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Pest categorisation of *Sternochetus mangiferae*

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Abstract

The European Commission requested EFSA to conduct a pest categorisation of *Sternochetus mangiferae* (Coleoptera: Curculionidae), a monophagous pest weevil whose larvae exclusively feed on mango seeds, whereas adults feed on mango foliage. *S. mangiferae* is a species with reliable methods available for identification. It is regulated in the EU by Council Directive 2000/29/EC where it is listed in Annex IIB as a harmful organism whose introduction into EU Protected Zones (PZ) (Alentejo, Algarve and Madeira in Portugal, and Granada and Malaga in Spain) is banned. *S. mangiferae* is native to South East Asia and has spread to other mango-growing areas in Africa, South America and Oceania, causing significant damage. Larvae of *S. mangiferae* have been detected several times in mango fruit imported into the EU. In 2013, an outbreak was declared in one PZ in Spain. Official measures taken achieved eradication, which was officially declared in January 2018. The EFSA Plant Health Panel concludes that *S. mangiferae* could establish again and spread in the mango-growing areas of southern EU. Considering the criteria within the remit of EFSA to assess the status as a potential Union quarantine pest (QP), as a potential protected zone quarantine pest (PZQP) or as a potential regulated non-quarantine pest (RNQP), *S. mangiferae* meets with no uncertainties the criteria for consideration as a potential Union QP, as it is absent from the EU, potential pathways for entry exist, and its establishment would cause an economic impact. The criterion of the pest being present in the EU, which is a prerequisite for RNQP and PZ QP, is not met.

Keywords: European Union, pest risk, plant health, plant pest, quarantine, mango, mango seed weevil

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Table of contents

1. Introduction

1.1. Background and Terms of Reference as provided by the requestor

1.1.1. Background

Council Directive 2000/29/EC[1] on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community establishes the present European Union plant health regime. The Directive lays down the phytosanitary provisions and the control checks to be carried out at the place of origin on plants and plant products destined for the Union or to be moved within the Union. In the Directive's 2000/29/EC annexes, the list of harmful organisms (pests) whose introduction into or spread within the Union is prohibited, is detailed together with specific requirements for import or internal movement.

Following the evaluation of the plant health regime, the new basic plant health law, Regulation (EU) 2016/2031[2] on protective measures against pests of plants, was adopted on 26 October 2016 and will apply from 14 December 2019 onwards, repealing Directive 2000/29/EC. In line with the principles of the above mentioned legislation and the follow-up work of the secondary legislation for the listing of EU regulated pests, EFSA is requested to provide pest categorisations of the harmful organisms included in the annexes of Directive 2000/29/EC, in the cases where recent pest risk assessment/pest categorisation is not available.

1.1.2. Terms of Reference

EFSA is requested, pursuant to Article 22(5.b) and Article 29(1) of Regulation (EC) No 178/2002[3], to provide scientific opinion in the field of plant health.

EFSA is requested to prepare and deliver a pest categorisation (step 1 analysis) for each of the regulated pests included in the appendices of the annex to this mandate. The methodology and template of pest categorisation have already been developed in past mandates for the organisms listed in Annex II Part A Section II of Directive 2000/29/EC. The same methodology and outcome is expected for this work as well.

The list of the harmful organisms included in the annex to this mandate comprises 133 harmful organisms or groups. A pest categorisation is expected for these 133 pests or groups and the delivery of the work would be stepwise at regular intervals through the year as detailed below. First priority covers the harmful organisms included in Appendix 1, comprising pests from Annex II Part A Section I and Annex II Part B of Directive 2000/29/EC. The delivery of all pest categorisations for the pests included in Appendix 1 is June 2018. The second priority is the pests included in Appendix 2, comprising the group of *Cicadellidae* (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), the group of *Tephritidae* (non-EU), the group of potato viruses and virus-like organisms, the group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L. and the group of *Margarodes* (non-EU species). The delivery of all pest categorisations for the pests included in Appendix 2 is end 2019. The pests included in Appendix 3 cover pests of Annex I part A section I and all pests categorisations should be delivered by end 2020.

For the above mentioned groups, each covering a large number of pests, the pest categorisation will be performed for the group and not the individual harmful organisms listed under "such as" notation in the Annexes of the Directive 2000/29/EC. The criteria to be taken particularly under consideration for these cases, is the analysis of host pest combination, investigation of pathways, the damages occurring and the relevant impact.

Finally, as indicated in the text above, all references to 'non-European' should be avoided and replaced by 'non-EU' and refer to all territories with exception of the Union territories as defined in Article 1 point 3 of Regulation (EU) 2016/2031.

[1] Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. OJ L 169/1, 10.7.2000, p. 1–112.

[2] Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants. OJ L 317, 23.11.2016, p. 4–104.

[3] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31/1, 1.2.2002, p. 1–24.

1.1.2.1. Terms of Reference: Appendix 1

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

Aleurocantus spp.
Anthonomus bisignifer (Schenkling)
Anthonomus signatus (Say)
Aschistonyx eppoi Inouye
Carposina niponensis Walsingham
Enarmonia packardi (Zeller)
Enarmonia prunivora Walsh
Grapholita inopinata Heinrich
Hishomonus phycitis
Leucaspis japonica Ckll.
Listronotus bonariensis (Kuschel)
Numonia pyrivorella (Matsumura)
Oligonychus perditus Pritchard and Baker
Pissodes spp. (non-EU)
Scirtothrips aurantii Faure
Scirtothrips citri (Moultex)
Scolytidae spp. (non-EU)
Scrobipalpopsis solanivora Povolny
Tachypterellus quadrigibbus Say
Toxoptera citricida Kirk.
Unaspis citri Comstock

(b) Bacteria

Citrus variegated chlorosis
Erwinia stewartii (Smith) Dye
Xanthomonas campestris pv. *oryzae* (Ishiyama) Dye and pv. *oryzicola* (Fang. et al.) Dye

(c) Fungi

Alternaria alternata (Fr.) Keissler (non-EU pathogenic isolates)
Anisogramma anomala (Peck) E. Müller
Apiosporina morbosa (Schwein.) v. Arx
Ceratocystis virescens (Davidson) Moreau
Cercoseptoria pini-densiflorae (Hori and Nambu) Deighton
Cercospora angolensis Carv. and Mendes
Elsinoe spp. Bitanc. and Jenk. Mendes
Fusarium oxysporum f. sp. *albedinis* (Kilian and Maire) Gordon
Guignardia piricola (Nosa) Yamamoto
Puccinia pittieriana Hennings
Stegophora ulmea (Schweinitz: Fries) Sydow & Sydow
Venturia nashicola Tanaka and Yamamoto

(d) Virus and virus-like organisms

Beet curly top virus (non-EU isolates)
Black raspberry latent virus
Blight and blight-like
Cadang-Cadang viroid
Citrus tristeza virus (non-EU isolates)
Leprosis
Little cherry pathogen (non- EU isolates)
Naturally spreading psorosis
Palm lethal yellowing mycoplasm
Satsuma dwarf virus
Tatter leaf virus
Witches' broom (MLO)

Annex IIB

(a) Insect mites and nematodes, at all stages of their development

Anthonomus grandis (Boh.)
Cephalcia lariciphila (Klug)
Dendroctonus micans Kugelan
Gilphinia hercyniae (Hartig)
Gonipterus scutellatus Gyll.
Ips amitinus Eichhof
Ips cembrae Heer
Ips duplicatus Sahlberg
Ips sexdentatus Börner
Ips typographus Heer
Sternochetus mangiferae Fabricius

