Proposed Approval for Importation of Passionfruit from Vietnam:

Submission from Passionfruit Australia Incorporated.

Passionfruit Australia Incorporated (PAI) represents Australian passionfruit growers. PAI is recognised as the Prescribed Industry Body (PIB) for the passionfruit industry by Hort Innovation Australia (HIA). PAI is proactive in promoting biosecurity awareness within the Australian industry and is a signatory to the EPPRD. PAI cooperates with Plant Health Australia and other small tropical fruit industries in developing a comprehensive biosecurity plan. A copy of the Biosecurity Plan for the Passionfruit Industry is included as Appendix B.

PAI is appreciative of the efforts of staff from the Department of Agriculture, Fisheries and Forestry (DAFF) in attending passionfruit industry forums to provide information and answer questions in relation to the proposed approval of importation of passionfruit from Vietnam. The passionfruit industry is also appreciative of the commitment and allocation of resources by federal and state governments to their responsibilities for maintenance of Australia's reputation as safe and reliable producer of high-quality food produce. Because of its active participation in national biosecurity initiatives, PAI is acutely aware of the risk of introduction of unwanted pests and diseases through Australia's strong border surveillance processes.

In responding to the draft report PAI wishes to make comment as follows;

1. **Pests**

The draft report addresses DAFF's process of identifying potential pests and diseases that need to be managed in any program to import Vietnamese passionfruit into Australia. PAI has assumed that all pests included in the passionfruit biosecurity plan have been assessed in preparation of the draft report. The recommended treatment of irradiation is supported for control of all pests for all consignments. There is concern about the adequacy of visual inspections in the absence of such treatment, especially for Thrips. One of PAI's North Queensland members reports that Queensland DAF has identified that Thrips have previously been found in passionfruit skin in Far North Queensland (Please see Appendix A). PAI feels that it may be difficult to identify such infestations by visual inspections and thus recommend irradiation on all consignments.

2. **Surveillance**

PAI notes advice provided by DAFF on the interceptions recorded for fresh passionfruit imports from New Zealand and imports other fruits from Vietnam. In the international context Vietnamese media has also mentioned that "Vietnamese fruits have encountered numerous warnings from importing countries due to their failure to meet clients' standards. The primary reason for this inadequacy is the lack of proper surveillance on production unit and packaging facility codes." PAI is a party to the current Varroa Mite emergency response and is acutely aware of the consequences of an exotic pest incursion into Australia.

3. **Accreditation**

The report identifies the regulatory and quality audit processes established to set and maintain prescribed biosecurity measures for export of fresh produce from Vietnam. Indeed, the Australian import approval process appears to be reliant on the integrity of the Vietnamese regulatory system. PAI is also aware of Vietnamese media reports on the adequacy of agency surveillance of certified planting and packaging facilities. This highlights the need for Australian authorities to be particularly diligent when relying on such accreditations.

4. **Maximum Residue Limits (MRLs)**

Australian passionfruit producers are required to have accreditation and be audited for food safety and traceability standards. This includes, amongst other requirements, testing of produce for MRLs for chemicals used in the production process. Imported passionfruit needs to be assessed for compliance with accepted Australian standards.

PAI appreciates this opportunity to respond to the draft report and DAFF's consideration of the matters raised above in preparation of the final report.

Appendix A: Thrips Statement from DAFF Mareeba

From: Ian Newton <Ian.Newton@daf.qld.gov.au>
Sent: Friday, 8 September 2023 10:45 AM
To: cynthiabarbagallo@bigpond.com
Subject: Thrips in passionfruit skin

To whom it may concern,

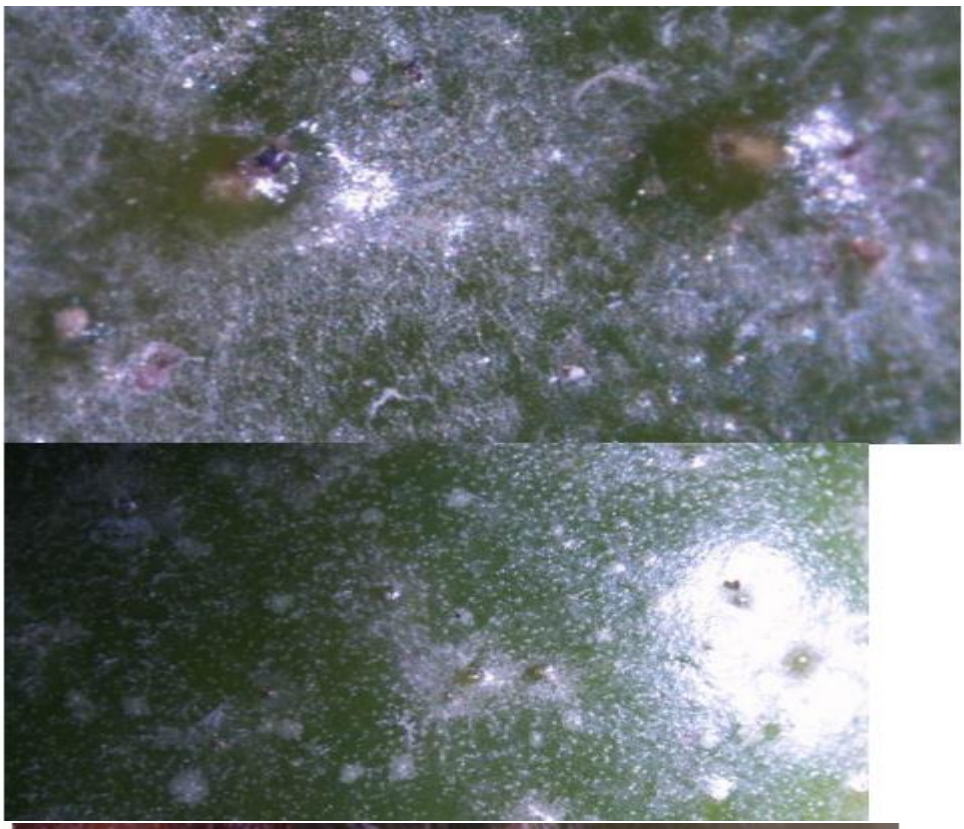
I am a Principal Entomologist, with Horticulture and Forestry Science in the Department of Agriculture and Fisheries, based in Mareeba Queensland.

This is to confirm that common blossom thrips *Frankliniella schultzei* have previously been found in passionfruit skin in far north Queensland.

In June 2018, I investigated galls (or small bumps/lumps) on the outer fruit skin of passionfruit collected from a farm at 739 Mareeba-Dimbulah Rd, Mareeba.
Dissection of the galls revealed eggs of thrips, which were thought to cause the galls. Subsequent field inspections and collections of passionfruit flowers, found high numbers of common blossom thrips *Frankliniella schultzei* developing in the flowers; eggs were found in the flower tissue and developing fruit. Adult thrips were identified under microscope by slide mounting. The eggs found in the fruit skin were thought to be the same as the eggs found in the flowers.

Frankliniella schultzei, are part of a species complex (many close species or sub-species with no clear boundaries between them) and are known to vector plant viruses.

For further question or enquiries, please contact me in the contact details below.



Thrips eggs found in galls.

