Coreidae																						
<i>Amrasca devastans</i> (= <i>A. biguttula</i> )	Cicadellidae																						
<i>Aonidiella aurantii</i>	Diaspididae							4											1	7	39=		
<i>Aphis craccivora</i>	Aphididae	10																	1	1	64=		
<i>Aphis gossypii</i>	Aphididae	9					9									8	2	9	8	6	21	11	
<i>Aspidiella hartii</i>	Diaspididae																						
<i>Aspidiotus destructor</i>	Diaspididae							2									2		2	18	21=		
<i>Aulacophora</i> spp.	Chrysomelidae				10														9	2	3	55=	
<i>Austracis</i> spp.	Acrididae																						
<i>Axiagastus cambelli</i>	Pentatomidae																						
<i>Bactrocera</i> spp.	Tephritidae	6	2	1	1	1			4	1	2		2	2		1		2	4	13	120	1	
<i>Baeuturia papuensis</i>	Cicadidae																						
<i>Bemisia argentifolii</i>	Aleyrodidae	1					2			3									3	27	9		

**Table 4** (con'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

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**Table 4** (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
<i>Leptoglossus gonagra</i> (= <i>L. australis</i> )	Coreidae																					
<i>Leucoptera</i> spp.	Lyonetiidae																					
<i>Lipaphis erysimi</i>	Aphididae																					
<i>Liromyza</i> spp.	Agromyzidae	8		4					1			4								4	27	7=
<i>Lygus muiri</i>	Miridae																					
<i>Mahasena corbetti</i>	Psychidae																					
<i>Marasmia exigua</i>	Pyralidae																					
<i>Maruca vitrata</i> (= <i>M. testulalis</i> )	Pyralidae	9			10															2	3	55=
<i>Megymenum affine</i>	Pentatomidae																					
<i>Metriiona circumdata</i>	Chrysomelidae					4														1	7	39=
<i>Mictis profana</i>	Coreidae																					
<i>Monolepta semiviolacea</i>	Chrysomelidae																					
<i>Myndus taffini</i>	Cixiidae																	10		1	1	64=
<i>Mythimna separata</i>	Noctuidae																					
<i>Myzus persicae</i>	Aphididae																					
<i>Nacoleia</i> (= <i>Lamprosema</i> ) <i>octasema</i>	Pyralidae											1	10							3	18	20
<i>Neotermes rainbowi</i>	Kalotermitidae	5																		2	16	27
<i>Neotermes</i> sp.	Kalotermitidae		8																	1	3	57=
<i>Nezara viridula</i>	Pentatomidae																					
<i>Nilaparvata lugens</i>	Delphacidae		5																	1	6	44=
<i>Nisotra</i> spp.	Chrysomelidae																					
<i>Ophiomyia phaseoli</i>	Agromyzidae																					
<i>Orchamoplatus mammaeferus</i>	Aleyrodidae	2																		1	9	33
<i>Oribius</i> spp.	Curculionidae											4								1	7	39=
<i>Oryctes rhinoceros</i>	Scarabaeidae		4										4		1				5	4	30	6
<i>Ostrinia furnacalis</i>	Pyralidae					5														1	6	44=

**Table 4** (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

**Table 4** (con'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

**Table 4** (cont'd) The relative importance given to each country's top 10 invertebrate pests of agriculture (70 species) (numerals in country columns indicate order assigned in

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F	No. *	Rating	Order
<i>Toxoptera aurantii</i>	Aphididae																					
<i>Trialeurodes vaporariorum</i>	Aleyrodidae			3																1	8	35=
<i>Ueana lifuana</i>	Cicadidae																					
<i>Unaspis citri</i>	Diaspididae									7					9					2	6	43
<i>Wasmannia auropunctata</i>	Formicidae								10											3	2	30=
<i>Xyleborus</i> spp.	Scolytidae			5																1	6	43=

**Table 5.** Ranking of the top 10 Pacific invertebrate pests, rating more than 10.

Order	Species	Cumulative rating	Number of entries in top 10
1	<i>Bactrocera</i> spp.	120	13
2	<i>Papuana</i> sp.	47	5
3	<i>Plutella xylostella</i>	45	9
4	<i>Othreis fullonia</i>	44	9
5	<i>Agonoxena argaula</i>	31	5
6	<i>Oryctes rhinoceros</i>	30	4
7 =	<i>Liriomyza</i> spp.	27	4
7 =	<i>Tarophagus proserpina</i>	27	4
9	<i>Bemisia argentifolii</i>	27	3
10	<i>Spodoptera litura</i>	26	5
11	<i>Aphis gossypii</i>	21	6
12 =	<i>Pentalonia nigronervosa</i>	21	4
12 =	<i>Helicoverpa armigera</i>	21	4
14	<i>Thrips palmi</i>	21	3
15	<i>Crocidolomia pavonana</i>	20	4
16	<i>Achatina fulica</i>	20	2
17	<i>Brontispa longissima</i>	19	4
18	<i>Icerya aegyptiaca</i>	19	2
19	<i>Cylas formicarius</i>	18	7
20	<i>Nacoleia octasema</i>	18	3
21 =	<i>Scapanes australis</i>	18	2
21 =	<i>Aspidiotus destructor</i>	18	2
23	<i>Epilachna</i> spp.	17	4
24 =	<i>Adoretus versutus</i>	16	4
24 =	<i>Cosmopolites sordidus</i>	16	4
26 =	<i>Aleurodicus dispersus</i>	16	3
27	<i>Neotermes rainbowi</i>	16	2
28 =	<i>Phyllocoptes citrella</i>	11	2
28 =	<i>Planococcus pacificus</i>	11	2

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**Table 6**

Too much emphasis should not be placed on any one method of evaluating the significance of the subjective opinions of country experts. As a third approach to selecting the pests of greatest concern and as a means of testing the validity of the top 10 selection, the entries for the top five in **Table 4** were considered.

For this exercise,

Priority 1 was assigned a value of	5	
2	"	4
3	"	3
4	"	2
5	"	1

and the values added for each species to obtain its score (**Table 6**).

It is interesting that as many as 44 of the 70 top-10 species appear in the top-5 ratings of at least one country; also that only one species (*Cosmopolites sordidus*) that made the short list of 29 top-10 species (**Table 5**) does not

appear in the top-5 list in any country, although it rated very highly overall. It can be seen (from the last column in **Table 6**) that the vast majority of high-rating top-5 species also occupy a similarly high rating in the top-10 list. It is tempting to postulate the reasons for the differences in priority order obtained by the different approaches. However, to do so would probably be to rely on there being a precision in the lists that does not exist. Suffice it to conclude that some 30 major Pacific pests have been identified and that the most important species figure near the top of the rankings by all three methods. Any further narrowing of the choice of target pests must now depend upon taking into account other factors, notably not only those outlined in the Introduction but also on assessment of the prospects for successful biological control, which includes whether or not it has been successful elsewhere.

**Table 6** Ranking of the top 5 invertebrate pests of agriculture.

Order	Species	Score	Entries in top 5	Order in top 10
1	<i>Bactrocera spp.</i>	55	13	1
2	<i>Papuana sp.</i>	22	5	2
3	<i>Oryctes rhinoceros</i>	15	4	6
4	<i>Bemisia argentifolii</i>	12	3	9
5	<i>Othreis fullonia</i>	10	4	4
6	<i>Agonoxena argaula</i>	10	3	5
7	<i>Achatina fulica</i>	10	2	16
8 =	<i>Aleurodicus dispersus</i>	9	3	26
8 =	<i>Liriomyza spp.</i>	9	3	7 =
10	<i>Icerya aegyptiaca</i>	9	2	18
11	<i>Tarophagus proserpina</i>	8	3	7 =
12 =	<i>Aspidiota destructor</i>	8	2	21 =
12 =	<i>Scapanes australis</i>	8	2	21 =
12 =	<i>Thrips palmi</i>	8	2	14
15	<i>Nacoleia octasema</i>	7	2	20
16	<i>Neotermes rainbowi</i>	6	2	26 =
17	<i>Plutella xylostella</i>	5	3	3
18	<i>Spodoptera litura</i>	5	2	10
19	<i>Pentalonia nigronervosa</i>	4	2	12 =
20 =	<i>Aphis gossypii</i>	4	1	11
20 =	<i>Orchamoplatus mammaeferus</i>	4	1	
22	<i>Helicoverpa armigera</i>	3	2	12 =
23 =	<i>Adoretus versutus</i>	3	1	24 =
23 =	<i>Graeffea crouanii</i>	3	1	
23 =	<i>Phylloconistis citrella</i>	3	1	28
23 =	<i>Pericyma cruegeri</i>	3	1	
23 =	<i>Promecotheca opacicollis</i>	3	1	
23 =	<i>Trialeurodes vaporariorum</i>	3	1	
23 =	<i>Wasmannia auropunctata</i>	3	1	
30	<i>Crocidolomia pavonana</i>	2	2	15
31 =	<i>Aonidiella aurantii</i>	2	1	
31 =	<i>Bemisia tabaci</i>	2	1	
31 =	<i>Brontispa longissima</i>	2	1	17
31 =	<i>Metrionia circumdata</i>	2	1	
31 =	<i>Oribius sp.</i>	2	1	
31 =	<i>Planococcus pacificus</i>	2	1	28 =
37 =	<i>Chrysodeixis eriosoma</i>	1	1	
37 =	<i>Cylas formicarius</i>	1	1	19
37 =	<i>Epilachna spp.</i>	1	1	23
37 =	<i>Nilaparvata lugens</i>	1	1	
37 =	<i>Ostrinia furnacalis</i>	1	1	
37 =	<i>Pinnaspis strahani</i>	1	1	
37 =	<i>Podagrica basselae</i>	1	1	
37 =	<i>Xyleborus sp.</i>	1	1	

**Table 7** Forest plantation trees (actual or potential) in the southern and western Pacific (numbers in brackets indicate importance).

Species	Family	Common name	Countries	
			Individual	Overall
<i>Acacia aulacocarpa</i> A. Cunn. ex Benth.	Mimosaceae	hickory wattle	PNG (1)	
<i>Acacia auriculiformis</i> A. Cunn. ex Benth.	Mimosaceae	ear-pod wattle	Guam (3)	+++
<i>Acacia confusa</i> Merrill	Mimosaceae		Guam (1)	
<i>Acacia crassicarpa</i> A. Cunn. ex Benth.	Mimosaceae	lancewood	PNG (1)	+
<i>Acacia mangium</i> Willd.	Mimosaceae	brown sandalwood	Cook I (1); Guam (3); PNG (3); Sol I (3)	+++
<i>Adenanthera pavonina</i> L.	Mimosaceae	red beantree	A Sam (2)	
<i>Agathis macrophylla</i> (Lindl.) Mast.	Araucariaceae	Vanikors kauri	N. Cal (3); PNG (1); Sol I (3); Van (1)	+++
<i>Agathis moorei</i> (Lindl.) Mast.	Araucariaceae		Fr P (1); N. Cal (2); PNG (1)	+
<i>Agathis robusta</i> (C. Moore ex F. Muell.) F.M. Bail.	Araucariaceae		PNG (1); Tonga (2)	
<i>Agathis vitiensis</i> (Seem.) Benth. & Hook. f. ex Drake	Araucariaceae	dakua makadre	Fiji (3)	+++
<i>Albizia</i> sp.	Mimosaceae	albizia	N. Cal (1); Sol I (2)	+
<i>Anthocephalus chinensis</i> (Lam.) A. Rich. ex Walp.	Rubiaceae	laran	Fiji (1)	+
<i>Araucaria cunninghamii</i> Aiton ex D. Don.	Araucariaceae	hoop pine	PNG (3); Sol I (3)	+++
<i>Araucaria hunsteinii</i> K. Schum.	Araucariaceae	klinkii pine	PNG (3); Sol I (3)	+++
<i>Azadirachta indica</i> A. Juss.	Meliaceae	neem	Guam (1); PNG (1)	
<i>Barringtonia asiatica</i> (L.) Kurz	Barringtoniaceae		Fr P (2); Sol I (?)	+
<i>Calophyllum inophyllum</i> L.	Clusiaceae	beach calophyllum, dilo	Guam (1); N. Cal (1); Sol I (1)	
<i>Calophyllum papuanum</i> Laut.	Clusiaceae	calophyllum	PNG (1)	
<i>Calophyllum vitiense</i> Turrill	Clusiaceae	calophyllum, damanu	Fiji (3); Sol I (1)	+++
<i>Camponosperma brevipetiolata</i> Volk.	Anacardiaceae	camponosperma	Sol I (2)	+
<i>Casuarina equisetifolia</i> J.R. & G. Forst.	Casuarinaceae	casuarina, velau	Cook I (1); Fr P (2); Guam (2); Sol I (1)	+
<i>Cedrela odorata</i> L.	Meliaceae		American Samoa (2)	
<i>Cordia alliodora</i> (Ruiz & Pavon) Cham. ex DC	Boraginaceae	salmwood, laurel, cypre	Fiji (1); PNG (2); Sol I (3); Van (1)	+++
<i>Cordia subcordata</i> Lam. & Poiret	Boraginaceae	sea trumpet	Fr P (2)	
<i>Dacrydium nidulum</i> de Laubenfels	Podocarpaceae	yaka	Fiji (3); PNG (1)	++

**Table 7 (cont'd)** Forest plantation trees (actual or potential) in the southern and western Pacific (numbers in brackets indicate importance).