(b) Bacteria

Curtobacterium flaccumfaciens pv. flaccumfaciens (Hedges) Collins and Jones

(c) Fungi

Glomerella gossypii Edgerton
Gremmeniella abietina (Lag.) Morelet
Hypoxylon mammatum (Wahl.) J. Miller

1.1.2.2. Terms of Reference: Appendix 2

List of harmful organisms for which pest categorisation is requested per group. The list below follows the categorisation included in the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

Group of Cicadellidae (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), such as:

1) *Carneocephala fulgida* Nottingham
2) *Draeculacephala minerva* Ball
3) *Graphocephala atropunctata* (Signoret)

Group of Tephritidae (non-EU) such as:

1) *Anastrepha fraterculus* (Wiedemann)
2) *Anastrepha ludens* (Loew)
3) *Anastrepha obliqua* Macquart
4) *Anastrepha suspensa* (Loew)
5) *Dacus ciliatus* Loew
6) *Dacus curcurbitae* Coquillet
7) *Dacus dorsalis* Hendel
8) *Dacus tryoni* (Froggatt)
9) *Dacus tsuneonis* Miyake
10) *Dacus zonatus* Saund.
11) *Epochra canadensis* (Loew)
12) *Pardalaspis cyanescens* Bezzi
13) *Pardalaspis quinaria* Bezzi
14) *Pterandrus rosa* (Karsch)
15) *Rhacochlaena japonica* Ito
16) *Rhagoletis completa* Cresson
17) *Rhagoletis fausta* (Osten-Sacken)
18) *Rhagoletis indifferens* Curran
19) *Rhagoletis mendax* Curran
20) *Rhagoletis pomonella* Walsh
21) *Rhagoletis suavis* (Loew)

(c) Viruses and virus-like organisms

Group of potato viruses and virus-like organisms such as:

1) Andean potato latent virus
2) Andean potato mottle virus
3) Arracacha virus B, oca strain
4) Potato black ringspot virus
5) Potato virus T
6) non-EU isolates of potato viruses A, M, S, V, X and Y (including Yo, Yn and Yc) and Potato leafroll virus

Group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L., such as:

1) Blueberry leaf mottle virus
2) Cherry rasp leaf virus (American)
3) Peach mosaic virus (American)
4) Peach phony rickettsia
5) Peach rosette mosaic virus
6) Peach rosette mycoplasm
7) Peach X-disease mycoplasm
8) Peach yellows mycoplasm
9) Plum line pattern virus (American)
10) Raspberry leaf curl virus (American)
11) Strawberry witches' broom mycoplasma
12) Non-EU viruses and virus-like organisms of *Cydonia Mill., Fragaria L., Malus Mill., Prunus L., Pyrus L., Ribes L., Rubus L.* and *Vitis L.*

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

Group of *Margarodes* (non-EU species) such as:

1) *Margarodes vitis* (Phillipi)
2) *Margarodes vredendalensis* de Klerk
3) *Margarodes prieskaensis* Jakubski

1.1.2.3. Terms of Reference: Appendix 3

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

Acleris spp. (non-EU)
Amauromyza maculosa (Malloch)
Anomala orientalis Waterhouse
Arrhenodes minutus Drury
Choristoneura spp. (non-EU)
Conotrachelus nenuphar (Herbst)
Dendrolimus sibiricus Tschetverikov
Diabrotica barberi Smith and Lawrence
Diabrotica undecimpunctata howardi Barber
Diabrotica undecimpunctata undecimpunctata Mannerheim
Diabrotica virgifera zeae Krysan & Smith
Diaphorina citri Kuway
Heliothis zea (Boddie)
Hirschmanniella spp., other than *Hirschmanniella gracilis* (de Man) Luc and Goodey
Liriomyza sativae Blanchard
Longidorus diadecturus Eveleigh and Allen
Monochamus spp. (non-EU)
Myndus crudus Van Duzee
Nacobbus aberrans (Thorne) Thorne and Allen
Naupactus leucoloma Boheman
Premnotrypes spp. (non-EU)
Pseudopityophthorus minutissimus (Zimmermann)
Pseudopityophthorus pruinosus (Eichhoff)
Scaphoideus luteolus (Van Duzee)
Spodoptera eridania (Cramer)
Spodoptera frugiperda (Smith)
Spodoptera litura (Fabricus)
Thrips palmi Karny
Xiphinema americanum Cobb sensu lato (non-EU populations)
Xiphinema californicum Lamberti and Bleve-Zacheo

(b) Fungi

Ceratocystis fagacearum (Bretz) Hunt
Chrysomyxa arctostaphyli Dietel
Cronartium spp. (non-EU)
Endocronartium spp. (non-EU)
Guignardia laricina (Saw.) Yamamoto and Ito
Gymnosporangium spp. (non-EU)
Inonotus weirii (Murril) Kotlaba and Pouzar
Melampsora farlowii (Arthur) Davis
Mycosphaerella larici-leptolepis Ito et al.
Mycosphaerella populorum G. E. Thompson
Phoma andina Turkensteen
Phyllosticta solitaria Ell. and Ev.
Septoria lycopersici Speg. var. *malagutii* Ciccarone and Boerema
Thecaphora solani Barrus
Trechispora brinkmannii (Bresad.) Rogers

(c) Viruses and virus-like organisms

Tobacco ringspot virus
Tomato ringspot virus
Bean golden mosaic virus
Cowpea mild mottle virus
Lettuce infectious yellows virus
Pepper mild tigré virus
Squash leaf curl virus
Euphorbia mosaic virus
Florida tomato virus

(d) Parasitic plants

Arceuthobium spp. (non-EU)

Annex IAII

(a) Insects, mites and nematodes, at all stages of their development

Meloidogyne fallax Karssen
Popillia japonica Newman
Rhizoecus hibisci Kawai and Takagi

(b) Bacteria

Clavibacter michiganensis (Smith) Davis et al. ssp. *sepedonicus* (Spieckermann and Kotthoff) Davis et al.
Ralstonia solanacearum (Smith) Yabuuchi et al.

(c) Fungi

Melampsora medusae Thümen
Synchytrium endobioticum (Schilbersky) Percival

Annex IB

(a) Insects, mites and nematodes, at all stages of their development

Leptinotarsa decemlineata Say
Liriomyza bryoniae (Kaltenbach)

(b) Viruses and virus-like organisms

Beet necrotic yellow vein virus

1.2. Interpretation of the Terms of Reference

Sternochetus mangiferae is one of a number of pests listed in the Appendices to the Terms of Reference (ToR) to be subject to pest categorisation to determine the criteria it fulfils informing its status as a regulated pest, i.e. quarantine pest (QP), or regulated non-quarantine pest (RNQP) for the area of the EU excluding Ceuta, Melilla and the outermost regions of Member States (MS) referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores, or a protected zone (PZ) pest for specified regions within the EU.

Unusually for a pest that is not present in the EU, *S. mangiferae* is specifically regulated in some PZs, (Alentejo, Algarve and Madeira in Portugal, and Granada and Malaga in Spain). This categorisation will explore whether the pest fulfils the criteria set in Regulation (EU) 2016/2031 regarding Union QP, RNQP and protected zone quarantine pest (PZQP) status, and which are within the remit for EFSA to assess.

Regarding the name of the pest, *S. mangiferae* (Fabricius), the brackets around the authority are not present in the ToR. Fabricius originally named and described the organism as *Curculio mangiferae* in 1775. Warner (1956) moved the organism into the genus *Sternochetus* to create a new combination which stands as the valid name. Therefore, the current valid name and authority is *Sternochetus mangiferae* (Fabricius).