Adult common blossom thrips *Frankliniella schultzei* found in flowers.

Regards,

Ian.

Ian Newton BSc(Hons) PhD.
Principal Entomologist, Horticulture and Forestry Science
Department of Agriculture and Fisheries

T 07 4017 0765 **M** 0459 808 021 **E** ian.newton@daf.qld.gov.au **W** www.daf.qld.gov.au
28 Peters Street, Mareeba QLD 4880
PO Box 1054, Mareeba QLD 4880

Queensland Government

Appendix B: Biosecurity Plan for the Passionfruit Industry.

BIOSECURITY PLAN FOR THE PASSIONFRUIT INDUSTRY

June 2021 Version 2.0

Location: Level 1
1 Phipps Close
DEAKIN ACT 2600
Phone: +61 2 6215 7700
Email: biosecurity@phau.com.au
Visit our website www.planthealthaustralia.com.au

An electronic copy of this plan is available through the email address listed above.

In referencing this document, the preferred citation is:

Plant Health Australia Ltd (2021) Biosecurity Plan for the Passionfruit Industry (Version 2.0 2021) Plant Health Australia, Canberra, ACT.

This project has been funded by Hort Innovation, using the Passionfruit research and development levy and contributions from the Australian Government. Hort Innovation is the grower-owned, not for profit research and development corporation for Australian horticulture.

Disclaimer:

The material contained in this publication is produced for general information only. It is not intended as professional advice on any particular matter. No person should act or fail to act on the basis of any material contained in this publication without first obtaining specific and independent professional advice.

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Revision history

VERSION NUMBER	DATE	DETAILS
2.0	 2021	Passionfruit Biosecurity Plan

Acknowledgements

The *Biosecurity Plan for the Passionfruit Industry* project was coordinated by Plant Health Australia and developed through a partnership approach with government and industry.

The following organisations and agencies were involved in the development and finalisation of the plan:

Endorsement

The *Biosecurity Plan for the Passionfruit Industry (Version 2.0)* was formally endorsed by the Passionfruit industry (through the Passionfruit Australia in ..... 2021, and all state and territory governments (through the Plant Health Committee) in ..... 2021.

The Australian Government endorses the document without prejudice for the purposes of industry's planning needs and meeting the Australian Department of Agriculture, Water and Environment's (DAWE) obligations under Clause 13 of the EPPRD. In providing this endorsement the Department notes page 26 of the Plan which states: "This Document considers all potential pathways by which a pest might enter Australia, including natural and assisted spread (including smuggling). This is a broader view of potential risk than the Biosecurity Import Risk Assessment (BIRA) conducted by DAWE which focus only on specific regulated import pathways."

Reporting suspect pests

Any unusual plant pest should be reported immediately to the relevant state/territory agriculture department through the Exotic Plant Pest Hotline (1800 084 881). Early reporting enhances the chance of effective control and eradication.

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LIST OF ACRONYMS

ACPPO	**Australian Chief Plant Protection Office**
APVMA	Australian Pesticides and Veterinary Medicines Authority
AS/NZS	Australian Standard/New Zealand Standard
BICON	Australian Biosecurity Import Conditions Database
BIG	Biosecurity Implementation Group
BIRA	Biosecurity Import Risk Analysis
BOLT	Biosecurity On-Line Training
BP	Biosecurity Plan
BRP	Biosecurity Reference Panel
CABI	Centre for Agriculture and Bioscience International
CCEPP	Consultative Committee on Emergency Plant Pests
CPHM	Chief Plant Health Manager
DAWE	Department of Agriculture, Water and the Environment
DAF QLD	Department of Agriculture and Fisheries, Queensland
DA	Department of Agriculture, Victoria
DPI NSW	Department of Primary Industries, New South Wales
DPIPWE	Department of Primary Industries, Parks, Water and Environment, Tasmania
DITT NT	Department of Industry, Tourism and Trade, Northern Territory
DPIRD WA	Department of Primary Industries and Regional Development, WA
EPP	Emergency Plant Pest
EPPO	European and Mediterranean Plant Protection Organization
EPPRD	Emergency Plant Pest Response Deed
FAO	Food and Agriculture Organization of the United Nations
HACCP	Hazard Analysis Critical Control Point
HPP	High Priority Pest
ICA	Interstate Certification Assurance
IGAB	Intergovernmental Agreement on Biosecurity
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
MICoR	Manual of Importing Country Requirements
NAQS	Northern Australian Quarantine Strategy
NDP	National Diagnostic Protocol
NMG	National Management Group
NPBDN	National Plant Biosecurity Diagnostic Network
NPBRDES IC	National Plant Biosecurity Research, Development and Extension Strategy. Implementation Committee
NPBS	National Plant Biosecurity Strategy
NSW	New South Wales
NT	Northern Territory

ORC	Owner Reimbursement Costs
PaDIL	Pest and Disease Image Library
PHA	Plant Health Australia
PHC	Plant Health Committee
PIC	Property Identification Code
PIRSA	Primary Industries and Regions South Australia
QA	Quality Assurance
QLD	Queensland
RDC	Research and Development Corporation
RD&E	Research, Development and Extension
SA	South Australia
SARDI	South Australian Research and Development Institute
SDQMA	Sub-Committee for Domestic Quarantine and Market Access
SNPHS	Sub-Committee for Plant Health Surveillance
SPHD	Sub-Committee on Plant Health Diagnostic
SPS	Sanitary and Phytosanitary
TEG	Technical Expert Group
TST	Threat Summary Table
Vic	Victoria
WA	Western Australia
WTO	World Trade Organization

DEFINITIONS

The definition of a plant pest used in this document includes insects, mites, snails, nematodes or pathogens (diseases) that have the potential to adversely affect food, fibre, ornamental crops, bees and stored products, as well as environmental flora and fauna. Exotic pests are those not currently present in Australia. Endemic pests are those established within Australia.

Emergency Plant Pest (EPP) – for a pest to be classified as an emergency plant pest (EPP), it must either be listed in Schedule 13 of the EPPRD, or be determined by the Categorisation Group or National Management Group (NMG) to be of potential national significance and meet at least one of the criteria below:

- a known exotic pest
- a variant form of an established plant pest
- a previously unknown pest
- a confined or contained pest.

High Priority Pest (HPP) – an exotic plant pest identified as one of the greatest pest threats to one or more plant production industries. A HPP must have a High or Extreme overall rating through the Biosecurity Planning process. For more information on risk ratings please refer to page 27.

EXECUTIVE SUMMARY

To ensure their future viability and sustainability, it is important that the Passionfruit industry, represented by Passionfruit Australia as the peak industry body, minimise the risks posed by exotic pests and responds effectively to plant pest threats. This plan is a framework to coordinate biosecurity activities and investment for the passionfruit industry. It provides a mechanism for industry, governments and stakeholders to better prepare for and respond to, incursions of pests that could have significant impacts on these industries. It identifies and prioritises exotic plant pests (not currently present in Australia) and established pests of biosecurity concern and focuses on future biosecurity challenges.

The Biosecurity Plan for the Passionfruit Industry (this biosecurity plan) was developed in concert with the development of biosecurity plans for the Australian Lychee and Australian Papaya Industries. Facilitated by Plant Health Australia (PHA) and involving the collaboration of plant health and biosecurity experts from relevant Commonwealth, State and Territory agriculture agencies, and representatives from the Australian Lychee Growers Association (ALGA), Papaya Australia and Passionfruit Australia. These parties will be referred to as key stakeholders in the remainder of this document.