Species	Family	Common name	Countries	
			Individual	Overall
<i>Decussocarpus vitiensis</i> (Seem.) de Laubenfels	Podocarpaceae	dakua salusalu	Fiji (3)	++
<i>Endospermum macrophyllum</i> (Muell. Arg.) Pax et K. Hoffm.	Euphorbiaceae	kauvula	Fiji (3)	++
<i>Endospermum medullosum</i> L. S. Sm.	Euphorbiaceae	basswood	Sol I (2); Van (3)	++
<i>Eucalyptus deglupta</i> Bl.	Myrtaceae	kamarere	Guam (1); Pohn (1); PNG (2); W. Sam (1); Sol I (3); Van (1)	++
<i>Eucalyptus grandis</i> W. Hill ex Maiden	Myrtaceae	flooded gum, rose gum	PNG (3); Sol I (3)	+++
<i>Eucalyptus pellita</i> F. Muell.	Myrtaceae	red mahogany	W. Sam. (2)	+++
<i>Eucalyptus robusta</i> Smith	Myrtaceae	swamp mahogany	PNG (3)	+
<i>Eucalyptus tereticornis</i> Smith	Myrtaceae	forest red gum	W. Sam. (2)	
<i>Garcinia myrtifolia</i> A. C. Sm.	Clusiaceae	laubu	Fiji (3)	++
<i>Gmelina arborea</i> L.	Verbenaceae	yemane	Sol I (3)	++
<i>Gmelina vitiensis</i> (Seem) A.C. Sm.	Verbenaceae	rosawa	Fiji (2)	+
<i>Gonostylus punctatus</i> A. C. Sm.	Gonystylaceae	mauota	Fiji (1)	+
<i>Grevillea robusta</i> Cunn. ex R. Br.	Proteaceae	silky oak	N. Cal (1); Tonga (1)	
<i>Heritiera ornithocephala</i> Kosterm.	Sterculiaceae	rogi, rosarosa	Fiji (2)	+
<i>Intsia bijuga</i> (Colebr.) O. Kuntze		ifilele	A. Sam. (2); Guam (1); N. Cal (2)	+
<i>Khaya senegalensis</i> (Desr.) A.H.L. Juss.	Meliaceae	African (Gambian) mahogany	Fr P (1)	+
<i>Maesopsis eminii</i> Engl.	Rhamnaceae		Fiji (1)	
<i>Myristica castaneifolia</i> A. Gray	Myristicaceae	kaudamu	Fiji (3)	++
<i>Ochroma lagopus</i> Sw.	Bombacaceae	balsa	PNG (3)	++
<i>Octomeles (= Erina) sumatrana</i> Mig.	Tetramelaceae		PNG (1)	+
<i>Palaquium hornei</i> (Hartog & Bak.) Dubard	Sapotaceae	sacau	Fiji (2)	+
<i>Palaquium porphyreum</i> A.C. Sm. & S. Darwin	Sapotaceae	bauvudi	Fiji (2)	+
<i>Pinus caribaea</i> Morelet, var <i>hondurensis</i> Barrett & Golffarr	Pinaceae	Caribbean pine	Cook I (3); Fiji (2); Fr P (3); N. Cal (3); PNG (1); Sol I (3); Tonga (2); Van (2); W.F. (3)	+++
<i>Pinus chiapensis</i> (L.)	Pinaceae		PNG (2)	+
<i>Pinus elliottii</i> Engelm.	Pinaceae	slash pine	PNG (3)	++

**Table 7 (cont'd)** Forest plantation trees (actual or potential) in the southern and western Pacific (numbers in brackets indicate importance).

Species	Family	Common name	Countries	
			Individual	Overall
<i>Pinus merkusii</i> Jungh. et De Vriese	Pinaceae	Mindoro pine	PNG (1)	+
<i>Pinus patula</i> Schldl. and Cham.	Pinaceae		Fr P (1), PNG (3); Sol I (3)	+++
<i>Pometia pinnata</i> J. R et G. Forst. f	Sapindaceae	taun	Fr P (2); A. Sam. (2)	++
<i>Pterocarpus indicus</i> Willd.	Papilionaceae	New Guinea rosewood, narra	Guam (3)	
<i>Securinega flexuosa</i> (Muell. Arg.)	Euphorbiaceae	poumuli	A. Sam. (2); W. Sam (3)	+++
<i>Swietenia macrophylla</i> King	Meliaceae	American mahogany	Fiji (3); Fr P (3); Guam (3); Niue (3); Pohn (1); Sol I (3); Tonga (2); W. Sam. (3); Van (1)	+++
<i>Tectona grandis</i> L. f.	Verbenaceae	teak	Fr P (1); Niue (1); PNG (3); Pohn (1); Sol I (3)	+++
<i>Terminalia brassii</i> Exell	Combretaceae	brown terminalia	Fr P (1); PNG (3); Sol I (3)	++
<i>Terminalia calamansanai</i> (Blco.) Rolfe	Combretaceae	yellow-brown terminalia	Sol I (3); W. Sam (2)	+++
<i>Terminalia catappa</i> L.	Combretaceae	Indian almond	Fr P (1); Sol I (1); Van (2)	+
<i>Toona australis</i> (F. Muell.) Harms	Meliaceae	Australian red cedar	Niue (3); W. Sam (1); Sol I (2); Tonga (2)	++

**Table 8** The major arthropod pests of plantation forests in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal trees attacked
<i>Acalolepta</i> spp.	Coleoptera	Cerambycidae	longhorn beetles	many species
<i>Acrocercops</i> sp.	Lepidoptera	Gracillariidae		<i>Terminalia catappa</i>
<i>Adoxophyes aurantiana</i> Bradley	Lepidoptera	Tortricidae		<i>Terminalia</i> , <i>Campnosperma</i> , <i>Calophyllum</i> , <i>Acacia</i> , <i>Albizia</i>
<i>Adoxophyes fasciculana</i> (Walker)	Lepidoptera	Tortricidae		<i>Araucaria cunninghamii</i>
<i>Agathiphaga vitiensis</i> Dumbleton	Lepidoptera	Agathiphagidae		<i>Agathis macrophylla</i> , <i>A. obtusa</i> , <i>A. vitiensis</i>
<i>Agrilus opulentus</i> Kerremans	Coleoptera	Buprestidae	varicose borer	<i>Eucalyptus deglupta</i>
<i>Agrilus viridissimus</i> Cobos	Coleoptera	Buprestidae		<i>Terminalia brassii</i>
<i>Amblypelta cocophaga</i> China	Hemiptera	Coreidae	coconut bug	<i>Eucalyptus deglupta</i> , <i>Campnosperma brevipetiolata</i> , coconut
<i>Aonidiella eremocitri</i> McKenzie	Hemiptera	Diaspididae		<i>Campnosperma brevipetiolata</i> , <i>Barringtonia</i>
<i>Arispoda</i> sp.	Coleoptera	Chrysomelidae		<i>Tectona grandis</i>
<i>Ascalenia</i> sp.	Lepidoptera	Cosmopterigidae		<i>Albizia</i> , <i>Pometia</i>
<i>Aspidiotus destructor</i> (Signoret)	Hemiptera	Diaspididae	coconut scale, transparent scale	coconut, <i>Barringtonia</i> , <i>Calophyllum</i>
<i>Asterolecanium</i> sp.	Hemiptera	Asterolecaniidae		<i>Cordia subcordata</i>
<i>Asterolepis glycera</i> (Meyrick)	Lepidoptera	Tortricidae		<i>Terminalia</i>
<i>Asymplecta phobiophora</i> Diakonoff	Lepidoptera	Lyonetiidae		<i>Campnosperma</i> , <i>Ochroma lagopus</i> , <i>Terminalia</i>
<i>Badamia exclamationis</i> (Fabricius)	Lepidoptera	Hesperiidae	brown awl	<i>Terminalia calamansanai</i> <i>T. catappa</i> , <i>T. brassii</i>
<i>Ceroplastes rubens</i> Maskell	Hemiptera	Coccidae	pink wax scale	<i>Pinus caribaea</i> , <i>Barringtonia</i>
<i>Chrysomphalus aonidum</i> (Linnaeus)	Hemiptera	Diaspididae	circular black scale	<i>Pinus caribaea</i>
<i>Chrysomphalus dictyospermi</i> Morgan	Hemiptera	Diaspididae	dictyosperma scale	<i>Pinus</i> , <i>Calophyllum</i> , <i>Terminalia</i> , <i>Barringtonia</i>
<i>Coccus hesperidum</i> Linnaeus	Hemiptera	Coccidae	soft brown scale	<i>Eucalyptus</i> , <i>Cordia</i> , <i>Casuarina</i> , <i>Pinus</i> , <i>Terminalia</i> , <i>Pometia</i>
<i>Coptotermes elisae</i> (Desneux)	Isoptera	Rhinotermitidae		<i>Araucaria cunninghamii</i> , <i>A. hunsteinii</i>
<i>Crossotarsus extermedentatus</i> (Fairmaire)	Coleoptera	Platypodidae		<i>Swietenia</i> , <i>Cordia</i> , <i>Terminalia</i> , <i>Eucalyptus</i> , etc.
<i>Cyphura bifasciata</i> (Butler)	Lepidoptera	Uraniidae		<i>Endospermum</i>
<i>Diotimana undulata</i> (Pascoe)	Coleoptera	Cerambycidae	hoop-pine longicorn	<i>Araucaria cunninghamii</i>
<i>Eriophyes casuarinae</i> Channabasavanna	(Acar)	Eriophyidae		<i>Casuarina equisetifolia</i>
<i>Eriophyes terminaliae</i> Channabasavanna	(Acar)	Eriophyidae		<i>Terminalia catappa</i>

**Table 8** (cont'd) The major arthropod pests of plantation forests in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal trees attacked
<i>Eucerocoris</i> sp.	Hemiptera	Miridae		<i>Campnosperma</i>
<i>Fabrichtilis australis</i> (Fabricius)	Hemiptera	Coreidae		<i>Araucaria, Eucalyptus, Tectona</i>
<i>Fabrichtilis gonagra</i> (Fabricius)	Hemiptera	Coreidae	passionvine bug	<i>Tectona grandis</i>
<i>Gryllotalpa africana</i> Beauvois	Orthoptera	Gryllotalpidae		<i>Tectona grandis</i>
<i>Homona coffearia</i> (Nietner)	Lepidoptera	Tortricidae	tea tortrix, coffee tortrix	<i>Acacia, Araucaria, Terminalia</i>
<i>Hyblaea puera</i> (Cramer)	Lepidoptera	Hyblaeidae	teak moth	<i>Tectona grandis, Spathodea</i>
<i>Hyblaea sanguinea</i> Gaede	Lepidoptera	Hyblaeidae		<i>Tectona grandis, Vitex</i>
<i>Hylurdretonus araucariae</i> Schedl	Coleoptera	Scolytidae		<i>Araucaria cunninghamii</i>
<i>Hylurdretonus piniarius</i> Schedl	Coleoptera	Scolytidae	hoop-pine bark beetle	<i>Araucaria cunninghamii</i>
<i>Hypothenemus birmanus</i> (Eichhoff)	Coleoptera	Scolytidae	kiawe scolytid	<i>Swietenia, Agathis, Casuarina</i>
<i>Hypothenemus eruditus</i> (Westwood)	Coleoptera	Scolytidae		<i>Swietenia, Tectona, Pterocarpus</i>
<i>Hypsipyla robusta</i> (Moore)	Lepidoptera	Pyralidae	cedar shoot caterpillar	<i>Swietenia, Toona, Cedrela</i>
<i>Icerya purchasi</i> Maskell	Hemiptera	Margarodidae	cottony cushion scale	<i>Casuarina equisetifolia, Pinus caribaea</i>
<i>Icerya seychellarum</i> (Westwood)	Hemiptera	Margarodidae	Seychelles mealybug	<i>Ficus, Albizia, Calophyllum, Tectona</i>
<i>Ips</i> sp.	Coleoptera	Scolytidae		
<i>Leptynoptera sulfurea</i> Crawford	Hemiptera	Psyllidae		<i>Calophyllum inophyllum</i>
<i>Lymantria flavoneura</i> Joicey	Lepidoptera	Lymantriidae		<i>Pinus patula</i>
<i>Lymantria ninayi</i> Bethune-Baker	Lepidoptera	Lymantriidae		<i>Pinus patula, P. radiata</i>
<i>Microcerotermes biroi</i> (Desneaux)	Isoptera	Termitidae		<i>Eucalyptus deglupta, Araucaria</i>
<i>Mictis profana</i> (Fabricius)	Hemiptera	Coreidae	crusader bug	<i>Acacia aulacocarpa</i>
<i>Milionia isodoxa</i> Prout	Lepidoptera	Geometridae		<i>Araucaria cunninghamii</i>
<i>Mussidia pectinicornela</i> Hampson	Lepidoptera	Pyralidae		<i>Eucalyptus grandis</i>
<i>Nasutitermes novarum-hebridarum</i> (Holmgren and Holmgren)	Isoptera	Termitidae		<i>Eucalyptus deglupta, Tectona, Acacia mangium</i>
<i>Neotermes</i> sp.	Isoptera	Kalotermitidae		<i>Calophyllum, Garcinia, Gonostylus, Heritiera, Myristica, Palaquium, Swietenia</i>
<i>Oceanaspisidiotus araucariae</i> (Adachi and Fullaway)	Hemiptera	Diaspididae		<i>Araucaria cookii</i>
<i>Ophiusa coronata</i> (Fabricius)	Lepidoptera	Noctuidae		<i>Terminalia</i>

**Table 8** (cont'd) The major arthropod pests of plantation forests in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal trees attacked
<i>Oribius destructor</i> Marshall	Coleoptera	Curculionidae		<i>Eucalyptus deglupta</i> , <i>Araucaria cunninghamii</i>
<i>Oribius inimicus</i> Marshall	Coleoptera	Curculionidae		<i>Eucalyptus deglupta</i> , <i>Araucaria</i> , <i>Pinus</i>
<i>Orthotomicus erosus</i> (Wollaston)	Coleoptera	Scolytidae		<i>Pinus</i>
<i>Oxymagis horni</i> (Heller)	Coleoptera	Cerambycidae		<i>Eucalyptus deglupta</i> , <i>Terminalia calamansanai</i> , <i>Albizia</i> , <i>Gmelina</i> , etc.
<i>Pachypeltis</i> sp.	Hemiptera	Miridae		<i>Terminalia</i>
<i>Pantorhytes</i> sp.	Coleoptera	Curculionidae		<i>Ochroma lagopus</i>
<i>Paratella errudita</i> Melichar	Hemiptera	Flatidae		<i>Eucalyptus deglupta</i>
<i>Parectopa</i> sp.	Lepidoptera	Gracillariidae		<i>Terminalia catappa</i>
<i>Phytorus lineolatus</i> Weise	Coleoptera	Chrysomelidae		<i>Calophyllum inophyllum</i>
<i>Pinnaspis aspidistrae</i> (Signoret)	Hemiptera	Diaspididae	fern scale	<i>Anacardium occidentale</i> , <i>Terminalia catappa</i>
<i>Pinnaspis strachani</i> (Cooley)	Hemiptera	Diaspididae		<i>Terminalia</i> , coconut
<i>Planococcus lilacinus</i> (Cockerell)	Hemiptera	Pseudococcidae	coffee mealybug	<i>Terminalia catappa</i>
<i>Platypus gerstaeckeri</i> Chapuis	Coleoptera	Platypodidae		<i>Swietenia macrophylla</i> , <i>Agathis</i> , <i>Calophyllum</i> , <i>Endospermum</i> , <i>Garcinia</i> , <i>Gonostylus</i> , <i>Heritiera</i> , <i>Myristica</i> , <i>Palaquium</i> , etc.
<i>Platypus jansoni</i> Chapuis	Coleoptera	Platypodidae		<i>Agathis</i> , <i>Araucaria</i>
<i>Pternistria levipes</i> Horváth	Hemiptera	Coreidae		<i>Tectona grandis</i>
<i>Pternistria macromera</i> Guerin	Hemiptera	Coreidae		<i>Tectona grandis</i>
<i>Ptochophyle innotata</i> Warren	Lepidoptera	Geometridae		<i>Terminalia calamansanai</i>
<i>Ptochophyle strigata</i> Warren	Lepidoptera	Geometridae		<i>Terminalia brassi</i>
<i>Rhyparida coriacea</i> Jacoby	Coleoptera	Chrysomelidae		<i>Eucalyptus deglupta</i>
<i>Saissetia coffeae</i> (Walker)	Hemiptera	Coccidae	coffee scale	<i>Barringtonia</i>
<i>Saissetia oleae</i> (Olivier)	Hemiptera	Coccidae	black scale	<i>Erythrina</i>
<i>Selenothrips rubrocinctus</i> Giard	Thysanoptera	Thripidae	redbanded thrips	<i>Terminalia catappa</i>
<i>Semiothisa abydata</i> (Guenée)	Lepidoptera	Geometridae		<i>Albizia</i>
<i>Syplete derogata</i> (Fabricius)	Lepidoptera	Pyralidae		<i>Campnosperma brevipetiolata</i> , <i>Ochroma lagopus</i>
<i>Trigonops</i> sp.	Coleoptera	Curculionidae		<i>Terminalia</i> , <i>Gmelina</i> , <i>Swietenia</i> , <i>Horsfieldia</i>
<i>Trigonops inusitata</i> Zimmerman	Coleoptera	Curculionidae		<i>Calophyllum inophyllum</i>
<i>Trigonops vulgaris</i> Zimmerman	Coleoptera	Curculionidae		<i>Terminalia catappa</i>