2. Data and methodologies

2.1. Data

2.1.1. Literature search

A literature search on *S. mangiferae* was conducted at the beginning of the categorisation in the ISI Web of Science bibliographic database, using the scientific name of the pest as search term. Relevant papers were reviewed and further references and information were obtained from experts, as well as from citations within the references and grey literature.

2.1.2. Database search

Pest information, on host(s) and distribution, was retrieved from the European and Mediterranean Plant Protection Organization (EPPO) Global Database (EPPO, 2018a,b) and relevant publications.

Data about the import of commodity types that could potentially provide a pathway for the pest to enter the EU and about the area of hosts grown in the EU were obtained from EUROSTAT (Statistical Office of the European Communities).

The Europhyt database was consulted for pest-specific notifications on interceptions and outbreaks. Europhyt is a web-based network run by the Directorate General for Health and Food Safety (DG SANTÉ) of the European Commission, and is a subproject of PHYSAN (Phyto-Sanitary Controls) specifically concerned with plant health information. The Europhyt database manages notifications of interceptions of plants or plant products that do not comply with EU legislation, as well as notifications of plant pests detected in the territory of the MS and the phytosanitary measures taken to eradicate or avoid their spread.

2.2. Methodologies

The Panel performed the pest categorisation for *S. mangiferae*, following guiding principles and steps in the International Standard for Phytosanitary Measures No 11 (FAO, 2013) and No 21 (FAO, 2004) and EFSA PLH Panel (2018).

This work was initiated following an evaluation of the EU plant health regime. Therefore, to facilitate the decision-making process, in the conclusions of the pest categorisation, the Panel addresses explicitly each criterion for a Union QP and for a Union RNQP in accordance with Regulation (EU) 2016/2031 on protective measures against pests of plants, and includes additional information required in accordance with the specific terms of reference received by the European Commission. In addition, for each conclusion, the Panel provides a short description of its associated uncertainty.

Table 1 presents the Regulation (EU) 2016/2031 pest categorisation criteria on which the Panel bases its conclusions. All relevant criteria have to be met for the pest to potentially qualify either as a QP or as a RNQP. If one of the criteria is not met, the pest will not qualify. A pest that does not qualify as a QP may still qualify as a RNQP that needs to be addressed in the opinion. For the pests regulated in the PZs only, the scope of the categorisation is the territory of the PZ; thus, the criteria refer to the protected zone instead of the EU territory.

It should be noted that the Panel's conclusions are formulated respecting its remit and particularly with regard to the principle of separation between risk assessment and risk management (EFSA founding regulation (EU) No 178/2002); therefore, instead of determining whether the pest is likely to have an unacceptable impact, the Panel will present a summary of the observed pest impacts. Economic impacts are expressed in terms of yield and quality losses and not in monetary terms, whereas addressing social impacts is outside the remit of the Panel.

Table 1: Pest categorisation criteria under evaluation, as defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Identity of the pest (Section 3.1)	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?
Absence/ presence of the pest in the EU territory (Section 3.2)	Is the pest present in the EU territory? If present, is the pest widely distributed within the EU? Describe the pest distribution briefly!	Is the pest present in the EU territory? If not, it cannot be a protected zone quarantine organism.	Is the pest present in the EU territory? If not, it cannot be a regulated non-quarantine pest. (A regulated non-quarantine pest must be present in the risk assessment area)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Regulatory status (Section 3.3)	If the pest is present in the EU but not widely distributed in the risk assessment area, it should be under official control or expected to be under official control in the near future.	The protected zone system aligns with the pest free area system under the International Plant Protection Convention (IPPC). The pest satisfies the IPPC definition of a quarantine pest that is not present in the risk assessment area (i.e. protected zone).	Is the pest regulated as a quarantine pest? If currently regulated as a quarantine pest, are there grounds to consider its status could be revoked?
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Is the pest able to enter into, become established in, and spread within, the EU territory? If yes, briefly list the pathways!	Is the pest able to enter into, become established in, and spread within, the protected zone areas? Is entry by natural spread from EU areas where the pest is present possible?	Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects? Clearly state if plants for planting is the main pathway!
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?	Would the pests' introduction have an economic or environmental impact on the protected zone areas?	Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
Available measures (Section 3.6)	Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?	Are there measures available to prevent the entry into, establishment within or spread of the pest within the protected zone areas such that the risk becomes mitigated? Is it possible to eradicate the pest in a restricted area within 24 months (or a period longer than 24 months where the biology of the organism so justifies) after the presence of the pest was confirmed in the protected zone?	Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?
Conclusion of pest categorisation (Section 4)	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria assessed by EFSA above for consideration as potential protected zone quarantine pest were met, and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential regulated non-quarantine pest were met, and (2) if not, which one(s) were not met

The Panel will not indicate in its conclusions of the pest categorisation whether to continue the risk assessment process, but following the agreed two-step approach, will continue only if requested by the risk managers. However, during the categorisation process, experts may identify key elements and knowledge gaps that could contribute significant uncertainty to a future assessment of risk. It would be useful to identify and highlight such gaps so that potential future requests can specifically target the major elements of uncertainty, perhaps suggesting specific scenarios to examine.

3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Identity and taxonomy

Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?

Yes, *S. mangiferae* is a well-defined insect species in the order Coleoptera (beetles), family Curculionidae (weevils)

The mango stone weevil, also known as mango seed weevil, mango weevil, and mango nut weevil (Smith et al., 1997), *S. mangiferae* (Fabricius) (Coleoptera: Curculionidae) is an insect originally described as *Curculio mangiferae* by Fabricius in 1775. Other former scientific names include: *Acryptorhynchus mangiferae* (Fabricius), *Cryptorhynchus ineffectus* Walker, *C. mangiferae* (Fabricius), *C. monachus* Boisduval, *Rhynchaenus mangiferae* (Fabricius), *Sternochetus ineffectus* (Walker), and *Sternochetus olivieri* Faust (Australian Government-DAFF, 2005; Woodruff and Fasulo, 2009; EPPO, 2011).

The EPPO standard diagnostic protocol for *S. mangiferae* provides detailed morphological descriptions of this species, as well as a key for its identification to species level (EPPO, 2011).

According to Smith et al. (1997) *S. mangiferae* can be confused with two closely related species also developing in mangoes: *S. olivieri* (Faust) and *Sternochetus frigidus* (Fabricius). Like *S. mangiferae*, *S. olivieri* develops in mango stones while *S. frigidus* develops in the fruit pulp. In their native ranges in Asia, *S. mangiferae* occurs from the Arabian Peninsula to the south of the Indian subcontinent and into Myanmar and Malaysia, whereas *S. olivieri* occurs further east, and *S. frigidus* can be found from north-east India (Assam) and Bangladesh across Indochina to Indonesia and the western Philippines. Keys for the identification of these species exist (Unahawutti et al., 2015).

3.1.2. Biology of the pest

According to Woodruff and Fasulo (2009), the literature on *S. mangiferae* is contradictory on several aspects of its biology and this can be attributed to confusion with the two closely related sympatric species mentioned above (see Section 3.1.1). Therefore, and following these authors, the description of the biology of *S. mangiferae* will be mostly based on Balock and Kozuma (1964), who studied this weevil in Hawaii, where these two close relatives are not known to occur.