Key stakeholders were represented in the Technical Expert Group (TEG) and Biosecurity Implementation Group (BIG), and these groups provided advice in the development of the three Biosecurity Plans (Lychee Biosecurity Plan, Papaya Biosecurity Plan, Passionfruit Biosecurity Plan).

A key part of the biosecurity planning process was the development of combined Threat Summary Tables (TST) for all three industries. Containing over 300 exotic plant pests, these tables demonstrate the potential biosecurity threats faced by these industries. Each pest on the list was given an overall risk rating based on four criteria; entry potential, establishment potential, spread potential, and potential for economic impact. In this biosecurity plan, established pests of biosecurity significance for the passionfruit industry were also identified as good biosecurity practices benefit the ongoing management of and surveillance for these pests.

The Biosecurity Plan also details current mitigation and surveillance activities being undertaken and identifies contingency plans, fact sheets and diagnostic protocols that have been developed for pests relevant to the passionfruit industry (Table 4). This enables identification of gaps and prioritisation of specific actions, as listed in the Biosecurity Implementation Table (Table 3). The development of this table will increase the industry's biosecurity preparedness and response capability by outlining specific areas of action which could be undertaken through a government and industry partnership.

The Biosecurity Plan is principally designed for use by decision makers. It provides industry and government with a mechanism to identify exotic plant pests as well as to address the specific strengths and weaknesses of the Australian Passionfruit Industry's current biosecurity position. It is envisaged that annual reviews of this biosecurity plan will be undertaken to assess progress against agreed activities, with another formal review conducted after five years.

The Biosecurity Plan is a document outlining the commitment to the partnership between the key stakeholders to improve biosecurity.

SIGNIFICANT BIOSECURITY THREATS

Document overview

Biosecurity for the Australian Passionfruit industry focuses on five key areas to identify the components to be implemented through the life of the biosecurity plan 2021-2026. These five areas are outlined in the sections below.

1. High priority exotic pests and established pests of biosecurity significance

A key outcome of this biosecurity plan is the identification of the exotic high priority pests, and established pests of biosecurity significance for the Australian Passionfruit industry (Page 4). This section includes:

- the High Priority Pests (HPPs), which are the most significant exotic threats affecting the passionfruit industry as identified through a prioritisation process.
- the established pests of biosecurity significance, which have been identified in consultation with industry.

The exotic HPP list, and established pests of biosecurity significance will allow industry and government to better prioritise preparedness activities and will assist in the implementation of effective grower and community awareness campaigns, targeted biosecurity education and training programs for growers, development of surveillance programs, diagnostic protocols as well as development of pest-specific mitigation activity.

Established weeds of biosecurity significance were considered during the development of this plan. No weeds of biosecurity significance were identified through consultation with government and industry.

2. Implementing biosecurity for the Australian Passionfruit Industry 2021-2026

This section (Page 9) includes the biosecurity implementation plan and a gap analysis of the current level of preparedness for HPPs of the Passionfruit Industry. The Biosecurity Implementation Group (BIG), comprised of both industry and government representatives, developed the implementation plan that sets out shared biosecurity goals and objectives over the next five years. It is intended that the biosecurity implementation plan is revisited by the Biosecurity Reference Panel (BRP) regularly over the next five years to maintain its relevance. The TEG, the BIG and the BRP all contained representatives of the three industries as well as technical experts from commonwealth, state and territory governments.

3. Threat identification and pest risk assessments

Guidelines are provided for the identification and ranking of biosecurity threats through a process of qualitative risk assessment. The primary goal is to coordinate identification of exotic pest threats that could impact productivity, or marketability. This plan strengthens risk assessment work already being done both interstate and overseas. All exotic biosecurity threats considered in the biosecurity plan are detailed in threat summary tables (Appendix 2: Threat Summary Tables). From the prioritisation process undertaken in the TST, pests with an overall high rating were identified as a HPP. Established pests of biosecurity significance are also listed.

4. Risk mitigation and preparedness

This section provides a summary of activities to mitigate the impact of pest threats on the Australian Passionfruit industry, along with a set of guidelines for managing risk at all operational levels. Many pre-emptive practices can be adopted by plant industries and government agencies to reduce risks. The major themes covered include:

- Barrier quarantine
- Surveillance
- Training
- Awareness
- Farm biosecurity
- Reporting of suspect pests

A summary of pest-specific information and preparedness documents, such as fact sheets, contingency plans and diagnostic protocols are also described to outline activities industry has undertaken to prepare for an exotic pest incursion. Information for industry on how to align preparedness activities with R,D&E, such as researching IPM strategies, and chemical control is also provided.

5. Response management

This section provides a summary of the processes in place to respond to emergency plant pest (EPP)[1] incursions that would affect the Australian Passionfruit industry. Areas covered in this section include the Emergency Plant Pest Response Deed (EPPRD), PLANTPLAN (outlines the generic approach to response management under the EPPRD), categorisation of pests under the EPPRD and industry specific response procedures and industry communication.

PESTS OF BIOSECURITY SIGNIFICANCE OVERVIEW

A key component of this biosecurity plan is to identify the exotic and established pests of biosecurity significance to the Australian Passionfruit Industry. This section provides information on the High Priority Pest (HPP) list, and the established pests of biosecurity significance for the Australian Passionfruit Industry . These pest lists, provide the Australian Passionfruit Industry, commonwealth, state and territory governments, and other relevant stakeholders with the information needed to prioritise resources for biosecurity risk management.

The exotic HPP list and established pests of biosecurity significance will allow industry and government to better prioritise preparedness activities and will assist in the implementation of effective grower and community awareness campaigns, targeted biosecurity education and training programs for growers, development of surveillance programs, diagnostic protocols as well as development of pest-specific mitigation activities.

Established weeds of biosecurity significance were considered during the development of this plan. No weeds of biosecurity significance were identified for the Australian Passionfruit Industry through consultation with government and industry.

[1] Refer to the PHA website for details http://www.planthealthaustralia.com.au/biosecurity/emergency-plant-pests/

Passionfruit industry high priority exotic pests Error! Not a valid bookmark self-reference. provides an overview of the top ranked biosecurity pest threats (invertebrates, pathogens and nematodes) for the Australian Passionfruit Industry. Further details on each pest along with the basis for the likelihood ratings are provided in the TST (Appendix 2: threat summary tables). Assessments may change given more detailed research, and the priority list will be formally reviewed along with the Biosecurity Plan on an annual basis through the Biosecurity Reference Panel. An explanation of the method used for calculating the overall risk can be found on the PHA website[2].