**Table 8** (cont'd) The major arthropod pests of plantation forests in the southern and western Pacific.

Scientific name	Order	Family	English common name	Principal trees attacked
<i>Unaspis citri</i> (Comstock)	Hemiptera	Diaspididae	white louse scale, citrus snow scale	<i>Toona australis</i>
<i>Uraba (=Roeselia) lignifera</i> (Walker)	Lepidoptera	Nolidae		<i>Terminalia</i>
<i>Uapteroides astheniata</i> (Guenée)	Lepidoptera	Uraniidae		<i>Endospermum</i>
<i>Vanapa oberthuri</i> Pouillaude	Coleoptera	Curculionidae		<i>Araucaria cunninghamii</i>
<i>Wasmannia auropunctata</i> (Roger)	Hymenoptera	Formicidae	little red fire ant (protects scale insects)	
<i>Westermannia gloriosa</i> Hampson	Lepidoptera	Noctuidae		<i>Terminalia</i>
<i>Xyleborus ferrugineus</i> (Fabricius)	Coleoptera	Scolytidae		<i>Swietenia, Agathis, Endospermum, Garcinia, Heritiera, Myristica, Palaquium, Pinus</i>
<i>Xyleborus perforans</i> (Wollaston)	Coleoptera	Scolytidae	island pinhole borer	<i>Agathis, Calophyllum, Endospermum, Garcinia, Myristica, Palaquium, Pinus, Campnosperma, Terminalia, Cedrela, Eucalyptus, Pometia, etc.</i>
<i>Xyleborus volvulus</i> (= <i>X. torquatus</i> ) (Fabricius)	Coleoptera	Scolytidae		<i>Swietenia, Pinus, Cedrela, Cordia</i>
<i>Xyleutes ceramicus</i> (Walker)	Lepidoptera	Cossidae	teak beehole borer	<i>Gmelina, Tectona</i>
<i>Xylosandrus compactus</i> (Eichhoff)	Coleoptera	Scolytidae	black twig borer	<i>Pometia, Melia, Swietenia, Pinus</i>
<i>Xylosandrus morigerus</i> (Blandford)	Coleoptera	Scolytidae	brown twig borer	<i>Swietenia</i>
<i>Xylotrupes gideon</i> (Linnaeus)	Coleoptera	Scarabaeidae	elephant beetle	<i>Eucalyptus, Toona, Fraxinus</i>
<i>Zeuzera coffeae</i> Nietner	Lepidoptera	Cossidae	red coffee borer	<i>Eucalyptus deglupta, Albizia Casuarina, Swietenia, Tectona, Terminalia</i>

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**Table 9**

In spite of the limited number of entries in this table, it seems likely that the top-ranking five species (*Crossotarsus externdentatus*, *Hypsipyla robusta*, *Uraba lignifera*, *Unaspis citri*, *Xyleborus perforans*) will remain among the group of most important pests when additional entries are made. It is fortunate that they are believed to have evolved elsewhere and that there are regions where they appear to be of minor importance, suggesting that they may be suitable targets for biological control. For example, the top-ranking species, the platypodid *Crossotarsus externdentatus*, occurs in East Africa and ranges in Southern Asia from Sri Lanka and India to the Philippines, Taiwan and Japan. However, it is

not listed in a recent review of important pests of Asian plantation trees (Day et al. 1994), indicating its low status in this vast region. On the other hand, there have been comparatively few classical biological control successes against pest Coleoptera, so the prospects for successful biological control would need to be carefully evaluated before selecting it as a target. The fifth species (*Xyleborus perforans*) has a very wide tropical distribution including Central and South America, tropical Africa, India, Southeast Asia and the Pacific. Dead or dying trees, fresh logs and newly sawn timber are the usual targets, but it is known to attack living trees (Bigger 1988).

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**Table 9.** The distribution and importance of the major arthropod pests of plantation forests in the southern and western Pacific (+++ very important and widespread; ++ important; + of lesser importance; P present, but unimportant; • recorded, but importance not known).

**Table 9.** (cont'd) The distribution and importance of the major arthropod pests of plantation forests in the southern and western Pacific (+++ very important and widespread; ++ important; + of lesser importance; P present, but unimportant; • recorded, but importance not known).

**Table 9.** (cont'd) The distribution and importance of the major arthropod pests of plantation forests in the southern and western Pacific (+++ very important and widespread; ++ important; + of lesser importance; P present, but unimportant; • recorded, but importance not known).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	Order
<i>Pantorhytes</i> sp.	Curculionidae										+									1	
<i>Paratella errudita</i>	Flatidae										P										
<i>Parectopa</i> sp.	Gracillariidae					P															
<i>Phytorus lineolatus</i>	Chrysomelidae					+++														3	
<i>Pinnaspis aspidistrae</i>	Diaspididae	•	P	•			•			•	•										
<i>Pinnaspis strachani</i>	Diaspididae	•	P	•		•	•		•	•	•			•	•	•	•	•	•		
<i>Planococcus lilacinus</i>	Pseudococcidae					•	P				•										
<i>Platypus gerstaeckeri</i>	Platypodidae		+++																	3	
<i>Platypus jansoni</i>	Platypodidae										+++									3	
<i>Pternistria levipes</i>	Coreidae										++									2	
<i>Pternistria macromera</i>	Coreidae										++									2	
<i>Ptochophyle innotata</i>	Geometridae													++						2	
<i>Ptochophyle strigata</i>	Geometridae													++						2	
<i>Rhyparida coriacea</i>	Chrysomelidae										++									1	
<i>Saissetia coffeae</i>	Coccidae										+++									4	
<i>Saissetia oleae</i>	Coccidae	+	•	•						•	•			•							
<i>Selenothrips rubrocinctus</i>	Thripidae		•	•	P						•			•							
<i>Semiothisa abydata</i>	Geometridae					+														1	
<i>Syllepte derogata</i>	Pyralidae										+			++						3	
<i>Trigonops</i> sp.	Curculionidae					•	+													1	
<i>Trigonops inusitata</i>	Curculionidae						+							+	+	+				1	
<i>Trigonops vulgaris</i>	Curculionidae						+													1	
<i>Unaspis citri</i>	Diaspididae	•	++	•		•	•		•	•	++	•	+	++		•		++	•	9	2 =
unidentified	(Scolytinae) Curculionidae											++								2	
<i>Uraba</i> (= <i>Roeselia</i> ) <i>lignifera</i>	Nolidae										+++			+++				++		8	5
<i>Urapteroides aestheniata</i>	Uraniidae		•											+				+		2	
<i>Vanapa oberthuri</i>	Curculionidae										+++									3	
<i>Wasmannia auropunctata</i>	Formicidae	•							+++					•				•		3	

Legend: + and +++; P and +++ indicate very important and widespread; + indicates important; + of lesser importance; P present, but unimportant; • recorded, but importance not known.

**Table 9.** (cont'd) The distribution and importance of the major arthropod pests of plantation forests in the southern and western Pacific (+++ very important and widespread; ++ important; + of lesser importance; P present, but unimportant; • recorded, but importance not known).

Species	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. +s	Order
<i>Westermannia gloriosa</i>	Noctuidae													++						2	
<i>Xyleborus ferrugineus</i>	Scolytidae	•	++	•					++	•			+							5	
<i>Xyleborus perforans</i>	Scolytidae	•	+++	•	•	•	•	•	•	•	+++	•	+	++	•	•				9	2 =
<i>Xyleborus volvulus</i>	Scolytidae	+++																		3	
<i>Xyleutes ceramicus</i>	Cossidae																			3 =	
<i>Xylosandrus compactus</i>	Scolytidae		++																	3	
<i>Xylosandrus morigerus</i>	Scolytidae		++																	4	
<i>Xylotrupes gideon</i>	Scarabaeidae											++								2	
<i>Zeuzera coffeae</i>	Cossidae											+								2	

Legend for symbols used in the distribution maps:  
 + = present but not recorded  
 ++ = present and recorded  
 +++ = present and very important  
 \* = present and importance not known  
 P = present but unimportant

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## Table 10

In this table the origin, or presumed origin, of the major invertebrate pests scoring 10+ or more (**Table 3**) is given where possible. Where a species has long been widespread it is often difficult to presume its origin, although detailed study of the literature on it and related species may well add further precision, particularly if supplemented by information on its specific (or reasonably specific) natural enemies. Experience has shown that the largest number

of these usually occur in the area of origin of a species. Also, if a phytophagous pest is specific, or reasonably specific, to a particular host plant, it is quite likely that it originated in the same region as that plant.

In general, those pests that originated outside the oceanic Pacific are far more likely to be suitable targets for classical biological control than those native to the region.

**Table 10** Presumed origins of the major invertebrate pests in the southern and western Pacific, scoring 10+ or more (see Tables 3 and 9).

	Species	Family	Origin
1.	<i>Achatina fulica</i>	Achatinidae	East Africa
2.	<i>Adoretus versutus</i>	Scarabaeidae	India
3.	<i>Agonoxena argaula</i>	Agonoxenidae	Southwest Pacific
4.	<i>Aleurodicus dispersus</i>	Aleyrodidae	Central America
5.	<i>Aphis craccivora</i>	Aphididae	Southeastern Europe
6.	<i>Aphis gossypii</i>	Aphididae	Southeastern Europe
7.	<i>Aspidiota destructor</i>	Diaspididae	
8.	<i>Aulacophora</i> spp.	Chrysomelidae	Malaysia-Australia
9.	<i>Bactrocera</i> spp.	Tephritidae	Some Pacific, others Southeast Asia or Australia
10.	<i>Bemisia argentifolii</i>	Aleyrodidae	? Caribbean
11.	<i>Bemisia tabaci</i>	Aleyrodidae	India
12.	<i>Brontispa longissima</i>	Chrysomelidae	Indonesia-PNG
13.	<i>Ceroplastes rubens</i>	Coccidae	China
14.	<i>Coccus viridis</i>	Coccidae	(Tropicopolitan)
15.	<i>Cosmopolites sordidus</i>	Curculionidae	Indo-Malaysian region
16.	<i>Crocidolomia pavonana</i>	Pyralidae	(Africa-Asia)
17.	<i>Crossotarsus extermenedentatus</i>	Platypodidae	Southern Asia
18.	<i>Cylas formicarius</i>	Apionidae	Indo-Malaysian region
19.	<i>Dysmicoccus brevipes</i>	Pseudococcidae	Central or South America
20.	<i>Earias vittella</i>	Noctuidae	Southeast Asia
21.	<i>Epilachna</i> spp.	Coccinellidae	Southeast Asia
22.	<i>Eusceps postfasciatus</i>	Curculionidae	South America
23.	<i>Graeffea crouanii</i>	Phasmatidae	Southwest Pacific
24.	<i>Halticus tibialis</i>	Miridae	Southeast Asia
25.	<i>Helicoverpa armigera</i>	Noctuidae	Old World tropics
26.	<i>Hellula</i> spp.	Pyralidae	
27.	<i>Hippotion celerio</i>	Sphingidae	Africa or Asia
28.	<i>Hypsipyla robusta</i>	Pyralidae	not Pacific

(cont'd over)

**Table 10** (cont'd) Presumed origins of the major invertebrate pests in the southern and western Pacific, scoring 10+ or more (see Tables 3 and 9).