S. mangiferae is a univoltine and monophagous species which completes its life cycle, from egg to adult, within the mango seed. Upon completion of the immature development adults (typical weevil morphology with a curved rostrum, compact, dark in colour and up to 10 mm long) cut their way out of the naked seed with their mouthparts, usually within a month or two after the fruit falls and decays. On rare occasions, weevils may emerge from the seed before fruit fall and eat their way through the flesh of the ripe fruit, ruining it completely. Adults can live for more than two years if provided with fresh mangoes and water (Follett, 2002). Those emerging late during the fruiting period, which extends from May to September in southern EU, can enter a diapause associated with the long-day photoperiod prevailing at that time. Diapausing weevils can be found under loose bark on mango tree trunks and on crevices in or near mango trees. Diapause finishes in coincidence with the break of the short-day photoperiod at the onset of the regular mango fruiting season (winter-early spring in southern Europe). At that time, adults become active, aggregate and begin feeding on leaves and tender shoots of mangoes. They are nocturnal and usually mate and oviposit from late afternoon to dusk. Females lay eggs (elliptical, 0.8 × 0.3 mm, creamy-white in colour) singly on the skin of immature to ripe fruit, mostly on the sinus of the fruit (the area close to the terminal lateral beak typical of mango fruit) (Shukla et al., 1985), but also on the stems. Females carve out a boat-shaped cavity in the skin where they deposit the egg. This is immediately covered by a brown exudate produced by the wound (Follett, 2002). Females may lay up to 15 eggs daily, with a maximum of around 300 eggs during a 3-month period in the laboratory (Balock and Kozuma, 1964). Hatching takes place in 5–7 days. After hatching, larvae burrow through the flesh and into the seed. It is not clear whether there are 4 or 5 larval instars, with size increasing from 1.4 to 8.0 mm long. Larvae are legless and white with a black head not retracted into the prothorax, as typical of most curculionids.

As fruit and seed develop, the tunnel and seed entry are completely obliterated so that in time it becomes quite difficult to distinguish infested from non-infested seeds unless they are cut open (Balock and Kozuma, 1964). Complete larval development, which takes about from one month to more than two months, depending on the season and temperatures, usually occurs within the maturing seed, but also very occasionally within the flesh (Hansen et al., 1989). Larvae feed within the seed and pupate in the seed cavity (Follett, 2002). Most infested seeds have one or two weevils but higher numbers can be found. Upon maturation, the adults rapidly leave the seeds crawling through the fruit (often rotten), and seek hiding places by crawling short distances rather than flying (Shukla and Tandon, 1985). Therefore, adults most often remain near the parent mango tree and high infestations regularly appear at the same locations, whereas new outbreaks may occur in nearby orchards.

3.1.3. Intraspecific diversity

No intraspecific diversity has been described for this species.

3.1.4. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, EPPO produced a standard addressing the detection and identification of *S. mangiferae* (EPPO, 2011).

Detection and monitoring:

According to CABI (2018), infested fruits are usually easy to distinguish from uninfested ones by the hardened, amber-coloured secretion often sculptured with two small angled tails at one end, which remains attached to the site of oviposition. This is especially recognisable when *S. mangiferae* populations are high. To detect these oviposition scars, fruits should be examined with a pocket lens, focusing on the sinus of fruit. However, according to EPPO diagnostic standard (2011), such fruits are difficult to detect since there is usually no damage visible externally (see Section 3.1.2). Because internally infested fruits rot from the outer surface of the stone, which show holes with the cotyledons turning black and becoming a rotten mass, inspection should include the opening of mango fruit and seed dissection with a knife (CABI, 2018).

Although adults have been caught in different types of trap (EPPO, 2011), none of them have been routinely used to monitor the adults of *S. mangiferae*, which are considered poor flyers.

Identification:

According to EPPO PM 7/106(1) (EPPO 2011), the identification of *S. mangiferae* should be based on the morphology of adult weevils. Examination under binocular and light microscopes is required. Adults have a compact body (up to 10 mm long) and are black and covered with black, greyish or yellowish scales. Their pronotum is subparallel-sided in the basal third only. Interstices 3, 5 and 7 of the elytra are strongly carinate. They show an indistinct oblique pale humeral stripe on the elytra which is elongate and gradually declivous behind. Femora have a single large tooth ventrally. The fore femora are stout, and distinctly clavate. The tarsal claws are simple and free. Males and females can be separated because the latter have an elevated ridge at the pygidial apex, which is absent in males.

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

S. mangiferae has been reported from all biogeographic regions where mangoes are grown with the exception of the Palearctic and the Nearctic regions (Figure 1; Table 2).

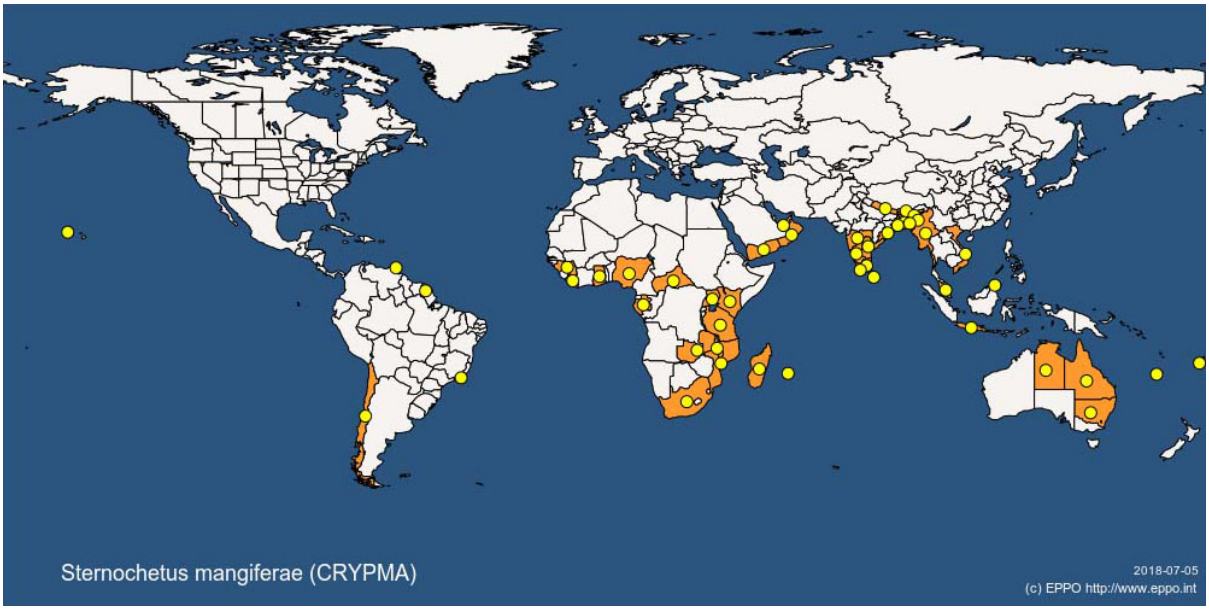

Figure 1: Global distribution map for *S. mangiferae* (extracted from the EPPO Global Database accessed on 5/7/2018)

Table 2: Current distribution of *S. mangiferae* outside Europe based on the information from the EPPO Global Database, accessed on 6 July 2018

Region	Country	Occurence
Africa	Central African Republic, Gabon, Ghana, Guinea, Kenya, Liberia, Madagascar, Malawi, Mauritius, Mozambique, Nigeria, Reunion, Seychelles, Tanzania, Uganda, Zambia	Present, no details
	South Africa	Present, restricted distribution
America	Barbados, Dominica, French Guiana, Grenada, Guadeloupe, Montserrat, Saint Lucia, St Vincent and the Grenadines, Trinidad and Tobago, United States of America (Hawaii), Virgin Islands (British), Virgin Islands (US)	Present, no details
	Brazil (general), Brazil (Rio de Janeiro)	Present, few occurrences
	Chile, United States of America (general)	Present, restricted distribution
	Martinique	Present, widespread
Asia	Bangladesh, Bhutan, India (Andhra Pradesh, Assam, Karnataka, Kerala, Maharashtra, Manipur, Orissa, Tamil Nadu, Tripura, West Bengal), Myanmar, Nepal, Oman, Sri Lanka, Indonesia, Indonesia (Java), Malaysia, Malaysia (Sabah, West), United Arab Emirates, Viet Nam	Present, no details
	India (general), Yemen	Present, widespread
Oceania	Australia (New South Wales, Northern Territory, Queensland), Fiji, Guam, New Caledonia, Northern Mariana Islands, Tonga, Wallis and Futuna Islands	Present, no details
	Australia (general), French Polynesia	Present, restricted distribution

3.2.2. Pest distribution in the EU

Is the pest present in the EU territory? If present, is the pest widely distributed within the EU?