Table 1. High Priority pests of the passionfruit industry

COMMON NAME SCIENTIFIC NAME	HOST	OTHER HOST(S)	AFFECTED PLANT PART	DISPERSAL	ENTRY POTENTIAL	EST.[3] POTENTIAL	SPREAD POTENTIAL	ECONOMIC IMPACT	OVERALL RISK
Invertebrates									
Diptera (flies and midges)									
Carambola fruit fly *Bactrocera carambolae*	Passionfruit	Highly polyphagous (75 hosts from 26 families) including grapefruit, orange, lemon, lime, mandarin, cashew, breadfruit, jackfruit, carambola, capsicum, mango, guava, banana, avocado, tomato, mangrove, papaya	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	HIGH	HIGH	HIGH	HIGH	HIGH
Oriental fruit fly *Bactrocera dorsalis (Bactrocera invadens; Bactrocera papayae;*	Passionfruit	Polyphagous, with wide host range including: Cashew, soursop, breadfruit, jackfruit, bell pepper, chilli, Citrus, watermelon, coffee, melon, cucumber, longan, persimmon,	Fruit	Infested plant material (including fruit), soil and hitchhiking. Adults capable of flight. Pupation occurs in the soil	HIGH	HIGH	HIGH	HIGH	HIGH

[2] Available from https://www.planthealthaustralia.com.au/wp-content/uploads/2013/07/Pest-risk-assessment-for-IBPs-July-2013.pdf
[3] Establishment potential.

COMMON NAME SCIENTIFIC NAME	HOST	OTHER HOST(S)	AFFECTED PLANT PART	DISPERSAL	ENTRY POTENTIAL	EST.[3] POTENTIAL	SPREAD POTENTIAL	ECONOMIC IMPACT	OVERALL RISK
Bactrocera philippinensis)[4]		mangosteen, dragon fruit, mango, apple, banana, avocado, lychee, papaya							
Fijian fruit fly *Bactrocera passiflorae*	Passionfruit	Polyphagous (49 hosts in 28 families) including Cashew, breadfruit, lime, mandarin, mango, avocado, guava, eggplant, cocoa, papaya	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	HIGH	HIGH	HIGH	HIGH	HIGH
Melon fruit fly *Zeugodacus cucurbitae*	Passionfruit	Watermelon, rockmelon, cucumber, pumpkin, tomato	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	HIGH	HIGH	HIGH	HIGH	HIGH
Hemiptera (stink bugs, aphids, mealybugs, scale, whiteflies and hoppers)									
Dysmicoccus grassii (Syn. *Pseudococcus grassi*)[5]	Passionfruit	Polyphagous including fig, acacia, pineapple, mango, asparagus, avocado, oleander, banana, coffee, avocado, hibiscus, prickly pear, sugar apple, papaya	Leaves, fruit, stems	Infested soil and plant material. Adult males capable of flight over short distances.	MEDIUM	HIGH	HIGH	HIGH	HIGH
Cocoa mirids *Helopeltis clavifer*	Passionfruit	Polyphagous, including tea, cocoa; cashew, sweetpotato and other host plants reported from New Guinea	Pods	Infested plant materials	HIGH	HIGH	HIGH	HIGH	HIGH

[4] https://lrd.spc.int/species/bactrocera-papayae--drew-and-hancock-asian-papaya-fruit-fly
Leblanc, L., Vueti, E. T., & Allwood, A. J. (2013). Host plant records for fruit flies (Diptera: Tephritidae: Dacini) in the Pacific Islands: 2. Infestation statistics on economic hosts.
[5] http://scalenet.info/catalogue/Dysmicoccus%20grassii/

COMMON NAME SCIENTIFIC NAME	HOST	OTHER HOST(S)	AFFECTED PLANT PART	DISPERSAL	ENTRY POTENTIAL	EST.[3] POTENTIAL	SPREAD POTENTIAL	ECONOMIC IMPACT	OVERALL RISK
Pathogens									
Bacteria (including phytoplasmas)									
Bacterial canker of stone fruit, bacterial canker of trees *Pseudomonas syringae* exotic strains[6]	Passionfruit	Broad host range over 50 hosts including sweet cherry, sour cherry, onion, capsicum, leek, lucerne, rice, chrysanthemum, citrus, cucumber, pumpkin, garden dahlia, hibiscus, walnut, lettuce, magnolia, mango, bean, avocado, stone fruit, roses, tomato, maize, willows, clover, blueberry, grapevine, cowpea	Whole plant Leaves, inflorescence, stems, pods, seeds, flowers, fruit	Infected plant material, wind, insect vector, mechanical, plant stress	HIGH	HIGH	HIGH	HIGH[56]	HIGH
Viruses and viroids									
Passionfruit severe leaf distortion virus	Passionfruit	*Passiflora spp.*	Systemic infection		HIGH	HIGH	HIGH	HIGH	HIGH
Passionfruit Sri Lankan mottle potyvirus	Passionfruit	*Passiflora spp.*	Systemic infection		HIGH	HIGH	HIGH	HIGH	HIGH
East Asian Passiflora virus	Passionfruit	*Passiflora* spp. (including *P. edulis, P. edulis* x *P. edulis* f. *flavicarpa* and *P. edulis* f. *flavicarpa*).	Systemic infection		HIGH	HIGH	HIGH	HIGH	HIGH

[6]Infected plant material, wind-driven rain, insects, use of infected budwood or nursery stock, contaminated pruning tools, aerosols in plant debris, sap and water movement when weeds or crops are cut (Moorman unknown). Predisposing stress factors listed were: freeze injury, wounds, nematode damage, coincident infections with plant-pathogenic fungi such as Leucostoma sp. and Nectria sp. Causes rapid death of trees in nurseries and orchards and have a significant effect on fruit production (CABI, Compendium of Stone Fruit Diseases).

Pollination pests

Although there are a variety of mechanisms for pollination, the European honey bee (*Apis mellifera*) is the most important insect pollinator of cultivated agricultural and horticultural crops in Australia. Pollination services of the European honey bee are provided by beekeepers to growers of pollinator-reliant crops.

As European honey bees forage for nectar and pollen their activities naturally pollinate plants, resulting in increased seed or fruit set, improved fruit shape and more even maturation of some crops.

Established and exotic pests of European honey bees as well as exotic pest bees can have a major impact on crop pollination services. Honey bee pests and pest bees can also impact unmanaged colonies which also provide pollination.

Passionfruit rely on a range of native and established insect species for pollination, including European honey bees. A list of the high priority bee pests and pest bees which could impact the Passionfruit industry can be located on the PHA website planthealthaustralia.com.au/industries/honey-bees/ and the BeeAware website beeaware.org.au/pests/

Established pests of biosecurity significance

Introduction

This section identifies established pests of biosecurity significance for the passionfruit industry in Australia. By identifying pests which passionfruit producers already have to manage, mechanisms can be put in place to better align industry and government resources and provide a stronger base for biosecurity risk management for the passionfruit industry.

Identification of established pests of biosecurity significance will also assist in the implementation of effective grower and community awareness campaigns, targeted biosecurity education and training programs for growers, surveillance coordinators, diagnosticians and development of pest-specific mitigation activities.

Threat identification

Information on established pests of the passionfruit industry described in this document came from a combination of:

- past records
- industry practice and experience
- relevant published literature
- local industry and overseas research
- specialist and expert judgment.

In order to be considered as a pest of biosecurity significance, the pests included should be economically important to the passionfruit industry and at least one of the following:

- restricted to regions within Australia
- notifiable by law
- have market access implications
- able to be prevented from entering a farm through good biosecurity practices.

These pests were considered in an effort to prioritise investment but did not undergo a formal pest risk assessment.