	Species	Family	Origin
29.	<i>Liriomyza</i> spp.	Agromyzidae	Southern USA – Northern South America
30.	<i>Maruca vitrata</i>	Pyralidae	possibly South America
31.	<i>Nacoleia octasema</i>	Pyralidae	Malaysia – ? Vanuatu
32.	<i>Nezara viridula</i>	Pentatomidae	Ethiopia
33.	<i>Oryctes rhinoceros</i>	Scarabaeidae	India – Indonesia
34.	<i>Othreis fullonia</i>	Noctuidae	Indonesia – Malaysia – PNG
35.	<i>Papuana</i> spp.	Scarabaeidae	Papua New Guinea – Solomon Is
36.	<i>Pentalonia nigronervosa</i>	Aphidiidae	Southeast Asia
37.	<i>Phylloconistis citrella</i>	Gracillariidae	(tropical Asia)
38.	<i>Phyllocoptrupa oleivora</i>	Eriophyidae	Asia
39.	<i>Planococcus pacificus</i>	Pseudococcidae	? probably introduced to Pacific
40.	<i>Plutella xylostella</i>	Yponomeutidae	Southern Europe
41.	<i>Polyphagotarsonemus latus</i>	Tarsonemidae	? tropical Africa
42.	<i>Rhabdoscelus obscurus</i>	Curculionidae	? PNG
43.	<i>Spodoptera litura</i>	Noctuidae	(India – Australia)
44.	<i>Tarophagus proserpina</i>	Delphacidae	Pacific
45.	<i>Tetranychus lambi</i>	Tetranychidae	Australia – Pacific
46.	<i>Tetranychus marianae</i>	Tetranychidae	Central and South America
47.	<i>Thrips palmi</i>	Thripidae	Southeast Asia
48.	<i>Unaspis citri</i>	Diaspididae	Southeast Asia
49.	<i>Uraba lignifera</i>	Nolidae	Australia
50.	<i>Xyleborus perforans</i>	Scolytidae	not Pacific

**Table 11** Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
<i>Acacia farnesiana</i> (L.) Willd.	Mimosaceae	mimosa bush	pasture, forests
<i>Acacia nilotica</i> (L.) Willd. ex Del.	Mimosaceae	prickly acacia	
<i>Achyranthes aspera</i> L.	Amaranthaceae	chafflower	disturbed forest
<i>Agave americana</i> L.	Agavaceae	century plant	
<i>Ageratum conyzoides</i> L.	Asteraceae	ageratum	gardens, field crops
<i>Alternanthera sessilis</i> (L.) R.Br. ex Roem & Schult	Amaranthaceae	sessile joyweed	taro, roadside ditches
<i>Amaranthus interruptus</i> R.Br.	Amaranthaceae	native amaranth	
<i>Amaranthus spinosus</i> L.	Amaranthaceae	spiny amaranth, spiny pigweed	vegetables
<i>Amaranthus viridis</i> (= <i>A. gracilis</i> ) L.	Amaranthaceae	slender amaranth, green amaranth	vegetables, cabbage
<i>Antigonon leptopus</i> Hook. & Arnott	Polygonaceae	mountain rose, Mexican creeper	fruit trees, roadsides
<i>Argemone mexicana</i> L.	Papaveraceae		
<i>Bidens alba</i> (L) DC.	Asteraceae	beggar's tick	vegetables, orchards, field crops
<i>Bidens pilosa</i> L.	Asteraceae	cobbler's pegs, beggar's tick	vegetables, orchards, field crops
<i>Blechum pyramidatum</i> (= <i>B. brownei</i> ) (Lam.) Urb.	Blechnaceae		
<i>Brachiaria mutica</i> (Forssk.) Stapf	Poaceae	para grass, buffalo grass	vegetables, wetlands
<i>Brachiaria reptans</i> (L)	Poaceae	running grass	vegetables, roadsides
<i>Brachiaria subquadriparia</i> (Trin.) Hitchc.	Poaceae	green summer grass	vegetables, lawn, roadside
<i>Broussonetia papyrifera</i> (L) Vent.	Urticaceae	paper mulberry	natural forest, roadsides
<i>Canavalia rosea</i> (Swartz) De Candolle	Fabaceae		sandy and rocky beaches
<i>Cardiospermum halicacabum</i> L.	Sapindaceae	balloon vine	hilly slopes
<i>Cassytha filiformis</i> L.	Lauraceae	dodder	coconut and pandanus seedlings, field crops, hedges
<i>Cecropia peltata</i> L.	Euphorbiaceae		
<i>Cenchrus echinatus</i> L.	Poaceae	sand burr	vegetables, coconut
<i>Chamaesyce</i> (= <i>Euphorbia</i> ) <i>hirta</i> (L) Millsp.	Euphorbiaceae	garden spurge, asthma plant	vegetables, bananas
<i>Chloris barbata</i> (L) Sw.	Poaceae	swollen fingergrass	pasture, roadsides
<i>Chromolaena odorata</i> (L) King & Robinson	Asteraceae	chromolaena, siam weed	gardens, natural vegetation
<i>Clerodendrum chinense</i> (= <i>C. philippinensis</i> ) (Osbeck) Mabberley	Verbenaceae	clerodendrum, Honolulu rose	field crops, roadsides, natural vegetation
<i>Clidemia hirta</i> (L) D. Don.	Melastomataceae	Koster's curse	pasture, native vegetation

**Table 11** (cont'd) Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
<i>Coccinia grandis</i> (L.) Voigt	Cucurbitaceae	ivy gourd, scarlet-fruited gourd	roadsides
<i>Commelinopsis benghalensis</i> L.	Commelinaceae	dayflower, hairy wandering jew	vegetables, field crops
<i>Commelinopsis diffusa</i> Burm. f.	Commelinaceae	spreading dayflower, commelina	vegetables, fruit trees
<i>Cordia subcordata</i> Lamark	Boraginaceae	cordia	forest thickets, sandy shores
<i>Crassocephalum crepidoides</i> Benth. (S. Moore)	Asteraceae		plantations, waste land
<i>Crotalaria pallida</i> Aiton	Fabaceae	smooth rattlepod, striped crotalaria	pasture, roadsides, waste land
<i>Crotalaria retusa</i> L.	Fabaceae		
<i>Cuphea carthagenensis</i> (Jacq.) Macbr.	Lythraceae	tarweed	
<i>Cynodon dactylon</i> (L) Pers	Poaceae	couch, bermuda grass	vegetables, field crops
<i>Cyperus rotundus</i> L.	Cyperaceae	nutgrass, nutsedge, purple nutsedge	gardens, field crops, lawns, taro
<i>Dactyloctenium aegyptium</i> (L) Willd.	Poaceae	crowfoot grass, beach wiregrass	disturbed places
<i>Desmodium incanum</i> DC.	Fabaceae	Spanish clover	lawns, roadsides
<i>Digitaria ciliaris</i> (Retz) Koeler	Poaceae	fingergrass, tropical crabgrass, common summergrass	pasture, field crops, roadsides
<i>Digitaria eriantha</i> (= <i>D. decumbens</i> ) Steudel	Poaceae	woolly finger grass	
<i>Digitaria insularis</i> (L) Mez ex Ekman	Poaceae	sour grass	pasture, waste places
<i>Digitaria setigera</i> Roth	Poaceae	itchy crabgrass	pasture, roadsides
<i>Echinochloa colona</i> (L) Link	Poaceae	jungle rice, awnless barnyard grass	rice, wet soils, disturbed areas
<i>Echinochloa crus-galli</i> (L) P. Beauv.	Poaceae	barnyard grass, watergrass	
<i>Eichhornia crassipes</i> (Mart.) Solms	Pontederiaceae	water hyacinth	lakes, rivers, waterways
<i>Eleocharis geniculata</i> (L) R.S.	Cyperaceae		rice, moist areas
<i>Elephantopus mollis</i> (= <i>E. scaber</i> ) Kunth	Asteraceae	elephant's foot, tobacco weed	vegetables, field crops, tree crops
<i>Eleusine indica</i> (L) Gaertner	Poaceae	crowsfoot grass, wiregrass, goosegrass	vegetables, field crops, lawns
<i>Eleutheranthera ruderalis</i> (Sw.) Sch.-Bip.	Asteraceae		
<i>Emilia sonchifolia</i> (L) DC.	Asteraceae	emilia, red tassel flower	
<i>Eragrostis tenella</i> (L) P. Beauv. ex Roem. & Schult.	Poaceae	feathery eragrostis, lovegrass	field crops, disturbed areas
<i>Euphorbia heterophylla</i> (= <i>E. geniculata</i> ) L.	Euphorbiaceae	painted spurge	field crops, roadside
<i>Fimbristylis cymosa</i> (= <i>F. atollensis</i> ) R. Br.	Cyperaceae		sweet potato, taro
<i>Fimbristylis dichotoma</i> (L) Vahl	Cyperaceae		sugarcane, lawns, wetlands
<i>Fimbristylis miliacea</i> (L) Vahl	Cyperaceae	grass-like fimbristylis, lesser fimbristylis	rice, moist places

**Table 11** (cont'd) Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
<i>Guettarda speciosa</i> L.	Rubiaceae		coconut
<i>Hydrilla verticillata</i> (L.f.) Royle	Hydrocharitaceae	water thyme	
<i>Hyptis pectinata</i> (L.) Poit.	Lamiaceae	comb hyptis	pastures
<i>Imperata conferta</i> (= <i>I. cylindrica</i> ) (Presl) Ohwi	Poaceae	blady grass	vegetables, field crops
<i>Indigofera suffruticosa</i> Mill.	Fabaceae	indigo	field crops, roadsides, waste land
<i>Ipomoea macrantha</i> Roem. & Schult.	Convolvulaceae		sweet potato, coconut seedlings
<i>Ischaemum</i> spp.	Poaceae		all crops
<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	cotton-leaved physic nut	
<i>Kyllinga brevifolia</i> Rottb.	Cyperaceae		
<i>Kyllinga nemoralis</i> (Forst.) Dandy ex Hutchinson & Dalziel	Cyperaceae		pasture, lawns, plantations
<i>Kyllinga polyphylla</i> Willd. ex Kunth	Cyperaceae	navua sedge	pasture, agricultural land
<i>Lantana camara</i> L.	Verbenaceae	lantana	pasture, gardens, waste lands
<i>Leucaena leucocephala</i> (Lam.) de Wit	Mimosaceae	wild tamarind, leucaena	pasture, roadsides, waste lands
<i>Ludwigia octovalvis</i> (= <i>Jussiaea suffruticosa</i> ) (Jacq.) Raven	Onagraceae	primrose willow	vegetables, taro, wetlands
<i>Macroptilium lathyroides</i> (L.) Urb.	Fabaceae	cowpea, phasey bean	vegetables, field crops
<i>Melaleuca quinquenervia</i> (Cav.) S.T. Blake	Myrtaceae	broad-leaved paperbark	
<i>Merremia peltata</i> (L.) Merr.	Convolvulaceae		gardens, plantations, pasture, forestry
<i>Miconia calvescens</i> DC	Melastomataceae		
<i>Mikania micrantha</i> Kunth	Asteraceae	mile-a-minute weed	gardens, plantations, fruit trees
<i>Mimosa invisa</i> Mart. ex Colla	Mimosaceae	creeping sensitive plant	gardens, growing lands, plantations
<i>Mimosa pigra</i> L.	Mimosaceae	giant sensitive plant	pasture, riverbanks
<i>Mimosa pudica</i> L.	Mimosaceae	sensitive plant	field crops, lawns
<i>Miscanthus floridulus</i> (Labill.) Warb. ex K. Schum.	Poaceae		
<i>Momordica charantia</i> L.	Cucurbitaceae	bitter gourd, balsam pear	field crops, low vegetation
<i>Monochoria hastata</i> (L.) Solms-Laub.	Pontederiaceae		
<i>Nephrolepis hirsutula</i> (Forster f.) Presl	Davalliaceae		coconuts
<i>Ocimum gratissimum</i> L.	Lamiaceae	wild basil	pasture, disturbed places
<i>Oxalis corniculata</i> L.	Oxalidaceae	yellow wood sorrel	vegetables, lawns
<i>Panicum maximum</i> Jacq.	Poaceae	guinea grass	gardens, roadsides

**Table 11** (cont'd) Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
<i>Parthenium hysterophorus</i> L.	Poaceae	parthenium	
<i>Paspalum conjugatum</i> Bergius	Poaceae	sour paspalum	lawns, roadsides, disturbed places
<i>Paspalum dilatatum</i> Poiret	Poaceae	paspalum	
<i>Paspalum paniculatum</i> L.	Poaceae	Russell river grass	taro, pasture, waste places
<i>Paspalum vaginatum</i> Sw.	Poaceae	saltwater couch	
<i>Passiflora foetida</i> L.	Passifloraceae	stinking passionfruit	pasture, low vegetation
<i>Passiflora maliformis</i> L.	Passifloraceae	-	
<i>Pennisetum polystachyon</i> (L.) Schultes	Poaceae	feathery pennisetum, mission grass	field crops, pastures
<i>Pennisetum purpureum</i> Schum.	Poaceae	elephant grass	roadsides
<i>Phyllanthus amarus</i> Schumach & Thonn.	Euphorbiaceae		field crops, roadsides
<i>Physalis angulata</i> L.	Solanaceae	wild cape gooseberry	pasture, roadsides
<i>Pistia stratiotes</i> L.	Araceae	water lettuce	clogging waterways
<i>Pluchea indica</i> (L.) Less.	Asteraceae	Indian pluchea, Indian fleabane	low saline areas
<i>Portulaca oleracea</i> L.	Portulacaceae	pigweed, purslane	vegetables
<i>Premna obtusifolia</i> (= <i>P.serratifolia</i> ) R. Br. C.F. Baker	Verbenaceae		coconut, pandanus
<i>Pseudelephantopus spicatus</i> (Juss. ex Aubl.) Asteraceae	Asteraceae	false elephant's foot	plantations, lawns
<i>Psidium guajava</i> L.	Myrtaceae	guava	pasture, forestry, waste land
<i>Ricinus communis</i> L.	Euphorbiaceae	castor oil plant, castor bean	vegetables, roadsides, waste places
<i>Rottboellia cochinchinensis</i> (Lour.) W. Clayton	Poaceae	itch grass	gardens, crops, roadsides, sugarcane
<i>Ruellia prostrata</i> Poiret	Acanthaceae		tree crops, roadsides
<i>Salvinia molesta</i> D. Mitch.	Salviniaceae	salvinia	
<i>Scaevola sericea</i> (= <i>S.taccada</i> ) Vahl.	Goodeniaceae	scaevola	coconut, pandanus
<i>Schinus terebinthifolius</i> Raddi	Anacardiaceae	christmas berry	waste areas, roadsides
<i>Senna</i> (= <i>Cassia</i> ) <i>occidentalis</i> (L.) Link	Fabaceae	coffee senna	field crops, pastures, roadsides
<i>Senna</i> (= <i>Cassia</i> ) <i>tora</i> (L.) Link	Fabaceae		
<i>Sida acuta</i> Burman f.	Malvaceae	spinyhead sida	pasture
<i>Sida cordifolia</i> L.	Malvaceae	flannel weed	
<i>Sida fallax</i> Walp.	Malvaceae		young coconut
<i>Sida rhombifolia</i> L.	Malvaceae	broom weed, common sida	pasture, plantations