No, *S. mangiferae* is not known to occur in the EU. It was detected in 2013 in southern Spain, from where it was considered as successfully eradicated in 2018.

Table 3: Current distribution of *S. mangiferae* in the 28 EU MS based on information from the EPPO Global Database (accessed on 6 July 2018) and other sources if relevant

Country	EPPO Global Database Last update: Date accessed:	Other sources
Austria	–	
Belgium	–	
Bulgaria	–	
Croatia	–	
Cyprus	–	
Czech Republic	–	
Denmark	–	
Estonia	–	
Finland	Absent, intercepted only	
France	–	
Germany	–	
Greece	–	
Hungary	–	
Ireland	–	
Italy	–	
Latvia	–	
Lithuania	–	
Luxembourg	–	
Malta	–	
Netherlands	–	
Poland	–	
Portugal	Absent, confirmed by survey	
Romania	–	
Slovak Republic	–	
Slovenia	–	
Spain	Absent, pest eradicated	Pest found present, but eradicated (Europhyt notifications outbreaks n. -197
Sweden	–	
United Kingdom	–	

'–': no information available.

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

S. mangiferae is listed in Council Directive 2000/29/EC. Details are presented in Tables 3 and 4.

Table 4: *S. mangiferae* in Council Directive 2000/29/EC

Annex II	**Harmful organisms whose introduction into, and spread within, all member states shall be banned if they are present on certain plants or plant products**		
Part B	**Harmful organisms whose introduction into, and whose spread within, certain protected zones shall be banned if they are present on certain plants or plant products**		
(a)	Insects, mites and nematodes, at all stages of their development		
	Species	Subject of contamination	Protected zone(s)
9. *Sternochetus mangiferae* Fabricius		Seeds of *Mangifera* spp. originating in third countries	E (Granada and Malaga), P (Alentejo, Algarve and Madeira)

3.3.2. Legislation addressing the hosts of *S. mangiferae*

Table 5: EC Regulated hosts and commodities that may involve *S. mangiferae* in Annexes, IV and V of Council Directive 2000/29/EC

Annex IV, Part B	**Special requirements which shall be laid down by all member states for the introduction and movement of plants, plant products and other objects into and within certain protected zones**		
	Plants, plant products and other objects	Special requirements	Protected zone(s)
29	Seeds of *Mangifera* spp.	Official statement that the seeds originate in areas known to be free from *Sternochetus mangiferae* Fabricius.	E (Granada and Malaga), P (Alentejo, Algarve and Madeira)
Annex V	Plants, plant products and other objects which must be subject to a plant health inspection (at the place of production if originating in the community, before being moved within the community — in the country of origin or the consignor country, if originating outside the community) before being permitted to enter the community		
Part B	Plants, plant products and other objects originating in territories, other than those territories referred to in Part A		
I	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community		
3	Fruits of *Mangifera* L., originating in non-European countries		

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

S. mangiferae has not been reported to complete development in any host except mango (*Mangifera indica*). In the laboratory, oviposition has been reported on potatoes, peach, litchi, plum, string beans, and several cultivars of apple (CABI, 2018). However, none of the resulting larvae reached maturity (Woodruff and Fasulo, 2009).

3.4.2. Entry

Is the pest able to enter into the EU territory?

Yes, the pest has been intercepted several times on fresh mango fruit. Furthermore, an outbreak was detected in southern Spain in 2013.

Searching EUROPHYT for notifications between 9/7/2009 and 6/7/2018, the PLHP found that there were 25 interceptions of *S. mangiferae* notified to the European Commission. The majority (22 of 25) of notifications were notified by Italy. Most interceptions were from Sri Lanka (Table 6). All notifications refer to fresh mango fruit (Europhyt code 140, 'fruit & vegetables')

Table 6: EU notifications of interceptions of *Sternochetus mangiferae* 2009 – 2018 (Source: Europhyt)

Country or origin	**2009**	**2011**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Sum**
LK (Sri Lanka)	–	–	3	12	1	–	–	–	16
UG (Uganda)	–	–	–	2	3	–	–	–	5
CM (Cameroon)	–	–	–	–	1	–	–	–	1
GH (Ghana)	–	1	–	–	–	–	–	–	1
IN (India)	1	–	–	–	–	–	–	–	1
KE (Kenya)	–	–	–	–	–	1	–	–	1
Sum	1	1	3	14	5	1	–	–	25

Entry via contaminated fresh mango fruit is considered the main entry pathway into the EU and PZs within the EU. EU import of mango fruit (HS 08045020) is shown in Table 7.

Table 7: EU member states import of mango fruits 2013–2017, ranked in descending order of mean annual import quantity 2013–2017 (Eurostat, accessed on 6/7/2018). Quantity in 100 kg

Partner/Period	2013	2014	2015	2016	2017
Brazil	900,652	993,140	1,111,954	1,149,230	1,228,447
United States of America	116,462	113,432	74,138	122,534	111,873
India	60,382	9,558	24,775	43,290	54,216
Ghana	16,200	23,828	26,558	36,107	35,284
South Africa	2,965	5,917	14,819	15,101	22,870
Guinea	8,201	10,127	11,588	4,599	3,196
Indonesia	1,398	2,039	2,304	1,976	2,024
Bangladesh	534	2,114	3,985	1,520	558
Sri Lanka	1,328	2,878	1,021	1,272	1,039
Vietnam	1,064	914	1,526	1,203	1,273
Malaysia	382	674	329	328	250
Grenada	449	406	379	459	253
Dominica	107	194	1,396	65	14
St Lucia	57	313	662	321	391
Chile	184	459	471	448	34
Uganda	75	123	177	293	664
Kenya	252	145	260	242	40
Madagascar		74	201	247	22
Australia	19	45	13	26	107
Tanzania	0			200	6
United Arab Emirates	12		109	61	9
French Polynesia				31	1
Nepal	19				0
Nigeria			5	11	2
Zambia	3	3			4
Mauritius	0	7			2
Gabon					2
Mozambique					2
Trinidad and Tobago					2
Myanmar	0				1

Mango fruits from non-European countries are subject to a plant health inspection before being permitted to enter the community (2000/29 EC, Annex V B 3).

Present EU regulations allow the import of mango seeds into EU protected zones only if they originate in pest free areas, i.e. areas free from *S. mangiferae* (Annexes II B 9 and IV B 29). No data could be found regarding EU import of mango seed.

Commercial mangoes are propagated vegetatively, meaning that trees are reproduced via asexual reproduction by grafting onto rootstock, which can be grown from seed. Mango fruit used as a seed source, deviating from the fruits intended use as fruit for consumption or processing, could provide a pathway.