Table 2. Passionfruit industry established pests of biosecurity significance

Common name (Scientific name)	Hosts	Affected plant part	Distribution in Australia	State movement controls or markets impacted by this pest	Factsheets	Comments
DIPTERA (Flies and midges)						
Mediterranean fruit fly (*Ceratitis capitata*)	Wide host range[7]	Fruit	WA	Pest of concern for New South Wales, Northern Territory, Queensland, Tasmania, Victoria.	Yes-PHA, NSW DPI[8]	
Queensland fruit fly (*Bactrocera tryoni*)	Wide host range[9]	Fruit	NT, QLD, VIC, NSW (restricted)	Pest of concern for South Australia, Tasmania, Western Australia.	Yes-PHA, NSW DPI[10]	
FUNGI						
Fusarium wilt *Fusarium oxysporum f.sp.passiflorae*[11]	Passionfruit, *Passiflora spp.*	Leaves, stems	QLD, NT, (absent from WA)			

[7] Plant Health Australia (2018) The Australian Handbook for the identification of fruit flies Version 3.0. PHA. Canberra, ACT

[8] **http://www.planthealthaustralia.com.au/wp-content/uploads/2013/01/QFly-and-Medfly-FS.pdf,** NSW DPI Integrated Pest and Disease Management for Australian Summerfruit (2005) - https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0008/184526/summerfruit-fulla.pdf and Cherry Growers Australia Inc. factsheet in the Biosecurity Management Programme

[9] Plant Health Australia (2018) The Australian Handbook for the identification of fruit flies Version 3.0. PHA. Canberra, ACT

[10] **http://www.planthealthaustralia.com.au/wp-content/uploads/2013/01/QFly-and-Medfly-FS.pdf**, NSW DPI Integrated Pest and Disease Management for Australian Summerfruit (2005) & Cherry Growers Australia Inc. factsheet in the Biosecurity Management Programme

[11] https://www.cabi.org/isc/datasheet/24678#toidentity

Implementing biosecurity for the Australian Passionfruit Industry 2021-2026

This section includes the biosecurity implementation plan and a gap analysis of the current level of preparedness for HPP of the Australian Passionfruit Industry. The Biosecurity Implementation Group (BIG), comprising of representatives of key stakeholders and other relevant experts, developed the implementation plan that sets out the Biosecurity Plans shared goals and objectives. It is intended that the implementation plan is revisited by the BRP regularly over the next five years to maintain its relevance. The TEG, the BIG and the BRP contain representatives of the three industries as well as scientific and technical experts from Australian commonwealth, state and territory governments, and other relevant organisations.

Biosecurity Implementation Table

The Biosecurity Implementation Table aims to build upon the themes outlined in the Intergovernmental Agreement on Biosecurity (IGAB)[12] and the National Plant Biosecurity Strategy (NPBS)[13] by providing a clear line of sight between the development of this Biosecurity Plan and broader plant health policy and legislation.

This table also aims to provide focus and strategic direction for plant biosecurity activities relating to the Australian Passionfruit Industry over the next five years (i.e. the life of this Biosecurity Plan). The Biosecurity Implementation Table provides specific recommendations for potential biosecurity activities identified by key stakeholders to improve biosecurity preparedness for pest threats.

Biosecurity is a shared responsibility between the key stakeholders and other stakeholders. The Biosecurity Implementation Table has been produced to help coordinate actions and resources in the Australian biosecurity system. Activities may require additional funding to be sourced prior to commencement. Implementing the specific actions listed in the Biosecurity Implementation Table, will not only strengthen Australian Passionfruit Industry biosecurity systems, but also the broader Australian plant biosecurity systems. Future versions of this table will also track progress on the activities described.

The Biosecurity Implementation Table outlines eight strategy areas where industry and government should align their biosecurity efforts. The eight strategy areas are:

- Capacity and Capability
- Education and Awareness
- Preparedness and Response
- Surveillance
- Diagnostics
- Established Pests of Biosecurity Concern
- Research, Development & Extension
- Legislation and Regulatory Issues of Importance

[12] For more information visit agriculture.gov.au/animal-plant-health/pihc/intergovernmental-agreement-on-biosecurity
[13] For more information visit planthealthaustralia.com.au/national-programs/national-plant-biosecurity-strategy/

Table 3. The Biosecurity Implementation Table for the Australian Passionfruit Industry 2021-2026.

Strategy: Capacity and Capability

Aligns with Strategy 4 of NPBS, Schedule 6 of IGAB

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
A. Establish a biosecurity reference panel (BRP) to help facilitate industry's future biosecurity activities, develop key biosecurity messages/materials and to review the Biosecurity Plan, including the Implementation Table regularly.	Passionfruit Australia, State/ Territory Governments, PHA	Annually	
B. Ensure that BRP priorities feed through to the relevant funding body (e.g. Hort Innovation, Passionfruit Australia) or committee (e.g. national fruit fly council, SPHD, SNPHS).	BRP, Passionfruit Australia, Hort Innovation, PHA	Annually	Provide priorities to Hort Innovation and Passionfruit Australia prior to Hort Innovation Strategic Investment Panel meetings.
C. Undertake deed training by PHA for industry organisation board members and relevant staff.	Passionfruit Australia, PHA	2022	

Strategy: Plant Biosecurity Education and Awareness

Aligns with Strategy 7 of NPBS, Schedule 6 of IGAB

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
A. The Biosecurity Reference Panel (BRP) to help coordinate future biosecurity activities, develop key biosecurity messages/materials, and review the implementation plan.	PHA, Passionfruit Australia, State/Territory Governments	2022	
B. Ensure that biosecurity priorities requiring funding, action or notification are tabled with the relevant funding body or committee • BRP to identify potential biosecurity R&D priorities to Passionfruit Australia and Hort Innovation • BRP to identify potential cross sectoral R&D priorities to submit to Plant Biosecurity Research Initiative (PBRI) • PHA to establish mechanisms to notify PHC, SNPHS and SPHD of biosecurity priorities	PHA, BRP, Passionfruit Australia	Annually at BRP meeting	
C. Promote, disseminate and demonstrate biosecurity to industry through industry forums, newsletters, road shows, field days, networks and/or workshops (hardcopy and online): - On-farm biosecurity planning - Reporting anything unusual - Best biosecurity practice such as hygiene principles - Promote bee code of practice with pollination contractors - On-farm biosecurity website: farmbiosecurity.com.au - EPPRD and owner reimbursement cost (ORC) frameworks - Economic case for good biosecurity practice (e.g. what would the cost of a specific incursion be)	Passionfruit Australia, PHA	Ongoing	
D. Develop and distribute awareness materials (e.g., on farm biosecurity planner, the Passionfruit Growing Guide and the Passionfruit Problem Solver Field Guide, etc), case studies and scenarios to encourage industry engagement on biosecurity issues.	Passionfruit Australia, State/Territory Governments, PHA	2022	
E. Review and develop detailed fact sheets on key pests of passionfruit	PHA, Passionfruit Australia, Hort Innovation	2021	