**Table 11** (cont'd) Major weeds of agriculture in the southern and western Pacific.

Scientific name	Family	English common name	Principal crops affected
<i>Solanum americanum</i> (= <i>S. nigrum</i> ) Miller	Solanaceae	black nightshade, glossy nightshade	vegetables
<i>Solanum mauritianum</i> Scop	Solanaceae	wild tobacco tree	
<i>Solanum torvum</i> Sw.	Solanaceae	prickly solanum, devil's fig	plantations, pastures, roadsides
<i>Sonchus oleraceus</i> L.	Asteraceae	sow thistle	vegetables, field crops
<i>Sorghum arundinaceum</i> (= <i>S. verticilliflorum</i> ) (Desv.) Stapf	Poaceae	wild sorghum	vegetables
<i>Sorghum halepense</i> (L.) Pers.	Poaceae	Johnson grass	disturbed areas, roadsides
<i>Sorghum sudanense</i> (Piper) Stapf	Poaceae	Sudan grass	disturbed areas, roadsides
<i>Spathodea campanulata</i> P. Beauv.	Bignoniaceae	African tulip tree	pastures, roadsides
<i>Sphaerostephanos invisus</i> (Forst. f.) Holttum	Thelypteridaceae		
<i>Sphaerostephanos unitus</i> (L.) Holttum	Thelypteridaceae		
<i>Stachytarpete cayennensis</i> (Rich) Schauer	Verbenaceae	snakeweed	
<i>Stachytarpete jamaicensis</i> (L.) Vahl	Verbenaceae	Jamaican snakeweed	pasture
<i>Stachytarpete urticifolia</i> (Salisb.) Sims	Verbenaceae	blue rat's tail, dark-blue snakeweed	pasture, newly cleared areas, roadsides
<i>Stichocardia tiliifolia</i> (Descr.) H. Hallier	Convolvulaceae		
<i>Syndrella nodiflora</i> (L.) Gaertn.	Asteraceae	syndrella, node weed	plantations, lawns
<i>Tecoma stans</i> (L.) Juss ex Kunth	Bignoniaceae	yellow elder	
<i>Themeda quadrivalvis</i> (L.) Kuntze	Poaceae	grader grass	
<i>Tournefortia</i> (= <i>Messerschmidia</i> ) <i>argentea</i> L.f.	Boraginaceae	tree heliotrope	coconut, pandanus
<i>Tribulus cistoides</i> L.	Zygophyllaceae		
<i>Tridax procumbens</i> L.	Asteraceae	tridax, coat buttons	vegetables, roadsides
<i>Triumfetta rhomboidea</i> Jacq.	Tiliaceae	Chinese burr, burr bush	pasture, plantations, roadsides
<i>Urena lobata</i> L.	Malvaceae	hibiscus burr, urena burr	pasture, roadsides
<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	vernonia, iron weed	sweet potato, banana
<i>Vigna marina</i> (Burman f.) Merr.	Fabaceae	dune bean	young coconut and pandanus
<i>Vitex trifolia</i> L.	Verbenaceae	beach vitex	sandy areas
<i>Wedelia trilobata</i> (L.) Hitchc.	Asteraceae	wedelia	vegetables
<i>Xanthium pungens</i> Wallr.	Asteraceae	noogoora burr	vegetables, pasture

**Table 12** The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fiji	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
<i>Acacia farnesiana</i>	Mimosaceae		P	+		P	P		*	+++	P			++				+		1	7	69=
<i>Acacia nilotica</i>	Mimosaceae								++									P		2		133=
<i>Achyranthes aspera</i>	Amaranthaceae	+	P	P		P			P		+	P	P	P				+		3	111=	
<i>Agave americana</i>	Agavaceae			P		+			++											3	111=	
<i>Ageratum conyzoides</i>	Asteraceae	+	+++	+		P			*	+++	P	+	++	+	++	P		++		1	16	24
<i>Alternanthera sessilis</i>	Amaranthaceae		+	P		P					++	++	+	+	P	P	P	+	P		7	73=
<i>Amaranthus interruptus</i>	Amaranthaceae								++	P				P						2	133=	
<i>Amaranthus spinosus</i>	Amaranthaceae		P			P			+		+		P	P				++		4	103=	
<i>Amaranthus viridis</i> (= <i>A. gracilis</i> )	Amaranthaceae	++	++	++		P	P		++	P	P	P	P	P	P	+	+	+		11	44=	
<i>Antigonon leptopus</i>	Polygonaceae			+		*	+++					P	P							1	4	98=
<i>Argemone mexicana</i> (= <i>A. americana</i> )	Papaveraceae								++								P			2	133=	
<i>Bidens alba</i> ; <i>Bidens pilosa</i>	Asteraceae	++	+	*	++	*	++	P	*	+++		+	*	++	++	++	+++	+		5	26	8=
<i>Blechum pyrimidatum</i> (= <i>B. brownnei</i> )	Acanthaceae					P					*	+++	++				++			1	7	69=
<i>Brachiaria mutica</i>	Poaceae	*	++	+	P		+		P	+	P	++	++	++	++	+		P	P	1	12	38=
<i>Brachiaria reptans</i>	Poaceae		+	++					++		P		P	+	+			P	P		7	73=
<i>Brachiaria subquadripila</i>	Poaceae	P	+			P			P			++	+	P	P	++		P	P		6	80=
<i>Broussonetia papyrifera</i>	Urticaceae			P							P		*	+++		P		P	++	1	5	86-
<i>Canavalia rosea</i>	Fabaceae		P	P		P	P		P		P	P	P				P	*	+++	1	3	106=
<i>Cardiospermum halicacabum</i>	Sapindaceae	*	+++	P	P				P				++				P			1	5	86=

**Table 12** (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order	
<i>Cassytha filiformis</i>	Lauraceae	P	P	++		*	*	P	+		P	P	P	P	P		*	+++	+	P	3	13	33
<i>Cecropia peltata</i>	Euphorbiaceae			*	+++															1	3	106=	
<i>Cenchrus echinatus</i>	Poaceae	++	+	+++		++	*	P	++	+	+	++	++	P	*	+	++	+	***	3	26	10	
<i>Chamaesyce (= Euphorbia) hirta</i>	Euphorbiaceae	*	++	+	+++	*	++	++	+	++	P	+	++	+	*	+	P	+	+	3	20	16	
<i>Chloris barbata</i>	Poaceae		P	++		P			++			+	+	P		P		P		6	80=		
<i>Chromolaena odorata</i>	Asteraceae				*	++	++				*	++								2	6	78=	
<i>Clerodendrum chinense (= C. philippinum)</i>	Verbenaceae	++	*	+++	+	P				*	+++	+	++	*	+++					3	15	25	
<i>Clidemia hirta</i>	Melastomataceae		+							+		*	+++	+++	++	P		+	***	2	14	29=	
<i>Coccinia grandis</i>	Cucurbitaceae		P			*	+++									P		+		1	4	98=	
<i>Commelinopsis benghalensis</i>	Commelinaceae		P	P		P		P		P	P	P	P	++	*	+++			1	5	86=		
<i>Commelinopsis diffusa</i>	Commelinaceae	*	+++	+	++	P		P		P	P	*	+++	++	P		P			2	11	42=	
<i>Cordia subcordata</i>	Boraginaceae			P		P	P	P		P	P	P	P			P		++	2	2	133=		
<i>Crassocephalum crepidioides</i>	Asteraceae	++	+	P					+	*	++	P	++	++	P		++	P		1	12	38=	
<i>Crotalaria pallida</i>	Fabaceae	+	+	++		P		P	+	P	P	+	+	++		+		+		10	51=		
<i>Crotalaria retusa</i>	Fabaceae			+		P				P	P	P						++		3	111=		
<i>Cuphea carthagenensis</i>	Lythraceae		+	+					+	P		++	++					+		8	63=		
<i>Cynodon dactylon</i>	Poaceae	++	+	+++		+	P		++	P	+	++	++	+	P	P		P	P	15	26=		

**Table 12** (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
<i>Cyperus rotundus</i>	Cyperaceae	*	*	*	*	*			*		*	*	*	*	P	*	*	*	*	13	44	1
<i>Dactyloctenium aegyptium</i>	Poaceae	+	P	+		P	+	P			P	P	P		P	P		P		3	111=	
<i>Desmodium incanum</i>	Fabaceae	+	P	+++		P						+	+			P	P	P	P	6	80=	
<i>Digitaria ciliaris</i>	Poaceae	P	+	+		P			++			++	+	P		P	P	P		7	73=	
<i>Digitaria eriantha</i> (= <i>D. decumbens</i> )	Poaceae		P	P					++	P								P		2	133=	
<i>Digitaria insularis</i>	Poaceae		P			+					***			+				P		1	5	86=
<i>Digitaria setigera</i>	Poaceae	P	P	+++		P			+			++	+	P	P	P	+	++		1	10	47=
<i>Echinochloa colona</i>	Poaceae	P	+++	++		+			++		P	++	++	+		+		+			15	26=
<i>Echinochloa crus-galli</i>	Poaceae		+++	P					P	P	+		P	+			++		* ++	1	9	57
<i>Eichhornia crassipes</i>	Pontederiaceae	P	*	+++	P	P	P	P	++		***		P	*	+++			*	+	4	12	36
<i>Eleocharis geniculata</i>	Cyperaceae	P	+	P			P	++	+		P		P							4	103=	
<i>Elephantopus mollis</i> (= <i>E. scaber</i> )	Asteraceae	+	+	*	+++		P		+	P	+			*	+++	++		+		2	13	34
<i>Eleusine indica</i>	Poaceae	+	+	+++	++	*	+++	P	*	+++	P	+	++	*	++	+	++	*	++	7	28	7
<i>Eleutheranthera ruderalis</i>	Asteraceae	+	P								+	+	+	P	P	++		+		7	73=	
<i>Emilia sonchifolia</i>	Asteraceae	P	+	+					++	+	+	+	+	+	P		P	+		10	51=	
<i>Eragrostis tenella</i>	Poaceae		P	+		P	P					+	+	P	P	P	P	P		3	111=	
<i>Euphorbia heterophylla</i> (= <i>E. geniculata</i> )	Euphorbiaceae	+	+			*	+++	+		P	+	+		P	+	+	P		1	10	47=	

Source: Maxwell and Mathur (1970) in summary form and from original sources as indicated.

**Table 12** (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
<i>Fimbristylis cymosa</i> (= <i>F. atollensis</i> )	Cyperaceae			P		+	P				+	++	P			*	+++			1	7	69=
<i>Fimbristylis dichotoma</i>	Cyperaceae		P	++		P	P		++	P		P	P	P		P	P	+		5	92=	
<i>Fimbristylis miliacea</i>	Cyperaceae		++	+		P							P			P				3	111=	
<i>Guettarda speciosa</i>	Cyperaceae	+		P		*	++	P	P	P		P	P	P	*	+			2	5	85	
<i>Hydrilla verticillata</i>	Hydrocharitaceae		+++	P		P			P										3	111=		
<i>Hyptis pectinata</i>	Lamiaceae		+++	++		P			++	+		P	++			P		+	1	12	38=	
<i>Imperata conferta</i> (= <i>I. cylindrica</i> )	Poaceae		++		P				*	++		P	+	P	++			++	1	10	47=	
<i>Indigofera suffruticosa</i>	Fabaceae	++	P	++		+						++	+	+	+	++		++		13	35	
<i>Ipomoea macrantha</i>	Convolvulaceae			P			P	P				P	P		*	+	*	+++	P	2	4	97
<i>Ischaemum spp.</i>	Poaceae		*	+++	P							P	P	P			P	P	1	3	106=	
<i>Jatropha gossypifolia</i>	Euphorbiaceae			+					++											3	111=	
<i>Kyllinga brevifolia</i>	Cyperaceae	P	+	++		P			+	P	++	++	++	P	P	P	P			11	44=	
<i>Kyllinga nemoralis</i>	Cyperaceae	P	+++			P						P	P			P				3	111=	
<i>Kyllinga polypylla</i>	Cyperaceae		*	+++						P			*					++	2	11	42=	
<i>Lantana camara</i>	Verbenaceae	P	*	+++	++	*	+	+	P	+++	+++	++	++	+++		*	P	+++	++	7	34	2
<i>Leucaena leucocephala</i>	Mimosaceae	++	P	*	+++		+	P	P	P	+	+	++	++	P	*	P	++	++	2	18	20

**Table 12** (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fiji	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order	
<i>Ludwigia octovalvis</i> (= <i>Jussiaea suffruticosa</i> )	Onagraceae	+	+	++		P	*	+++		+	P	P	++	++	P	P	P	+++	+	2	16	22=	
<i>Macroptilium lathyroides</i>	Fabaceae		+	+		+			++				+	+	P	P	P		P		7	73=	
<i>Melaleuca quinquenervia</i>	Myrtaceae				P				+++											3	111=		
<i>Merremia peltata</i>	Convolvulaceae	P	+	+++	+++	P			P	P			+	++	+	P		+++	P	2	14	29=	
<i>Miconia calvescens</i>	Melastomataceae			*	+++				P										++	1	5	86=	
<i>Mikania micrantha</i>	Asteraceae	*	*	P		*	+++		+	+++	+++	+++	+++	+++	++	P	*	++	+++	10	29	5	
<i>Mimosa invisa</i>	Mimosaceae	*	*	*	*	P			+++	++	+++	+++	+++	+++	+++			*	++	10	30	4	
<i>Mimosa pigra</i>	Mimosaceae										*		++							1	2	129=	
<i>Mimosa pudica</i>	Mimosaceae	++	++	+++	++	*	*		++	+++	+	++	++	++	+++	+++		+	*	+++	6	32	3
<i>Miscanthus floridulus</i>	Poaceae		++	+++		P					P	P	P					P			5	92=	
<i>Momordica charantia</i>	Cucurbitaceae	++	P	++		++		P	P	P	++	+	+	P		P		+			11	44=	
<i>Monochoria hastata</i>	Pontederiaceae		++																		2	132=	
<i>Nephrolepis hirsutula</i>	Davalliaceae	P	P	P		P			P	P		++	+++	++	P	P		+			8	63=	
<i>Ocimum gratissimum</i>	Lamiaceae	++	P	+++		P			+++			P	P			P		+		1	9	57=	
<i>Oxalis corniculata</i>	Oxalidaceae	++	P	+		P						+	+			P		P	P		5	92=	
<i>Panicum maximum</i>	Poaceae	++	+	++		++			+	++	+	++	++	++	+	+++		+	P	1	20	18	
<i>Parthenium hysterophorus</i>	Asteraceae				P				+									*	+	1	2	129=	

**Table 12** (con'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific

**Table 12** (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fiji	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
<i>Salvinia molesta</i>	Salviniaceae	++	P	P					+		P						*			3	111=	
<i>Scaveola sericea</i> (= <i>S. taccada</i> )	Goodeniaceae	P	P	P		P	+++		P	P		P	P		P		+++	P	2	6	78=	
<i>Schinus terebinthifolius</i>	Anacardiaceae		P	P		P		P	++			P	P							2	132=	
<i>Senna</i> (= <i>Cassia</i> ) <i>occidentalis</i>	Caesalpiniaceae		+	++		P	+		++		+	+	+	P	P		+			10	51=	
<i>Senna</i> (= <i>Cassia</i> ) <i>tora</i>	Caesalpiniaceae	P	++	++		P			++	P	+	+	++	+	*	++	***	P	2	16	22=	
<i>Sida acuta</i>	Malvaceae	++	++	+++		+			+++	+	++	+	++	+++	P		*	+++		4	23	12
<i>Sida cordifolia</i>	Malvaceae			P		P				++					P		++		1	4	98=	
<i>Sida fallax</i>	Malvaceae			P			**	+++								P			1	3	106=	
<i>Sida rhombifolia</i>	Malvaceae	++	++	+++		P		P	++	++	+++	+++	++	++	++	P	++	P	3	25	11	
<i>Solanum americanum</i> (= <i>S. nigrum</i> )	Solanaceae	++	+	+++		P			+	P	P	+	+	P	P	P		+		10	51=	
<i>Solanum mauritianum</i>	Solanaceae	P	P	P					++					P	P					2	132=	
<i>Solanum torvum</i>	Solanaceae		+++	++		P			++	P	++	P	* +++	+++	++	++	+++			4	20	15
<i>Sonchus oleraceus</i>	Asteraceae	+	P	+		+	+		++		P		+		P		P			8	63=	
<i>Sorghum arundinaceum</i> (= <i>S. verticilliflorum</i> )	Poaceae	*	+++	P	+				++		++			P			+		1	9	57=	
<i>Sorghum halepense</i>	Poaceae		+++	+++		++		P	++	+++	+			P		*	++	* ++	3	20	16=	
<i>Sorghum sudanense</i>	Poaceae			P		P						*	+++	+	P				1	4	98=	

Note: Relative and measures of importance to show how the species are distributed and spreading in the Pacific.