Free living adults could also enter the EU on plants for planting (excluding seeds), bark, and cut branches. However, in these cases, the pest is usually visible at the naked eye.

3.4.3. Establishment

Is the pest able to become established in the EU territory?

Yes, *S. mangiferae* is a monophagous pest developing on mangoes only. An outbreak was detected in Spain in 2013 and declared eradicated in 2018. Other mango-growing areas in southern EU are also likely to be suitable for the establishment of this pest.

3.4.3.1. EU distribution of main host plants

Mangoes can be grown outdoors in several southern states of the EU, including Cyprus, Greece, Italy, Malta, Portugal and Spain (Canarius, 2011). However, Italy and Spain are the only European countries with any commercial production of these subtropical fruits. In the Iberian Peninsula, this production concentrates in the Andalusian Mediterranean coast, in the provinces of Malaga and Granada, where 5,000 ha with an annual production of 22,000 tonnes are located (Fresh Plaza, 2015; MAGRAMA, 2018). In Italy, production concentrates in Sicily (provinces of Catania, Messina and Palermo), with about 55 ha (Agronotizie, 2016).

3.4.3.2. Climatic conditions affecting establishment

Mango is a subtropical crop occurring in southern EU (see Section 3.4.3.1) and *S. mangiferae* has co-evolved with this crop in its area of origin. Therefore, establishment could occur in EU areas growing mango. In November 2013, *S. mangiferae* was detected for the first time in the EU on mangoes in the municipality of Velez-Malaga (included in the Spanish protected zone of Malaga). The pest was found in one plot of approximately 1 ha where more than 70% of the mangoes were damaged. A demarcated area was established and eradication measures were put in place. However, *S. mangiferae* was detected again in the same plot in 2015. Additional measures were taken and because since 2016, *S. mangiferae* has not been detected again, the Spanish NPPO considered the pest eradicated in 2018 (EPPO, 2018a,b).

3.4.4. Spread

Although this weevil can fly, it is considered a poor flyer. Individuals often remain within the vicinity of the original mango tree on which they developed (see Section 3.1.2). This can be inferred from the aggregated distribution patterns observed in infested areas. Therefore, *S. mangiferae* spreads over long distances mostly by transportation of infested symptomless fruits since this weevil develops within the mango seed and thus remains most often unnoticed until adult emergence (CABI, 2018).

Would the pests' introduction have an economic or environmental impact on the EU territory?

Yes, should *S. mangiferae* enter and establish in the EU, economic impacts on mango production would be expected.

RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?[4]

RNQP not relevant as pest is absent from EU

Yes, the presence of *S. mangiferae* in mango seeds, usually precludes its germination. Therefore, infested seeds are not usable for mango rootstock roduction.

3.5. Impacts

S. mangiferae damage may result in reduction in yield from premature fruit drop (Verghese et al., 2005), fruits being downgraded (Peng and Christian, 2004, 2005) and reduction in seed viability for seedling production (Follett and Gabbard, 2000). However, its greatest significance as a pest is to interfere with the export of mango fruit because of quarantine restrictions imposed by large mango-importing countries (Peng and Christian 2007).

[4] See Section 2.1 on what falls outside EFSA's remit.

When *S. mangiferae* was detected in Spain in 2013, the eradication programme had an economic impact for growers (70% affected fruit in the outbreak orchard), nurserymen and the regional plant health administration in charge of the eradication programme.

3.6. Availability and limits of mitigation measures

Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?

Yes, measures against *S. mangiferae* are available to reduce the likelihood of its introduction into the EU protected zones (see Section 3.3: source mango seeds and fruit from PFA; subject mango fruit and seed imports to plant health inspection). Further control measures are available to hamper introduction into the EU as a whole (see section 3.6.1).

RNQPs: Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?

RNQP not relevant as pest is absent from EU

Yes, measures could be to source mango seeds from pest free areas (as per 2000/29 EC, Annexes II B 9 and IV B 29).

3.6.1. Identification of additional measures

Phytosanitary measures are currently applied to mango seeds, whose introduction into EU protected zones is banned unless originating from a PFA. Phytosanitary measures also applied to mango fruits from third countries, which are subject to a plant health inspection before being permitted to enter the community (see Section 3.3).

Extending the measure against seed to the whole of the EU rather than just the PZs, and the requirement to source fruit from a PFA would reduce likelihood of pest entry into the EU as a whole.

The following potential additional control measures (control measures have a direct effect on pest abundance) were identified (for more detailed information, refer to Table 8):

- Preharvest measures:
  - Chemical treatments targeting diapausing adult populations
  - Sanitation and proper disposal of waste material
  - Use of resistant cultivars
  - Conservation biological control.
- Post-harvest measures:
  - Fruit irradiation.

The following potential additional supporting measures (supporting measures are organisational measures or procedures supporting the choice of appropriate risk reduction options that do not directly affect pest abundance) were identified (for more detailed information, refer to Table 9):

- Inspection
- Laboratory testing
- Sampling
- Plant health inspection
- Certified and approved premises for export
- Certification of mango seeds
- Establishment of demarcated areas and buffer zones
- Surveillance.

Table 8: Selected control measures (a full list is available in EFSA PLH Panel, 2018) for pest entry, establishment, spread and impact in relation to currently unregulated hosts and pathways

Information sheet title (with hyperlink to information sheet if available)	Risk Reduction Option (RRO) summary	Risk component (entry/ establishment/spread/ impact)
Chemical treatments on crops including reproductive material (Work in progress, not yet available)	Chemical control has been used against this pest (Shukla and Tandon, 1985; de Villiers, 1987). Diapausing adults are targeted by trunk applications and foliar sprays at the time of oviposition	Entry, establishment, impact
Physical treatments on consignments or during processing	Irradiation is the most effective method of killing or sterilising weevils within fruit (Follett, 2001). An irradiation dose of 300 Gy is approved for control of mango seed weevil in mangoes exported from Hawaii to the continental USA (US Federal Register, 2002). In South Africa, irradiation of ripe, marketable fruit protected it from damage and prevented adult emergence (Kok, 1979)	Entry, spread
Waste management	Treatment of the waste (e.g. deep burial, composting, incineration, chipping, production of bio-energy) in authorised facilities and official restriction on the movement of waste	Entry, establishment, spread, impact (linked to waste from roguing and pruning)
Use of resistant and tolerant plant species/ varieties (Work in progress, not yet available)	Some mango cultivars are not infested by the weevil (CABI, 2018). In the case of the Itamaraca cultivar, larvae cannot penetrate the seed (Balock and Kozuma, 1964)	Entry, establishment, spread, impact
Roguing and pruning	Good orchard sanitation is an effective way to reduce adult populations, and this involves the destruction of all the fallen fruit, stones and fruits with seed weevil damage during and immediately after mango harvest (Wheatley, 1961; Kok, 1979; de Villiers, 1987; Peng and Christian, 2004)	Entry, establishment, spread, impact
Biological control and behavioural manipulation (Work in progress, not yet available)	The ant *Oecophylla smaragdina* is an effective biocontrol agent of *S. mangiferae* adults (Peng and Christian, 2004, 2005)	Establishment, spread, impact

Table 9: Selected supporting measures (a full list is available in EFSA PLH Panel, 2018) to mitigate the likelihood and magnitude of pest entry, establishment, spread and, or impact in relation to currently unregulated hosts and pathways