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
F. Identify industry biosecurity training and extension needs, recommend priorities.	BRP, PHA, Passionfruit Australia		
G. Monitor the Fruit Fly Council newsletter for issues relevant to the Passionfruit industry.	Passionfruit Australia	Ongoing	
H. Raise awareness of the BeeAware website: beeaware.org.au and subscribe to the BeeAware newsletter.	Passionfruit Australia, PHA	Ongoing	

Strategy: Preparedness and Response

Aligns with Strategy 3 of NPBS, Schedule 7 of IGAB

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
A. Prioritise industry preparedness activities for HPP's. These activities (once prioritised for both HPP and activity) may include: - A pest specific contingency plan - an industry specific business continuity plan - a pathway analysis review - categorisation in the Emergency Plant Pest Response Deed - awareness material such as factsheets - National Diagnostic Protocols.	BRP, Passionfruit Australia, Hort Innovation, PHA	2023	
B. To investigate the development of data packages which would enable rapid access to emergency/minor use permits with the APVMA for HPP's. If required identify trial work required to acquire a permit.	BRP, Passionfruit Australia, Hort Innovation, APVMA, PHA	2023	
C. Promote clean planting material through ensuring growers are aware of the importance of accessing seed and seedlings from 'high health' sources.	Passionfruit Australia	Ongoing	
D. Consider a simulation exercise for a HPP incursion; particularly to test the ability to reach out/communicate to all parts of the passionfruit supply chain.	PHA, Passionfruit Australia, Hort Innovation, Commonwealth/State/Territory Governments	2022	
E. Update the industry member database to facilitate critical information in the event of an emergency response.	Passionfruit Australia	Ongoing	
F. Develop an owner reimbursement cost framework	Passionfruit Australia, PHA	2024	

Strategy: Surveillance

Aligns with Strategy 2 of NPBS, Schedule 4 of IGAB

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
A. Raising industry awareness of HPPs and exotic pests to encourage monitoring and recording (presence and absence) to build a greater understanding of the importance of surveillance and potential trade and market access issues.	Passionfruit Australia	Ongoing	
B. Establish and maintain linkages with international passionfruit researchers and industry organisations to remain informed about plant pests affecting passionfruit crops overseas.	Passionfruit Australia, Commonwealth, State and Territory Governments, PHA	Ongoing	
C. Establish and maintain linkages with the NAQS and State /Territory Depts of Agriculture to remain informed about current surveillance activities.	Passionfruit Australia, Commonwealth (NAQS)/State/Territory Governments, PHA	Ongoing	
D. Understand what surveillance is taking place for HPPs (exotic and established) and consider a surveillance strategy which recommends surveillance for industry HPPs, linking industry and government efforts.	Passionfruit Australia, Hort Innovation, State Governments, Commonwealth, Subcommittee on National Plant Health Surveillance (SNPHS), PHA		

Strategy: Diagnostics

Aligns with Strategy 5 of NPBS, Schedule 4 of IGAB

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
A. To raise diagnostic priorities with the Subcommittee on Plant Health Diagnostics (SPHD) on an annual basis when priorities change.	Passionfruit Australia, Subcommittee on Plant Health Diagnostics (SPHD), PHA, BRP	Annually	
B. Ensure awareness of diagnostic capacity for industry HPPs both laboratory capabilities and which pests have protocols available for diagnostics.	Passionfruit Australia, Commonwealth/State/Territory Governments (SPHD), PHA	ongoing	
C. Keep informed of activities with SPHD and SNPHS through the diagnostic and surveillance network coordinator.	Passionfruit Australia, Commonwealth (SPHD), PHA, BRP	Annually	
D. Maintain and develop diagnostic protocols for exotic and quarantinable pests and pathogens.	SPHD, Hort Innovation, BRP	Annually	

Strategy: Established Pests

Aligns with Strategy 6 of NPBS, Schedule 5 of IGAB

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
A. Raise industry awareness of established pests of biosecurity significance and demonstrate how best biosecurity practice has direct relevance to day-to-day operations for pests already within Australia as well as exotic pests	Passionfruit Australia, Hort Innovation, Commonwealth/State/Territory Governments, PHA	Ongoing	

Strategy: Biosecurity Research, Development and Extension (RD&E)

Aligns with Strategy 8 of NPBS, Schedule 8 of IGAB

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
A. Prioritise biosecurity RD&E annually to feed into Hort Innovation plant biosecurity RD&E implementation priorities.	BRP, Passionfruit Australia	Annually	Ongoing
B. Consider collaborative opportunities to maximise R&D investment in biosecurity.	Passionfruit Australia, Hort Innovation and other relevant RDCs, NPBRDES IC, National Fruit Fly Council, PBRI, Commonwealth, PHA	Ongoing	
C. Support and monitor fruit fly RD&E initiatives that will provide more flexible export trade relevant to the Passionfruit industry.	Passionfruit Australia, Hort Innovation, Fruit Fly Fund	Ongoing	
D. Continue investing in R&D for workable market access protocols	Passionfruit Australia, Hort Innovation		

Strategy: Legislative and Regulatory Issues of Importance

Aligns with Strategy 1 of NPBS

ACTION	RESPONSIBLE PARTY	DUE DATE	CURRENT ACTIVITIES
A. Raise awareness that all states have a responsibility to practice good biosecurity under the Australian *Biosecurity Act, 2015*. Some states may have quite specific legislative approaches whilst others have a more general approach, e.g. The General Biosecurity Obligation (in QLD), General Biosecurity Duty (NSW).	Passionfruit Australia, State/Territory Governments, Commonwealth, PHA	Ongoing	
B. States to inform industry and in turn industry to raise awareness with growers on each state legislative requirements in relation to pest reporting and management of neglected orchards. • Passionfruit Australia to provide the Qld and NSW General Biosecurity Obligation factsheets on their website.	Passionfruit Australia, State Governments, PHA		

Australian Passionfruit industry - biosecurity preparedness

The following table has been populated with the high priority pests of the Passionfruit industry. The aim of this table is to document the current preparedness documents and activities which are available and are currently being undertaken. This will allow industry, governments and RD&E agencies to better prepare for these high priority pests and align future activities as listed in the Biosecurity Implementation Table (Table 3).

Table 4. Preparedness Status - Documents and activities currently available for high priority pests of the Passionfruit industry[14]

INDUSTRY	COMMON NAME (SCIENTIFIC NAME)	NATIONAL DIAGNOSTIC PROTOCOL[15]	SURVEILLANCE PROGRAMS	FACT SHEETS[16]	CONTINGENCY PLAN	EPPRD CATEGORY	NATIONAL PRIORITY PEST	COLLABORATORS[17]
Invertebrates								
Diptera (flies and midges)								
Passionfruit	**Oriental fruit fly** (*Bactrocera dorsalis*)	Not developed - Fruit Fly ID Australia provides diagnostic information on this species.[18]	Australian Government & all states (excl. ACT), NAQS[19]	Yes (Papaya, Avocado, Apple and Pear, Citrus)	Not developed	Yes - 2	Yes - 4	Avocado, Mango, Summerfruit, Apple and Pear, Citrus, Viticulture, Banana, Coffee, Cherry, Tomato, Vegetable
Passionfruit	**Carambola fruit fly** *Bactrocera*	Not developed - Fruit Fly ID Australia provides diagnostic information on this	Australian Government & all states (excl. ACT), NAQS[21]	Not developed	Not developed	Not categorised	Yes - 4	Avocado, Citrus, Mango, Tomato, Vegetable

[14] Information presented has been taken from the National Plant Biosecurity Status Report 2019 and confirmed or updated through either Plant Health Committee, the Subcommittee on Plant Health Diagnostic Standards, the Subcommittee on National Plant Health Surveillance or other stakeholders

[15] Copies of these documents are available from planthealthaustralia.com.au/pidd

[16] Copies of these documents are available from planthealthaustralia.com.au/pidd

[17] Industries listed in this column identify these pests within their biosecurity plans as High Priority Pests.