**Table 12** (cont'd) The distribution and importance of the major weeds of agriculture in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. of *	No. of +	Order
<i>Spathodea campanulata</i>	Bignoniaceae		*	+++	P		P					P	P			P				1	3	106=
<i>Sphaerostephanos invisus</i>	Thelypteridaceae			++																2	132=	
<i>Sphaerostephanos unitus</i>	Thelypteridaceae											+	P		P		++			3	111=	
<i>Stachytarpheta cayennensis</i>	Verbenaceae				P				++			+	P				P			3	111=	
<i>Stachytarpheta jamaicensis</i>	Verbenaceae	+	P			*	++	+		+	+++	P	+	P	+	P		++		2	12	37
<i>Stachytarpheta urticifolia</i>	Verbenaceae	+++	+	*	+++	++			+++	+++	++	+++	++	+++	P	++	P	++		5	29	6
<i>Stictocardia tiliifolia</i>	Convolvulaceae			P								+	+					+		3	111=	
<i>Syndrella nodiflora</i>	Asteraceae	++	+	+++		P	+		++	P	P	++	++	++	P	P	P	++		17	21	
<i>Tecoma stans</i>	Bignoniaceae	P	P	+++					++			P		P		++				1	7	69=
<i>Themeda quadrivalvis</i>	Poaceae		P						++									+		3	111=	
<i>Tournefortia (= Messerschmidia) argentea</i>	Boraginaceae	P	P	P		P	*	+++	P			P	P	P	P	P		+	1	4	98=	
<i>Tribulus cistoides</i>	Zygophyllaceae			+			P				++									3	111=	
<i>Tridax procumbens</i>	Asteraceae		P	++		P	+		+	P	+	+	P		P	++	+			9	61=	
<i>Triumfetta rhomboidea</i>	Tiliaceae	P	P	+++		P			+	P	P	++	P	P		+	+			8	63=	
<i>Urena lobata</i>	Malvaceae	+	++	+		P			+	P	+	+	P		P	+	++	++		12	41	
<i>Vernonia cinerea</i>	Asteraceae	++	+	+++		++	++			P	P	+	P		P	++	+			14	32	
<i>Vigna marina</i>	Fabaceae		P				*	+++	P			P	P	P		P	P	++	1	5	86=	
<i>Vitex trifolia</i>	Verbenaceae	++			++							P	P	P			+	P		5	92=	
<i>Wedelia trilobata</i>	Asteraceae			+++								P				P				3	111=	
<i>Xanthium pungens</i>	Asteraceae	*	+++	+++	++					+									1	9	61=	

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### Table 13

In this table the 56 most important (those scoring 10 or more +s) of the 141 major weeds of agriculture (**Table 12**) are arranged in five groups according to their combined score of +s. It contains those weeds that, if exotic to the Pacific, as most if not all are, should be considered first for appropriateness as targets for classical biological control on a regional basis. Of course, there could well be justification, for a more limited number of nations, for attention to be paid to other weeds which score +++ for at least one nation or ++ for at least two nations, particularly if biological control had already been successful elsewhere. This second group of weeds can be readily identified from entries in **Table 12**. The total +s can be taken only as a broad indication of the importance attached to the pest in the Pacific. However, differences of 5 or more can be assumed to be indicative of real

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differences. Grasses (with the exception of number 7, *Eleusine indica*, which is known to have a number of potentially useful enemies) are given a ‘-’ rating for attractiveness as targets. This is because they have not been studied for specific natural enemies, and a major and costly investigation (more than 5 years) would be required. Where there is little or no information about possibly specific natural enemies of a pest it is given a ‘-’ attractiveness rating on the basis that a major and costly investigation would be required. Unless there is a special reason to choose one of these targets, there are other far more promising (and less costly) targets to consider. In any case, the attractiveness ratings are very subjective and may be modified when additional information becomes available from dossiers or from studies elsewhere on the pest.

**Table 13** Aggregated ratings of the major weeds of agriculture in the southern and western Pacific.

Order	Number of +s	Pest and + scores	Times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
<b>30 and over</b>						
1	44	<i>Cyperus rotundus</i>	13	+	-	-
2	34	<i>Lantana camara</i>	7	+	+	+++
3	32	<i>Mimosa pudica</i>	6	+	-	?
4	30	<i>Mimosa invisa</i>	10	+	+	+++
<b>25-29</b>						
5	29	<i>Mikania micrantha</i>	10	+	-	+++
6	29	<i>Stachytarpheta urticifolia</i>	5	+	-	?
7	28	<i>Eleusine indica</i>	7	+	-	++
8	26	<i>Bidens pilosa</i> and <i>B. alba</i>	5	+	-	-
10	26	<i>Cenchrus echinatus</i>	3	-	-	-
11	25	<i>Sida rhombifolia</i>	3	+	-	+
<b>20-24</b>						
12	23	<i>Sida acuta</i>	4	+	-	+
13	23	<i>Portulaca oleracea</i>	2	+	-	+++
14	22	<i>Paspalum conjugatum</i>	3	-	-	-
15	20	<i>Solanum torvum</i>	4	+	-	++
16 =	20	<i>Chamaesyce hirta</i>	3	+	-	-
16 =	20	<i>Sorghum halepense</i>	3	-	-	-
18	20	<i>Panicum maximum</i>	1	-	-	-
<b>15-19</b>						
19	19	<i>Psidium guajava</i>	1	-	-	-
20	18	<i>Leucaena leucocephala</i>	2	-	-	-
21	17	<i>Syndrella nodiflora</i>	0	-	-	-
22 =	16	<i>Ludwigia octovalvis</i>	2	-	-	-
22 =	16	<i>Senna tora</i>	2	+	-	?
24	16	<i>Ageratum conyzoides</i>	1	+	-	?
25	15	<i>Clerodendrum chinense</i>	3	+	-	+++
26 =	15	<i>Cynodon dactylon</i>	0	-	-	-
26 =	15	<i>Echinochloa colona</i>	0	-	-	-
26 =	15	<i>Paspalum paniculatum</i>	0	-	-	-

(cont'd over)

**Table 13** (con'td) Aggregated ratings of the major weeds of agriculture in the southern and western Pacific.

Order	Number of +s	Pest and + scores	Times in top 10	Dossier available?	Any biological control successes?	Attractiveness as a target
<b>10-14</b>						
29 =	14	<i>Merremia peltata</i>	2	+	-	?
29 =	14	<i>Clidemia hirta</i>	2	+	+	++++
31	14	<i>Pennisetum purpureum</i>	1	-	-	-
32	14	<i>Vernonia cinerea</i>	0	-		
33	13	<i>Cassytha filiformis</i>	3	-	-	+
34	13	<i>Elaphantopus mollis</i>	2	+	-	+
35	13	<i>Indigofera suffruticosa</i>	0	-		
36	12	<i>Eichhornia crassipes</i>	4	+	+	++++
37	12	<i>Stachytarpete jamaicensis</i>	2	-		
38 =	12	<i>Brachiaria mutica</i>	1	-		
38 =	12	<i>Crassocephalum crepidoides</i>	1	-		
38 =	12	<i>Hyptis pectinata</i>	1	-		
41	12	<i>Urena lobata</i>	0	-		
42 =	11	<i>Commelina diffusa</i>	2	-		
42 =	11	<i>Kyllinga polyphylla</i>	2	+	-	?
44 =	11	<i>Amaranthus viridis</i>	0	-		?
44 =	11	<i>Kyllinga brevifolia</i>	0	-		?
44 =	11	<i>Momordica charantia</i>	0	-		?
47 =	10	<i>Digiteria setigera</i>	1	-		
47 =	10	<i>Euphorbia heterophylla</i>	1	+	-	+
47 =	10	<i>Imperata conferta</i>	1	-	-	-
47 =	10	<i>Ricinus communis</i>	1	-		?
51 =	10	<i>Crotalaria pallida</i>	0	-		?
51 =	10	<i>Emilia sonchifolia</i>	0	-		?
51 =	10	<i>Passiflora foetida</i>	0	+	-	+
51 =	10	<i>Phyllanthus amarus</i>	0	-		?
51 =	10	<i>Senna occidentalis</i>	0	-		?
51 =	10	<i>Solanum americanum</i>	0	-		?
(56)						

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## Table 14

**Table 14** shows for weeds what **Table 4** did for invertebrates in relation to the top 10 entries. Since no information was available on the relative rating for the five weeds nominated by Tokelau (shown by an asterisk), each was

allocated the median value of 5. The ranking order is only given for species that attain an aggregated value of 10 or more. These are arranged in descending order of importance in **Table 15**.

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**Table 14** The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No.*	Rating	Order
<i>Acacia farnesiana</i>	Mimosaceae								4											1	7	
<i>Acacia nilotica</i>	Mimosaceae																					
<i>Achyranthes aspera</i>	Amaranthaceae																					
<i>Agave americana</i>	Agavaceae																					
<i>Ageratum conyzoides</i>	Asteraceae									2										1	9	
<i>Alternanthera sessilis</i>	Amaranthaceae																					
<i>Amaranthus interruptus</i>	Amaranthaceae																					
<i>Amaranthus spinosus</i>	Amaranthaceae																					
<i>Amaranthus viridis</i> (= <i>A. gracilis</i> )	Amaranthaceae																					
<i>Antigonon leptopus</i>	Polygonaceae					2														1	9	
<i>Argemone mexicana</i> (= <i>A. americana</i> )	Papaveraceae																					
<i>Bidens alba</i> , <i>Bidens pilosa</i>	Asteraceae			7	9	3			8			1							9	6	29	6 =
<i>Blechum pyrimidatum</i> (= <i>B. brownei</i> )	Acanthaceae										8									1	3	
<i>Brachiaria mutica</i>	Poaceae	8																		1	3	
<i>Brachiaria reptans</i>	Poaceae																					
<i>Brachiaria subquadripila</i>	Poaceae																					
<i>Broussonetia papyrifera</i>	Urticaceae														4					1	7	
<i>Canavalia rosea</i>	Fabaceae																	10	1	1		
<i>Cardiospermum halicacabum</i>	Sapindaceae	2																		1	9	
<i>Cassytha filiformis</i>	Lauraceae					7	2										6			3	18	13
<i>Cecropia peltata</i>	Euphorbiaceae			5																1	6	
<i>Cenchrus echinatus</i>	Poaceae							3							*					3	3	21
<i>Chamaesyce</i> (= <i>Euphorbia</i> ) <i>hirta</i>	Euphorbiaceae	10			10										*					3	7	45 =
<i>Chloris barbata</i>	Poaceae																					

**Table 14** (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific.

**Table 14** (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
<i>Emilia sonchifolia</i>	Asteraceae																					
<i>Eragrostis tenella</i>	Poaceae																					
<i>Euphorbia heterophylla</i> (= <i>E. geniculata</i> )	Euphorbiaceae					8														1	3	
<i>Fimbristylis cymosa</i> (= <i>F. atollensis</i> )	Cyperaceae																			1	4	
<i>Fimbristylis dichotoma</i>	Cyperaceae																					
<i>Fimbristylis miliacea</i>	Cyperaceae																					
<i>Guettarda speciosa</i>	Cyperaceae						4													2	12	21 =
<i>Hydrilla verticillata</i>	Hydrocharitaceae																					
<i>Hyptis pectinata</i>	Lamiaceae																			1	8	
<i>Imperata conferta</i> (= <i>I. cylindrica</i> )	Poaceae								10											1	1	
<i>Indigofera suffruticosa</i>	Fabaceae																					
<i>Ipomoea macrantha</i>	Convolvulaceae																			2	11	23 =
<i>Ischaemum spp.</i>	Poaceae	10																		1	1	
<i>Jatropha gossypifolia</i>	Euphorbiaceae																					
<i>Kyllinga brevifolia</i>	Cyperaceae																					
<i>Kyllinga nemoralis</i>	Cyperaceae																					
<i>Kyllinga polypylla</i>	Cyperaceae	3																		2	10	26 =
<i>Lantana camara</i>	Verbenaceae	8	6	6					7	1										7	40	4
<i>Leucaena leucocephala</i>	Mimosaceae		2																	3	13	19
<i>Ludwigia octovalvis</i> (= <i>Jussiaea suffruticosa</i> )	Onagraceae						5													2	15	15 =
<i>Macroptilium lathyroides</i>	Fabaceae																					
<i>Melaleuca quinquenervia</i>	Myrtaceae																					
<i>Merremia peltata</i>	Convolvulaceae				1														10	2	11	23 =
<i>Miconia calvescens</i>	Melastomataceae			1																1	10	28 =
<i>Mikania micrantha</i>	Asteraceae	6	9			4				8	6	2	6	7					8	5	10	49
<i>Mimosa invisa</i>	Mimosaceae	1	1	3	4				7	4	3	7	5						2	10	73	2

**Table 14** (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
<i>Mimosa pigra</i>	Mimosaceae				5	6				4	3			6	9				2	1	8	
<i>Mimosa pudica</i>	Mimosaceae																		6	40	5	
<i>Misanthus floridulus</i>	Poaceae																					
<i>Momordica charantia</i>	Cucurbitaceae																					
<i>Monochoria hastata</i>	Pontederiaceae																					
<i>Nephrolepis hirsutula</i>	Davalliaceae																					
<i>Ocimum gratissimum</i>	Lamiaceae								5										1	6		
<i>Oxalis corniculata</i>	Oxalidaceae																					
<i>Panicum maximum</i>	Poaceae															3			1	5		
<i>Parthenium hysterophorus</i>	Asteraceae																7		1	4		
<i>Paspalum conjugatum</i>	Poaceae																	8	2	9		
<i>Paspalum dilatatum</i>	Poaceae																					
<i>Paspalum paniculatum</i>	Poaceae																					
<i>Paspalum vaginatum</i>	Poaceae															5			1	6		
<i>Passiflora foetida</i>	Passifloraceae																					
<i>Passiflora maliformis</i>	Passifloraceae																					
<i>Pennisetum polystachyon</i>	Poaceae				2															1	9	
<i>Pennisetum purpureum</i>	Poaceae									2										1	9	
<i>Phyllanthus amarus</i>	Euphorbiaceae																					
<i>Physalis angulata</i>	Solanaceae																					
<i>Pistia stratiotes</i>	Araceae																					
<i>Pluchea indica</i>	Asteraceae																					
<i>Portulaca oleracea</i>	Portulacaceae	5															3		2	14	18	
<i>Premna obtusifolia</i> (= <i>P. serratifolia</i> )	Verbenaceae							1											1	10	28 =	
<i>Pseudelephantopus spicatus</i>	Asteraceae																					
<i>Psidium guajava</i>	Myrtaceae								3										1	8		
<i>Ricinus communis</i>	Euphorbiaceae							6											1	5		

Species names and numbers at which they occur in Table 5 are summarized below in groups of 10.