Information sheet (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/ establishment/spread/ impact)
Inspection and trapping	Refer to EPPO standard on *S. mangiferae* diagnostics (EPPO PM 7/106)	Entry
Laboratory testing	Refer to EPPO standard on *S. mangiferae* diagnostics (EPPO PM 7/106)	Entry
Sampling (Work in progress, not yet available)	According to ISPM 31, it is usually not feasible to inspect entire consignments, so phytosanitary inspection is performed mainly on samples obtained from a consignment	Entry, establishment However, no sampling plan presently available for this pest
Phytosanitary certificate and plant passport (Work in progress, not yet available)	Refer to IPPC model phytosanitary certificate (ISPM 5)	Entry, spread

Information sheet (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/ establishment/spread/ impact)
Certified and approved premises	Mango orchards exporting to the EU could be subject to this procedure	Entry
Certification of reproductive material (voluntary/official) (Work in progress, not yet available)	Mango seeds could be subject to this procedure	Entry, spread
Delimitation of Buffer zones	ISPM 5	Spread (should the pest re-enter the EU)
Surveillance (Work in progress, not yet available)	Could be applied outside within the EU outside current PZs	Entry, establishment Surveillance has been used by MS (e.g. Spain)

3.6.1.1. Biological or technical factors limiting the feasibility and effectiveness of measures to prevent the entry, establishment and spread of the pest

- Infested fruit is often symptomless;
- Phytotoxicity of some quarantine treatments such as heat.

3.7. Uncertainty

Although pest categorisation by its very nature of being a rapid process contains uncertainties, in this case, there is no uncertainty affecting the conclusions of the pest categorisation of *S. mangiferae*.

4. Conclusions

S. mangiferae meets with no uncertainties the criteria assessed by EFSA for consideration as a potential Union QP (it is absent from the EU, potential pathways exist, and its establishment would cause an economic impact). The criterion of the pest being present in the EU, which is a prerequisite for RNQP and PZQP status, is not met.

Table 10: The Panel's conclusions on the pest categorisation criteria defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	The identity of the pest is established. *S. mangiferae* is a weevil for which EPPO produced a standard on detection and identification	The identity of the pest is established. *S. mangiferae* is a weevil for which EPPO produced a standard on detection and identification	The identity of the pest is established. *S. mangiferae* is a weevil for which EPPO produced a standard on detection and identification	No uncertainties

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Absence/ presence of the pest in the EU territory (Section 3.2)	*S. mangiferae* is not known to occur in the EU territory	*S. mangiferae* is not known to occur in the EU territory. Therefore, this pest does not fulfil this criterion of being present in the EU to qualify for PZ QP status	*S. mangiferae* is not known to occur in the EU territory. Therefore, this pest does not fulfil the criterion of being present in the EU to qualify for RNQP status	No uncertainties
Regulatory status (Section 3.3)	*S. mangiferae* is presently regulated under Annex IIB and is not known to occur in the EU	Although the pest is presently regulated as a PZQP, it is not present in the EU, a usual feature of an EU PZ pest	*S. mangiferae* is not regulated as a RNQP and there are no grounds to consider this status as it is not present in the EU	No uncertainties
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	*S. mangiferae* has been intercepted several times at EU borders. It was eradicated from Spain in 2018. Fresh fruit and seeds are the main two pathways for this monophagous species. Free living adults could also enter on plants for planting other than seeds, bark, and cut branches	*S. mangiferae* has been recently (2018) eradicated from a PZ in Spain, where it was found in 2013. Its introduction should most probably be related to movement of infested material (either seeds or fruit) rather than natural spread	Spread is mainly via plants for planting (seeds) rather than via natural spread	No uncertainties
Potential for consequences in the EU territory (Section 3.5)	The introduction of *S. mangiferae* into the EU would most probably have an economic impact in the areas where mango commercial orchards exist (i.e. Andalusia and Sicily)	The introduction of *S. mangiferae* into the EU PZ would most probably have an economic impact in these areas (Granada and Malaga in Spain, and Alentejo, Algarve and Madeira in Portugal)	The presence of *S. mangiferae* on plants for planting (seeds) has an economic impact, as regards to the intended use of those plants for planting	No uncertainties
Available measures (Section 3.6)	There are measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated (i.e. sourcing fruit and seeds from PFA, plant health certificate prior to import)	There are measures available to prevent the entry into, establishment within or spread of the pest within the EU PZ such that the risk becomes mitigated (i.e. sourcing fruit and seeds from PFA, plant health certificate prior to import) The outbreak of this pest declared in a PZ in Spain in 2013 took 5 years to get eradicated	There are measures available to prevent pest presence on plants for planting such that the risk becomes mitigated (i.e. sourcing fruit and seeds from PFA, plant health certificate prior to import)	No uncertainties

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Conclusion on pest categorisation (Section 4)	All criteria assessed by EFSA above for consideration as a potential quarantine pest were met	All criteria assessed by EFSA above for consideration as potential protected zone quarantine pest were not met. The criterion of the pest being present in the EU is not met	All criteria assessed by EFSA above for consideration as a potential regulated non-quarantine pest were not met. The criterion of the pest being present in the EU is not met	No uncertainties
Aspects of assessment to focus on/ scenarios to address in future if appropriate	Due to the lack of uncertainty within this categorisation, the PLH Panel do not feel the need to draw attention to particular aspects of risk that warrant further attention in a more detailed assessment			

References

Agronotizie, 2016. La Sicilia si profuma di mango. Available online: https://agronotizie.imagelinenetwork.com/vivaismo-e-sementi/2016/02/10/la-sicilia-si-profuma-di-mango/47253 [Accessed: 26 January 2018]

Australian Government-DAFF (Department of Agriculture, Fisheries and Forestry), 2005. Mangoes from India. Draft Revised Import Policy. 251 pp.

Balock JW and Kozuma TT, 1964. Notes on the biology and economic importance of the mango weevil, *Sternochetus mangiferae* (Fabricius), in Hawaii (Coleoptera: Curculionidae). Proceedings of the Hawaiian Entomological Society, 18, 353–364.

CABI, 2018. *Sternochetus mangiferae* (mango seed weevil) Datasheet 16434, CABI Crop Protection Compendium, Last Modified 14th July 2018. Available online: http://www.cabi.org/cpc/datasheet/16434 [Accessed: 23 July 2018]

Canarius, 2011. Exotic plants from the Canary Isands. Mango. Available online: https://www.canarius.com/blog/where-do-mangos-grow-in-europe/ [Accessed: 26 January 2018]

EFSA PLH Panel (EFSA Panel on Plant Health), Jeger M, Bragard C, Caffier D, Candresse T, Chatzivassiliou E, Dehnen-Schmutz K, Gregoire J-C, Jaques Miret JA, MacLeod A, Navajas Navarro M, Niere B, Parnell S, Potting R, Rafoss T, Rossi V, Urek G, Van Bruggen A, Van Der Werf W, West J, Winter S, Hart A, Schans J, Schrader G, Suffert M, Kertesz V, Kozelska S, Mannino MR, Mosbach-Schulz O, Pautasso M, Stancanelli G, Tramontini S, Vos S and Gilioli G, 2018. Guidance on quantitative pest risk assessment. EFSA Journal 2018;16(8):5350, 86 pp. https://doi.org/10.2903/j.efsa.2018.5350

EPPO (European and Mediterranean Plant Protection Organization), 2011. EPPO PM 7/106 (1) Diagnostics *S. mangiferae*. Bulletin OEPP/EPPO Bulletin, 41, 352–356.