[18] fruitflyidentification.org.au/lookup-species/

[19] Australian Gov.: Northern Australian Quarantine Survey exotic fruit fly trapping, NSW: Exotic Fruit Flies-Ports & Riverina (protocol based on pheromone traps), Tas.: Fruit Fly Trapping program (area freedom & export protocol), VIC: National Plant Health Surveillance Project (protocol developed), SA: Ports of Entry Trapping Program (protocol developed), WA: Port of Entry Fruit Fly Trapping (Fruit fly Codes of Practice protocol), QLD: Exotic fruit fly trapping (protocol developed), NT: Fruit Fly monitoring and surveillance

[21] Australian Gov.: Northern Australian Quarantine Survey exotic fruit fly trapping, NSW: Exotic Fruit Flies-Ports & Riverina (protocol based on pheromone traps), Tas.: Fruit Fly Trapping program (area freedom & export protocol), VIC: National Plant Health Surveillance Project (protocol developed), SA: Ports of Entry Trapping Program (protocol developed), WA: Port of Entry Fruit Fly Trapping (Fruit fly Codes of Practice protocol), QLD: Exotic fruit fly trapping (protocol developed), NT: Fruit Fly monitoring and surveillance

INDUSTRY	COMMON NAME (SCIENTIFIC NAME)	NATIONAL DIAGNOSTIC PROTOCOL[15]	SURVEILLANCE PROGRAMS	FACT SHEETS[16]	CONTINGENCY PLAN	EPPRD CATEGORY	NATIONAL PRIORITY PEST	COLLABORATORS[17]
	carambolae	species.[20]						
Passionfruit	**Fijian fruit fly** *Bactrocera passiflorae*	Not developed - Fruit Fly ID Australia provides diagnostic information on this species.[22]	Australian Government & all states (excl. ACT), NAQS[23]	Yes (Papaya)	Not developed	Not categorised	Not listed	Mango, Avocado, Vegetable
Hemiptera (stink bugs, aphids, mealybugs, scale, whiteflies and hoppers)								
Passionfruit	**Mealybug** *Dysmicoccus grassii* (Syn. *Pseudococcus grassi*)	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not listed	
Passionfruit	**Cocoa mirids** *Helopeltis clavifer*	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not listed	
Pathogens								
Bacteria (including phytoplasmas)								
Passionfruit	**Bacterial canker of stone fruit, bacterial canker of trees** *Pseudomonas syringae* exotic strains	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not listed	Nursery & Garden

[20] fruitflyidentification.org.au/lookup-species/

[22] fruitflyidentification.org.au/lookup-species/

[23] Australian Gov.: Northern Australian Quarantine Survey exotic fruit fly trapping, NSW: Exotic Fruit Flies-Ports & Riverina (protocol based on pheromone traps), Tas.: Fruit Fly Trapping program (area freedom & export protocol), VIC: National Plant Health Surveillance Project (protocol developed), SA: Ports of Entry Trapping Program (protocol developed), WA: Port of Entry Fruit Fly Trapping (Fruit fly Codes of Practice protocol), QLD: Exotic fruit fly trapping (protocol developed), NT: Fruit Fly monitoring and surveillance

INDUSTRY	COMMON NAME (SCIENTIFIC NAME)	NATIONAL DIAGNOSTIC PROTOCOL[15]	SURVEILLANCE PROGRAMS	FACT SHEETS[16]	CONTINGENCY PLAN	EPPRD CATEGORY	NATIONAL PRIORITY PEST	COLLABORATORS[17]
Viruses and viroids								
Passionfruit	**Passionfruit severe leaf distortion virus**	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not listed	
Passionfruit	**Passionfruit Sri Lankan mottle potyvirus**	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not listed	
Passionfruit	**East Asian Passiflora virus**	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not listed	

NATIONAL BIOSECURITY SYSTEM

What is biosecurity and why is it important?

Plant biosecurity is a set of measures which protect the economy, environment and community from the negative impacts of exotic plant pests. A fully functional and effective biosecurity system is a vital part of the future profitability, productivity and sustainability of Australia's plant production industries and is necessary to preserve the Australian environment and our way of life.

Plant pests include (but are not limited to) insects, mites, snails or diseases (pathogens, including nematodes) that have the potential to adversely affect fresh food, fibre, ornamental crops, honey bees and stored products, as well as environmental flora and fauna. For agricultural systems, if exotic plant pests enter Australia, they can reduce crop yields, affect trade and market access, significantly increase costs to production and in the worst-case scenario, bring about the complete failure of a production system. Historical examples present us with an important reminder of the serious impact that exotic plant pests can have on agricultural production.

Australia's geographic isolation and lack of shared land borders have, in the past, provided a degree of natural protection from exotic plant pest threats. Australia's national quarantine system also helps to prevent the introduction of harmful exotic threats to plant industries. However, there will always be some risk of an exotic pest entering Australia, whether through natural dispersal (such as wind) or assisted dispersal as a result of increases in international tourism, imports and exports, mail and changes to transport procedures (e.g., refrigeration and containerisation of produce).

The plant biosecurity system in Australia

Australia has a unique and internationally recognised biosecurity system to protect our plant production industries and the natural environment against new plant pests. The system is underpinned by a cooperative partnership between plant industries and all levels of government.

The framework for managing the cooperative partnership for delivering an effective plant biosecurity system is built on a range of strategies, policies and legislation, such as the Intergovernmental Agreement on Biosecurity (IGAB) and the National Plant Biosecurity Strategy (NPBS). These not only provide details about the current structure but provide a vision of how the future plant biosecurity system should operate.

Australia's biosecurity system has been subject to several reviews in recent times, with the recommendations recognising that a future-focused approach is vital for maintaining a strong and resilient biosecurity system that will protect Australia from new challenges. As a result, there is a focus on continuous improvement from industry and governments to keep Australia's plant biosecurity system effective, with the key themes including:

- Targeting what matters most, including risk-based decision making and managing biosecurity risks across the biosecurity continuum (pre-border, border and post-border).
- Good regulation, including reducing regulatory burden and having effective legislation in place.
- Better processes, including service delivery modernisation with electronic, streamlined systems.
- Sharing the responsibility, including maintaining productive relationships with all levels of government, primary industries and the wider Australian public.
- Maintaining a capable workforce.

Passionfruit peak industry body

Passionfruit Australia Inc. is the peak industry body for the Passionfruit industry. They are a signatory to the EPPRD and are the key industry contact point if a suspect emergency plant pest affecting the Australian Passionfruit Industry is detected. For a background on the Passionfruit industry, refer to page 55.

Plant Health Australia

Plant Health Australia (PHA) is the national coordinator of the government-industry partnership for plant biosecurity in Australia.