**Table 14** (con'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
<i>Rottboellia cochinchinensis</i>	Poaceae		5							2									2	15	15 =	
<i>Ruellia prostrata</i>	Acanthaceae																					
<i>Salvinia molesta</i>	Salviniaceae																					
<i>Scaevola sericea</i> (= <i>S. taccada</i> )	Goodeniaceae						7										4		2	11	23 =	
<i>Schinus terebinthifolius</i>	Anacardiaceae																					
<i>Senna (= Cassia) occidentalis</i>	Caesalpinaeae																					
<i>Senna (= Cassia) tora</i>	Caesalpinaeae															8	6	2	8			
<i>Sida acuta</i>	Malvaceae								9	9				8			4	4	14	17		
<i>Sida cordifolia</i>	Malvaceae																					
<i>Sida fallax</i>	Malvaceae						8											1	3			
<i>Sida rhombifolia</i>	Malvaceae										8	9				7		3	9			
<i>Solanum americanum</i> (= <i>S. nigrum</i> )	Solanaceae																					
<i>Solanum mauritianum</i>	Solanaceae																					
<i>Solanum torvum</i>	Solanaceae														2	9	5	1	4	27	8	
<i>Sonchus oleraceus</i>	Asteraceae																					
<i>Sorghum arundinaceum</i> (= <i>S. verticilliflorum</i> )	Poaceae	4																	1	7		
<i>Sorghum halepense</i>	Poaceae									9						4		4	3	16	14	
<i>Sorghum sudanense</i>	Poaceae											10							1	1		
<i>Spathodea campanulata</i>	Bignoniaceae		4																1	7		
<i>Sphaerostaphanos invisus</i>	Thelypteridaceae																					
<i>Sphaerostephanos unitus</i>	Thelypteridaceae																					
<i>Stachytarpheta cayennensis</i>	Verbenaceae																					
<i>Stachytarpheta jamaicensis</i>	Verbenaceae							10				6						2	6			

**Table 14** (cont'd) The relative importance given to the top 10 weeds of agriculture (72 species) of each country in the southern and western Pacific.

Name	Family	Col	Fij	FrP	FSM	Gua	Kir	Mar	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.	No. *	Rating	Order
<i>Stachytarpheta urticifolia</i>	Verbenaceae			10						5		7		10						4	12	20
<i>Stictocardia tiliifolia</i>	Convolvulaceae																					
<i>Syndrella nodiflora</i>	Asteraceae																					
<i>Tecoma stans</i>	Bignoniaceae			4																1	7	
<i>Themeda quadrivalvis</i>	Poaceae																					
<i>Toomefortia</i> (= <i>Messerschmidia</i> ) <i>argentea</i>	Boraginaceae						9													1	2	
<i>Tribulus cistoides</i>	Zygophyllaceae																					
<i>Tridax procumbens</i>	Asteraceae																					
<i>Triumfetta rhomboidea</i>	Tiliaceae																					
<i>Urena lobata</i>	Malvaceae																					
<i>Vernonia cinerea</i>	Asteraceae																9			1	2	
<i>Vigna marina</i>	Fabaceae					10														1	1	
<i>Vitex trifolia</i>	Verbenaceae																					
<i>Wedelia trilobata</i>	Asteraceae																					
<i>Xanthium pungens</i>	Asteraceae	3																		1	8	

\*Scored mean rank and maximum rank in various crops to derive 0.1 of all of ranking among all species of the total. +1 slight

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## Table 15

This table was constructed by assigning the following values to the top 10 entries in **Table 14** and then adding the scores for each weed.

Country order of importance	Score
1	10
2	9
3	8
4	7
5	6
6	5
7	4
8	3
9	2
10	1

Note that these scores are different from the ratings of +s in **Tables 12 and 13**.

Since this table is concerned with what are evaluated as being the top-10 weeds of each country, its rankings might be considered more sharply focused than those in **Table 13**. It is notable, however, that the seven highest-ranking weeds (first column) are the same as those in **Table 13** (last column), although the order is slightly different. Then follows a group of weeds (*Solanum torvum*, *Clerodendrum chinense*, *Eichhornia crassipes* and *Cassytha filiformis*) whose standing is much higher by this method. This arises because of the very high priority given to them by several countries. Perhaps this is an indication that the ceiling of +++ adopted for **Table 12** is too restrictive. Further consideration of the most appropriate way to rank the weeds is given in **Table 16**.

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**Table 15.** Ranking of the 29 top 10 weeds of agriculture, scoring 10 or more.

Order in top 10	Species	Score	Entries in top 10	Order in aggregated +s (Table 13)
1	<i>Cyperus rotundus</i>	98	13	1
2	<i>Mimosa invisa</i>	73	10	5
3	<i>Mikania micrantha</i>	49	10	4
4	<i>Lantana camara</i>	40	7	2
5	<i>Mimosa pudica</i>	40	6	3
6 =	<i>Bidens pilosa</i>	29	6	6 =
6 =	<i>Bidens alba</i>	29	6	6 =
8	<i>Solanum torvum</i>	27	4	15
9	<i>Clerodendrum chinense</i>	27	3	25
10	<i>Eichhornia crassipes</i>	26	4	36
11	<i>Eleusine indica</i>	21	7	7
12	<i>Cenchrus echinatus</i>	21	3	10
13	<i>Cassytha filiformis</i>	18	3	33
14	<i>Sorghum halepense</i>	16	3	17
15 =	<i>Ludwigia octovalvis</i>	15	2	22 =
15 =	<i>Rottboellia cochinchinensis</i>	15	2	
17	<i>Sida acuta</i>	14	4	12
18	<i>Portulaca oleracea</i>	14	2	13
19	<i>Leucaena leucocephala</i>	13	3	20
20	<i>Stachytarpheta urticifolia</i>	12	4	37
21 =	<i>Chromolaena odorata</i>	12	2	
21 =	<i>Guettarda speciosa</i>	12	2	
23 =	<i>Ipomoea macrantha</i>	11	2	
23 =	<i>Merremia peltata</i>	11	2	30 =
23 =	<i>Scaevola sericea</i>	11	2	
26 =	<i>Elephantopus mollis</i>	10	2	34
26 =	<i>Kyllinga polyphylla</i>	10	2	42 =
28 =	<i>Miconia calvescens</i>	10	1	
28 =	<i>Premna serratifolia</i>	10	1	

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**Table 16**

This table shows the results of considering the top five weeds designated by each country, so as to determine whether this was a means of focusing attention even more sharply on the most important species. For this purpose, the 53 weeds listed by one or more country in their top-5 (**Table 14**) had the following values assigned.

Country order of importance	Score
1	5
2	4
3	3
4	2
5	1

It can be seen in **Table 16** that the first 10 or so weeds are the same as those occupying this

position in **Table 15**, although their relative positions are somewhat changed. Bearing in mind that (a) most countries do not have weed experts, (b) the evaluations of relative importance are subjective [being the opinions of the most relevant agricultural authorities in each country (who do not always agree)] and (c) each of the three methods of establishing priority order showed much the same species in the most important 20 or so, it was concluded that there was little merit in attempting to achieve greater precision. Other factors, including the attractiveness of a species as a target for biological control (**Table 13**), together with the criteria listed in the introduction, should thus be taken into account when finally selecting one or more species for action.

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**Table 16.** Ranking of the 53 top 5 weeds of agriculture in the southern and western Pacific.

Order in top 5	Species	Score	Entries in top 5	Order in top 10 (Table 15)
1	<i>Cyperus rotundus</i>	33	8	1
2	<i>Mimosa invisa</i>	26	8	2
3	<i>Clerodendrum chinense</i>	12	3	9
4	<i>Solanum torvum</i>	10	3	8
5	<i>Eichhornia crassipes</i>	9	2	10
6 =	<i>Bidens pilosa</i>	8	2	6 =
6 =	<i>Bidens alba</i>	8	2	6 =
6 =	<i>Lantana camara</i>	8	2	4
9 =	<i>Cenchrus echinatus</i>	7	3	12
9 =	<i>Mikania micrantha</i>	7	3	3
9 =	<i>Mimosa pudica</i>	7	3	5
12 =	<i>Ludwigia octovalvis</i>	5	2	15 =
12 =	<i>Rottboellia cochinchinensis</i>	5	2	15 =
14 =	<i>Merremia peltata</i>	5	1	23 =
14 =	<i>Miconia calvescens</i>	5	1	28 =
14 =	<i>Premna serratifolia</i>	5	1	28 =
17 =	<i>Portulaca oleracea</i>	4	2	18
17 =	<i>Sorghum halepense</i>	4	2	14
19 =	<i>Ageratum conyzoides</i>	4	1	
19 =	<i>Antigonon leptopus</i>	4	1	
19 =	<i>Cardiospermum halicacabum</i>	4	1	
19 =	<i>Cassytha filiformis</i>	4	1	13
19 =	<i>Commelina benghalensis</i>	4	1	
19 =	<i>Leucaena leucocephala</i>	4	1	19
19 =	<i>Pennisetum polystachyon</i>	4	1	
19 =	<i>Pennisetum purpureum</i>	4	1	
27 =	<i>Clidemia hirta</i>	3	2	
27 =	<i>Guettarda speciosa</i>	3	2	21 =
29 =	<i>Chromolaena odorata</i>	3	1	21 =
29 =	<i>Elephantopus mollis</i>	3	1	26 =
29 =	<i>Hyptis pectinata</i>	3	1	
29 =	<i>Kyllinga polyphylla</i>	3	1	26 =
29 =	<i>Mimosa pigra</i>	3	1	
29 =	<i>Panicum maximum</i>	3	1	
29 =	<i>Psidium guajava</i>	3	1	
29 =	<i>Xanthium pungens</i>	3	1	
37 =	<i>Ipomoea macrantha</i>	2	2	23 =
38 =	<i>Sida acuta</i>	2	1	17
38 =	<i>Acacia farnesiana</i>	2	1	
38 =	<i>Broussonetia papyrifera</i>	2	1	
38 =	<i>Clidemia hirta</i>	2	1	
38 =	<i>Scaveola sericea</i>	2	1	
38 =	<i>Sorghum verticilliflorum</i>	2	1	

**Table 16.** (cont'd) Ranking of the 53 top 5 weeds of agriculture in the southern and western Pacific.

Order in top 5	Species	Score	Entries in top 5	Order in top 10 (Table 15)
38 =	<i>Spathodea campanulata</i>	2	1	
38 =	<i>Tecoma stans</i>	2	1	
46 =	<i>Cecropia peltata</i>	1	1	
46 =	<i>Chamaesyce hirta</i>	1	1	
46 =	<i>Coccinea grandis</i>	1	1	
46 =	<i>Eleusine indica</i>	1	1	11
46 =	<i>Ocimum gratissimum</i>	1	1	
46 =	<i>Paspalum conjugatum</i>	1	1	
46 =	<i>Paspalum vaginatum</i>	1	1	
46 =	<i>Stachytarpheta urticifolia</i>	1	1	20

**Table 17.** The major weeds of plantation forests in the southern and western Pacific.

Scientific name	Family	English common name
<i>Antigonon leptopus</i> Hook. and Arnott	Polygonaceae	mountain rose, Mexican creeper
<i>Broussonetia papyrifera</i> (L) Vent.	Urticaceae	paper mulberry
<i>Cardiospermum grandiflorum</i> Sw.	Sapindaceae	balloon vine
<i>Cassytha filiformis</i> L.	Lauraceae	dodder
<i>Coccinea grandis</i> (L) Voigt	Cucurbitaceae	ivy gourd, scarlet-fruited gourd
<i>Cordia alliodora</i> (Ruiz & Pavon) Cham.	Boraginaceae	
<i>Cuscuta campestris</i> Yuncker	Cuscutaceae	golden dodder
<i>Entada phaseoloides</i> (L) Merr.	Mimosaceae	matchbox bean, entada
<i>Leucaena leucocephala</i> (Lam.) de Wit	Mimosaceae	wild tamarind, leucaena
<i>Merremia peltata</i> (L) Merr	Convolvulaceae	merremia
<i>Miconia calvescens</i> DC	Melastomataceae	
<i>Mikania micrantha</i> Kunth	Asteraceae	mile-a-minute
<i>Mimosa invisa</i> Mart. ex Colla	Mimosaceae	creeping sensitive plant
<i>Passiflora rubra</i> L	Passifloraceae	red passionfruit
<i>Solanum repandum</i> J.R. & G. Forster	Solanaceae	
<i>Spathodea campanulata</i> Beauvois	Bignoniaceae	African tulip tree

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## Table 18

Surprisingly few weeds have so far been reported to be of major importance to forest plantations in the Pacific and, of these, *Mikania micrantha* and *Merremia peltata* stand out clearly as of particular concern. Both, and especially *Mikania micrantha*, have emerged also as being of considerable importance to agriculture (**Table 13**). Dossiers are available on prospects for their biological control (Waterhouse 1993a or 1993b, Waterhouse and Norris 1987).

Three of the species listed in the table are considered to be pests in some Pacific countries, but valuable in others. Thus, in the

Solomon Islands, the paper mulberry *Broussonetia papyrifera* is a rapidly invasive species forming dense thickets along roadsides and in recently cleared areas, whereas in Tonga its bark is highly prized and in limited supply for making tapa cloth. The fuel and forage tree *Leucaena leucocephala* is held in high regard in New Caledonia, but considered a nuisance in some other countries. *Cordia alliodora*, a fast-growing exotic tree, is regarded in the Solomon Islands and Fiji as having potential as a plantation species, but differently in American Samoa and some other countries.

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**Table 18.** The distribution and importance of the major weeds of plantation forests in the southern and western Pacific (+++ very important; ++ important; + of lesser importance; P present, but unimportant; - recorded but importance unknown).