EPPO (European and Mediterranean Plant Protection Organization), 2018a. EPPO Global Database. Available online: https://gd.eppo.int/ [Accessed 5 July 2018]

EPPO (European and Mediterranean Plant Protection Organization). 2018b. PPO Reporting Service no. 02 - 2018 Num. article: 2018/030. Available online: https://gd.eppo.int/reporting/article-6224

FAO (Food and Agriculture Organization of the United Nations), 1995. ISPM (International standards for phytosanitary measures) No 4. Requirements for the establishment of pest free areas. Available online: https://www.ippc.int/en/publications/614/

FAO (Food and Agriculture Organization of the United Nations), 2004. ISPM (International Standards for Phytosanitary Measures) 21—Pest risk analysis of regulated non-quarantine pests. FAO, Rome, 30 pp. Available online: https://www.ippc.int/sites/default/files/documents/1323945746_ISPM_21_2004_En_2011-11-29_Refor.pdf

FAO (Food and Agriculture Organization of the United Nations), 2013. ISPM (International Standards for Phytosanitary Measures) 11—Pest risk analysis for quarantine pests. FAO, Rome, 36 pp. Available online: https://www.ippc.int/sites/default/files/documents/20140512/ispm_11_2013_en_2014-04-30_201405121523-494.65%20KB.pdf

FAO (Food and Agriculture Organization of the United Nations), 2017. ISPM (International standards for phytosanitary measures) No 5. Glossary of phytosanitary terms. Available online: https://www.ippc.int/en/publications/622/
Follett PA, 2001. Irradiation as a quarantine treatment for mango seed weevil (Coleoptera: Curculionidae). Proceedings of the Hawaiian Entomological Society, 35, 95–100.
Follett PA, 2002. Mango seed weevil (Coleoptera: Curculionidae) and premature fruit drop in mangoes. Journal of Economic Entomology, 95, 336–339.
Follett PA and Gabbard Z, 2000. Effect of mango weevil (Coleoptera: Curculionidae) damage on mango seed viability in Hawaii. Journal of Economic Entomology, 93, 1237–1240.
Fresh Plaza, 2015. Avocados and mangoes. Spain is the only European country with a considerable tropical production. Available online: http://www.freshplaza.com/print.asp?id=149889 [Accessed: 26 January 2018]
Hansen JD, Armstrong JW and Brown SA, 1989. The distribution and biological observations of the mango weevil, *Cryptorhynchus mangiferae* (Coleoptera: Curculionidae), in Hawaii. Proceedings, Hawaiian Entomological Society, 29, 31–39.
Kok IB, 1979. Control of the mango seed weevil by trapping and irradiation. Citrus and Subtropical Fruit Journal, 552, 14–16.
MAGRAMA (The Spanish Ministry of Agriculture, Fisheries and Food). 2018. Mango. Available online: https://www.mapa.gob.es/es/estadistica/temas/estadisticas-agrarias/agricultura/superficies-producciones-anuales-cultivos/ [Accessed: 26 January 2018]
Peng RK and Christian K, 2004. Integrated control of the mango seed weevil (*Sternochetus mangiferae*) using weaver ants (*Oecophylla smaragdina*) as a major component in the Northern Territory. In: Proceedings of International Workshop on Integrated Control of Mango Insect Pests, November, 2004, Mytho, Vietnam [ed. by Peng, R. K. Christian, K.]. 69–74.
Peng RK and Christian K, 2005. Integrated pest management for mango orchards using green ants as a major component - a manual for conventional and organic mango growers in Australia. Charles Darwin University, Australian Centre for International Agricultural Research and the Department of Primary Industry, Fisheries and Mines of Northern Territory Government, 53.
Peng RK and Christian K, 2007. The Effect of the Weaver Ant, *Oecophylla smaragdina* (Hymenoptera: Formicidae), on the Mango Seed Weevil, *Sternochetus mangiferae* (Coleoptera: Curculionidae), in Mango Orchards in the Northern Territory. International Journal of Pest Management, 53, 15–24.
Shukla RP and Tandon PL, 1985. Bio-ecology and management of the mango weevil, *Sternochetus mangiferae* (Fabricius) (Coleoptera: Curculionidae). International Journal of Tropical Agriculture, 3, 293–303.
Shukla RP, Tandon PL and Suman CL, 1985. Intra-tree distribution of the eggs of mango stone weevil, *Sternochetus mangiferae* (Fabricius) (Coleoptera: Curculionidae). Entomon, 10, 215–218.
Smith IM, McNamara DG, Scott PR and Holderness M, 1997. Datasheets on quarantine pests *Sternochetus mangiferae*. Quarantine Pests for Europe, 2nd Edition, CABI/EPPO, Wallingford, 1425 pp.
Unahawutti U, Euatrakool O, Rujitharanawong A, Chukumnerd S, Rattanadechakul W, Phodee A, Chaowalit S and Bannakan I, 2015. Detection Survey of Mango Seed Weevil, *Sternochetus mangiferae* (Fabricius). (Coleoptera: Curculionidae) in Thailand. Available online: https://www.ippc.int/static/media/files/eventreporting/2015/04/20/Detection_Survey_of_Mango_Seed__Weevil_from_pdf_Entozoo_journal_APDokyM.pdf
US Federal Register, 2002. Irradiation phytosanitary treatment of imported fruits and vegetables. Rules and Regulations, 67, 65016–65029.
Verghese A, Nagajary DK, Jayanthi PDK and Madhura HS, 2005. Association of mango stone weevil, *Sternochetus mangiferae* (Fabricius) (Coleoptera: Curculionidae) with fruit drop in mango. Crop Protection, 24, 479–481. Available online: http://www.sciencedirect.com/science/journal/0261-2194
de Villiers EA, 1987. Mango weevil must be controlled. Information Bulletin, Citrus and Subtropical Fruit Research Institute, South Africa, 176, 12–13.
Warner RE, 1956. Nomenclature of *Sternochetus mangiferae* (F.), the mango weevil (Coleoptera, Curculionidae). Entomology News, 67, 246–247.
Wheatley PE, 1961. Insect pests in the Coast Province of Kenya. 1-Mango. East African Agriculture for Journal, 26, 129–131.
Woodruff R and Fasulo T, 2009. Mango Seed Weevil, *Sternochetus mangiferae* (Fabricius) (Insecta: Coleoptera: Curculionidae) Entomology and Nematology Department. Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, 5 pp.

Abbreviations

DG SANTÉ	Directorate General for Health and Food Safety
EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures

MS	Member State
PFA	Pest Free Areas
PLH	EFSA Panel on Plant Health
PZ	Protected Zone
PZQP	protected zone quarantine pest
QP	quarantine pest
RNQP	regulated non-quarantine pest
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

Glossary

(The definition of terms are from ISPM 5 unless indicated by +)

Containment (of a pest)	Application of phytosanitary measures in and around an infested area to prevent spread of a pest (FAO, 1995, 2017)
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2017)
Control measures+	Measures that have a direct effect on pest abundance
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO, 2017)
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2017)
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2017)
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2017)
Supporting measures+	Organisational measures or procedures supporting the choice of appropriate Risk Reduction Options that do not directly affect pest abundance
Pathway	Any means that allows the entry or spread of a pest (FAO, 2017)
Phytosanitary measures	Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests (FAO, 2017)
Protected zones (PZ)	A Protected zone is an area recognised at EU level to be free from a harmful organism, which is established in one or more other parts of the Union
Quarantine pest	A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (FAO, 2017)
Regulated non-quarantine pest (RNQP)	A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party (FAO, 2017)
Risk reduction option (RRO)	A measure acting on pest introduction and/or pest spread and/or the magnitude of the biological impact of the pest should the pest be present. A RRO may become a phytosanitary measure, action or procedure according to the decision of the risk manager
Spread (of a pest)	Expansion of the geographical distribution of a pest within an area (FAO 2017)