**Table 19** The presumed origins of the major southern and western Pacific weeds scoring 10+ or more.  
(In general the views of Whistler (1995) are adopted.)

Species	Family	Origin
<i>Ageratum conyzoides</i>	Asteraceae	tropical America
<i>Amaranthus viridis</i>	Amaranthaceae	old world tropics
<i>Bidens alba</i>	Asteraceae	tropical America
<i>Bidens pilosa</i>	Asteraceae	tropical America
<i>Brachiaria mutica</i>	Poaceae	Africa (tropical Africa?)
<i>Cenchrus echinatus</i>	Poaceae	tropical and subtropical America (Brazil?)
<i>Chamaesyce hirta</i>	Euphorbiaceae	tropical America
<i>Clerodendrum chinense</i>	Verbenaceae	southern China
<i>Clidemia hirta</i>	Melastomataceae	tropical America
<i>Commelinina diffusa</i>	Commelinaceae	tropical Asia
<i>Crassocephalum crepidioides</i>	Asteraceae	tropical Africa
<i>Crotalaria pallida</i>	Fabaceae	tropical Africa
<i>Cynodon dactylon</i>	Poaceae	Africa
<i>Cyperus rotundus</i>	Cyperaceae	India
<i>Digitaria setigera</i>	Poaceae	southern Asia
<i>Echinochloa colona</i>	Poaceae	old world tropics
<i>Eichhornia crassipes</i>	Pontederiaceae	South America
<i>Elephantopus mollis</i>	Asteraceae	tropical America
<i>Eleusine indica</i>	Poaceae	India
<i>Emilia sonchifolia</i>	Asteraceae	Africa
<i>Euphorbia heterophylla</i>	Euphorbiaceae	tropical America
<i>Hyptis pectinata</i>	Lamiaceae	tropical America
<i>Imperata conferta</i>	Poaceae	tropical Asia
<i>Indigofera suffruticosa</i>	Fabaceae	tropical America
<i>Kyllinga brevifolia</i>	Cyperaceae	old world tropics (Africa?)
<i>Kyllinga polyphylla</i>	Cyperaceae	tropical Africa
<i>Lantana camara</i>	Verbenacee	tropical America (Brazil?)
<i>Leucaena leucocephala</i>	Fabaceae	South America
<i>Ludwigia octovalvis</i>	Onagraceae	tropical America
<i>Merremia peltata</i>	Convolvulaceae	Malaysia-Indonesia
<i>Mikania micrantha</i>	Asteraceae	tropical America

(cont'd over)

**Table 19** (cont'd) The presumed origins of the major southern and western Pacific weeds scoring 10+ or more.  
(In general the views of Whistler (1995) are adopted.)

Species	Family	Origin
<i>Mimosa invisa</i>	Mimosaceae	tropical America
<i>Mimosa pudica</i>	Mimosaceae	tropical America
<i>Momordica charantia</i>	Cucurbitaceae	subtropical Asia or Africa
<i>Panicum maximum</i>	Poaceae	Africa
<i>Paspalum conjugatum</i>	Poaceae	tropical America
<i>Paspalum paniculatum</i>	Poaceae	tropical America
<i>Passiflora foetida</i>	Passifloraceae	tropical America
<i>Pennisetum purpureum</i>	Poaceae	old world tropics (Africa?)
<i>Phyllanthus amarus</i>	Euphorbiaceae	tropical America
<i>Portulaca oleracea</i>	Portulacaceae	central America
<i>Psidium guajava</i>	Myrtaceae	tropical America
<i>Ricinus communis</i>	Euphorbiaceae	Africa
<i>Senna occidentalis</i>	Fabaceae	tropical America
<i>Senna tora</i>	Fabaceae	Indo-Malaysia
<i>Sida acuta</i>	Malvaceae	central America
<i>Sida rhombifolia</i>	Malvaceae	tropical America
<i>Solanum americanum</i>	Solanaceae	central America
<i>Solanum torvum</i>	Solanaceae	Caribbean
<i>Sorghum halepense</i>	Poaceae	north Africa
<i>Stachytarpete jamaicensis</i>	Verbenaceae	Caribbean
<i>Stachytarpete urticifolia</i>	Verbenaceae	tropical America
<i>Syndrella nodifolia</i>	Asteraceae	tropical America
<i>Urena lobata</i>	Malvaceae	tropical Asia (SE Asia?)
<i>Vernonia cinerea</i>	Asteraceae	tropical America

(new b'nes)

**Table 20** FAO agricultural production statistics for 1994 for countries in the southern and western Pacific. ( ) indicates total land area. Figures in ( ) taken from the Pacific Islands Yearbook 1989.)

	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.
Population ('000)	(17)	771	215	(93)	147	78	(39)	178	(3)	4205	(36)	169	366	(2)	98	(8)	166	(13)
Permanent crops ('000 ha)	3	180	22		6	37		6	2	345	2	67	17	[1]	31	(3)	124	4
Arable land ('000 ha)	2	80	5		6			7	5	40	1	55	40		17		20	1
Forest and woodland ('000 ha)		1185	115		10	2		708	5	42000	14	134	2450		8		914	
Cereals total production ('000 t)		32						1		3							1	
Rice paddy ('000 t)		30								1								
Coarse grains ('000 t)		2						1		3							1	
Maize ('000 t)		2						1		2							1	
Sorghum ('000 t)										1								
Roots and tubers (total) ('000 t)	7	64	13		2	8		22	4	1303	2	41	110		102		51	6
Potatoes ('000 t)			3					3										
Taro ('000 t)		15				1		2	3	220	2	37	27		27			2
Cassava ('000 t)	4	40	6					3		114		1	1		30			2
Sweet potatoes ('000 t)	2	3						3		484			62		14			
Yams ('000 t)		7						11		224		1	20		31			1
Pulses (total) ('000 t)		1								2			2					
Groundnuts (in shell) ('000 t)										1					1		2	

**Table 20** (cont'd) FAO agricultural production statistics for 1994 for countries in the southern and western Pacific. ( ) indicates total land area. Figures in ( ) taken from the Pacific Islands Yearbook 1989.

	Col	Fij	FrP	FSM	Gua	Kir	Marl	NCa	Niu	PNG	ASa	WSa	Sol	Tok	Ton	Tuv	Van	W.F.
Coconuts ('000 t)	4	201	86		43	65		10	2	790	5	130	220	3	25	2	259	2
Copra ('000 t)		13	10		2	8				100	1	11	31		2		30	
Palm kernels ('000 t)										66000			6000					
Palm oil ('000 t)										225000			32000					
Vegetables and melons (total) ('000 t)	1	13	6		5	5		3		383	1	1	6		8		8	1
Fruit excluding melons ('000 t)	7	12	8		2	5		4	1	1833	1	43	14		13	1	20	9
Tree nuts ('000 t)										5								
Cabbage ('000 t)			1															
Tomatoes ('000 t)		4	1												1			
Pumpkins, squash, gourds ('000 t)		1																
Watermelon ('000 t)			1		2								1		2			
Cantaloupes and other melons ('000 t)			35										1					
Sugar cane ('000 t)		3750	3							300								
Sugar (centrifugal, raw) ('000 t)	3	450	2		9	4	2	2	2	43	1	22	40	12	30	1		
Rubber ('000 t)										3								
Oranges ('000 t)	(13)	337	312	(63)	173	28	(30)	138	(3)	4302	(39)	196	399	(3)	89	(8)	109	(13)
Tangerines, mandarins ('000 t)	3														3			

**Table 20** (cont'd) FAO agricultural production statistics for 1994 for countries in the southern and western Pacific. ( ) indicates total land area. Figures in ( ) taken from the Pacific Islands Yearbook 1989.)

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## Tables 21 and 22

1. The names included here are from the lists submitted by country experts and are those where alternatives are, or have recently been in use in the region. Many other names, where there is no current confusion, appear in Table 1.
  2. The preferred name (x) is indicated by 'see x' or by 'x use for y', the name (y) being non-preferred.
  3. The names are arranged alphabetically. The author and family of each preferred name appear in Table 1.
  4. Not all the non-preferred names are invalid: some, indeed, are valid, but not applicable to the taxa concerned in the Pacific.
  5. The above comments apply also to the following list for weeds (Table 22), for which the author and family of each preferred name appear in Table 11.
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**Table 21.** Checklist of preferred names of insect pests.

<i>Amblypelta lutescens</i>	use for <i>Amblypelta papuensis</i>
<i>Amblypelta papuensis</i>	see <i>Amblypelta lutescens</i>
<i>Amrasca biguttula</i>	see <i>Amrasca devastans</i>
<i>Amrasca devastans</i>	use for <i>Amrasca biguttula</i>
<i>Cassida circumdata</i>	use for <i>Metriiona circumdata</i>
<i>Chloropulvinaria psidii</i>	use for <i>Pulvinaria psidii</i>
<i>Crocidolomia binotalis</i>	see <i>Crocidolomia pavonana</i>
<i>Crocidolomia pavonana</i>	use for <i>Crocidolomia binotalis</i>
<i>Deanolis albizonalis</i>	use for <i>Noorda albizonalis</i>
<i>Earias fabia</i>	see <i>Earias vittella</i>
<i>Earias vittella</i>	use for <i>Earias fabia</i>
<i>Endoclita signifer</i>	use for <i>Phassus signifer</i>
<i>Fabritilis gonagra</i>	use for <i>Leptoglossus australis</i>
<i>Ferrisia virgata</i>	use for <i>Ferrisiana virgata</i>
<i>Ferrisiana virgata</i>	see <i>Ferrisia virgata</i>
<i>Helicoverpa armigera</i>	use for <i>Heliothis armigera</i>
<i>Heliothis armigera</i>	see <i>Helicoverpa armigera</i>
<i>Lamprosema diemenalis</i>	use for <i>Omiodes diemenalis</i>
<i>Lamprosema octasema</i>	see <i>Nacoleia octasema</i>
<i>Leptoglossus australis</i>	see <i>Fabritilis gonagra</i>
<i>Leptoglossus gonagra</i>	see <i>Fabritilis gonagra</i>
<i>Macaria abydata</i>	see <i>Semiothisa abydata</i>
<i>Maruca testulalis</i>	see <i>Maruca vitrata</i>
<i>Maruca vitrata</i>	use for <i>Maruca testulalis</i>
<i>Metriiona circumdata</i>	see <i>Cassida circumdata</i>
<i>Nacoleia octasema</i>	use for <i>Lamprosema octasema</i>
<i>Noorda albizonalis</i>	see <i>Deanolis albizonalis</i>
<i>Ochetomyrmex auropunctata</i>	see <i>Wasemannia auropunctata</i>
<i>Omiodes diemenalis</i>	see <i>Lamprosema diemenalis</i>
<i>Petrova cristata</i>	use for <i>Rhyacionia cristata</i>
<i>Phassus signifer</i>	use for <i>Endoclita signifer</i>
<i>Pleurotypa balteata</i>	see <i>Syllepte derogata</i>
<i>Pulvinaria psidii</i>	see <i>Chloropulvinaria psidii</i>
<i>Rhyacionia cristata</i>	see <i>Petrova cristata</i>
<i>Roeselia lignifera</i>	see <i>Uraba lignifera</i>
<i>Semiothisa santhamaria</i>	see <i>Semiothisa abydata</i>
<i>Semiothisa abydata</i>	use for <i>Macaria abydata</i>
<i>Syllepte derogata</i>	use for <i>Pleurotypa balteata</i>
<i>Uraba lignifera</i>	use for <i>Roeselia lignifera</i>
<i>Wasemannia auropunctata</i>	use for <i>Ochetomyrmex auropunctata</i>
<i>Xyleborus torquatus</i>	see <i>Xyleborus volvulus</i>
<i>Xyleborus volvulus</i>	use for <i>Xyleborus torquatus</i>

**Table 22.** Checklist of preferred names of weeds

<i>Amaranthus gracilis</i>	see <i>Amaranthus viridis</i>
<i>Amaranthus viridis</i>	use for <i>Amaranthus gracilis</i>
<i>Argemone americana</i>	see <i>Argemone mexicana</i>
<i>Argemone mexicana</i>	use for <i>Argemone americana</i>
<i>Blechum brownneii</i>	see <i>Blechum pyramidatum</i>
<i>Blechum pyramidatum</i>	use for <i>Blechum brownneii</i>
<i>Cassia occidentalis</i>	see <i>Senna occidentalis</i>
<i>Cassia tora</i>	see <i>Senna tora</i>
<i>Chamaesyce hirta</i>	use for <i>Euphorbia hirta</i>
<i>Clerodendrum chinense</i>	use for <i>Clerodendrum philippinum</i>
<i>Clerodendrum philippinum</i>	see <i>Clerodendrum chinense</i>
<i>Digitaria decumbens</i>	see <i>Digitaria eriantha</i>
<i>Digitaria eriantha</i>	use for <i>Digitaria decumbens</i>
<i>Elephantopus mollis</i>	use for <i>Elephantopus scaber</i>
<i>Elephantopus scaber</i>	see <i>Elephantopus mollis</i>
<i>Euphorbia geniculata</i>	see <i>Euphorbia heterophylla</i>
<i>Euphorbia heterophylla</i>	use for <i>Euphorbia geniculata</i>
<i>Euphorbia hirta</i>	see <i>Chamaesyce hirta</i>
<i>Fimbristylis atollensis</i>	see <i>Fimbristylis cymosa</i>
<i>Fimbristylis cymosa</i>	use for <i>Fimbristylis atollensis</i>
<i>Imperata cylindrica</i>	see <i>Imperata conferta</i>
<i>Imperata conferta</i>	use for <i>Imperata cylindrica</i>
<i>Jussiaea suffruticosa</i>	see <i>Ludwigia octovalvis</i>
<i>Ludwigia octovalvis</i>	use for <i>Jussiaea suffruticosa</i>
<i>Messerschmidia argentea</i>	see <i>Tournefortia argentea</i>
<i>Premna obtusifolia</i>	use for <i>Premna serratifolia</i>
<i>Premna serratifolia</i>	see <i>Premna obtusifolia</i>
<i>Scaveola sericea</i>	use for <i>Sericea taccada</i>
<i>Scaveola taccada</i>	see <i>Scaveola sericea</i>
<i>Senna occidentalis</i>	use for <i>Cassia occidentalis</i>
<i>Senna tora</i>	use for <i>Cassia tora</i>
<i>Solanum americanum</i>	use for <i>Solanum nigrum</i>
<i>Solanum nigrum</i>	see <i>Solanum americanum</i>
<i>Sorghum arundinaceum</i>	use for <i>Sorghum verticilliflorum</i>
<i>Sorghum verticilliflorum</i>	see <i>Sorghum arundinaceum</i>
<i>Tournefortia argentea</i>	use for <i>Messerschmidia argentea</i>

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