PHA is a not-for-profit, subscription-funded public company. The main activities of PHA are funded from annual subscriptions paid by members. The Australian Government, state and territory governments and 38 plant industry organisations are all members of PHA and each meet one third of the total annual membership subscription. This tripartisan funding model ensures the independence of PHA.

Plant Health Australia was formed to address priority plant health issues, and to work with all its members to develop an internationally outstanding plant health management system that enhances Australia's plant health status and the sustainability and profitability of Australia's plant industries. Through PHA, current and future needs of the plant biosecurity system can be mutually agreed, issues identified, and solutions to problems found. The independence and impartiality of PHA, allows the organisation to put the interests of the plant biosecurity system first and support a longer-term perspective.

For more information about PHA visit planthealthaustralia.com.au .

The Biosecurity Plan

The Biosecurity Plan for the Australian Passionfruit Industry was developed in consultation with the Technical Expert Group and Biosecurity Implementation Group. These groups were comprised of plant health and biosecurity experts and industry representatives from key stakeholders .

The biosecurity plan not only details exotic plant pest threats to the Australian Passionfruit industry but also contains information on the current mitigation and surveillance activities being undertaken against these threats, and identifies contingency plans, fact sheets and diagnostic protocols that have been developed for these pests.

This plan is a framework to coordinate biosecurity activities and investment for Australia's Passionfruit Industry, and to build on strengths and address weaknesses in the industry's current biosecurity position. It provides a mechanism for key stakeholders to better prepare for and respond to, incursions of plant pests that could have significant impacts on the Australian Passionfruit Industry.

Biosecurity planning

Biosecurity planning provides a mechanism for the Australian Passionfruit Industry and other key stakeholders to actively determine plant pests of highest priority, analyse the risks they pose and put in place practices and procedures that would rapidly detect and minimise the impact of a pest incursion and/or reduce the chance of pests becoming established. Effective industry biosecurity planning relies on effort and engagement from all stakeholders, including government agencies, industry, and the public (Figure 1).

Ensuring the Passionfruit industry has the capacity to minimise the risks posed by pests, and to respond effectively to any pest threats is a vital step for the future sustainability and viability of the industry. Through this pre-emptive planning process, the industry will be better placed to maintain domestic and international trade and reduce the economic and social costs of pest incursions on both growers and the wider community. The information gathered during these processes provides additional assurance that the Australian Passionfruit industry is free from specific pests and has systems in place to control and manage biosecurity risks, which assists the negotiation of access to new overseas markets.

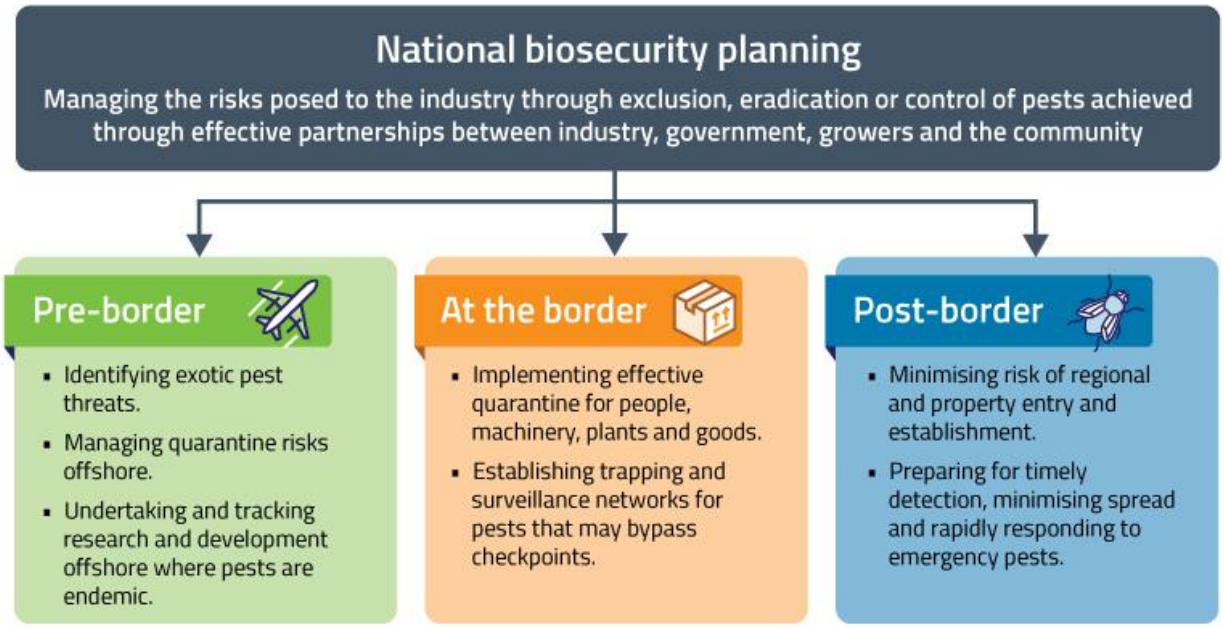

Figure 1. Industry biosecurity: a shared responsibility.

Biosecurity Plan development

With the assistance of Passionfruit Australia, ALGA and Papaya Australia a Tropical Fruits Technical Expert Group (TEG) and a Tropical Fruits Biosecurity Implementation Group (BIG) were formed to work on the review of the Biosecurity Plan for the Passionfruit industry. These groups were coordinated by Plant Health Australia (PHA) and included representatives from the three industries, relevant Commonwealth, state, and territory agriculture agencies.

Key roles of the Technical Expert Group for the BP included:

- identifying and documenting key threats to the Passionfruit industry
- confirming an agreed high priority pest (HPP) list.

Key roles of the Biosecurity Implementation Group for the BP included:

- documenting pest-specific fact sheets, contingency plans, diagnostic protocols and surveillance programs for HPPs
- documenting the roles and responsibilities of stakeholder groups
- developing a biosecurity implementation table for future biosecurity related work to be conducted over the life of this biosecurity plan.

Table 5. Members of the Tropical Fruit Technical Expert Group (TEG) and/or the Tropical Fruit Biosecurity Implementation Group (BIG)

NAME	ORGANISATION	AREA OF EXPERTISE	MEMBER OF TEG	MEMBER OF BIG
Jill Houser	ALGA	Industry	✓	✓
Gerard Kath	Papaya Australia	Industry	✓	✓
Joe Zappala	Papaya Australia	Industry		✓
Dennis Chant	Passionfruit Australia	Industry	✓	✓
Jane Richter	Passionfruit Australia	Industry	✓	
Greg Chandler	Hort Innovation	Biosecurity, Research	✓	

NAME	ORGANISATION	AREA OF EXPERTISE	MEMBER OF TEG	MEMBER OF BIG
		& Development		
Matt Adkins	NSW DPI	Research & Development	✓	
Ruth Huwer	NSW DPI	Entomology	✓	✓
Fucheng Shan	WADPIRD	Research	✓	✓
Touhidur Rahman	WADPIRD	Entomology	✓	
Alison Mackie	WA DPIRD	Pathology, Research		✓
Ceri Pearce	DAFQ	Pathology	✓	✓
Fiona Giblin	DAFQ	Pathology	✓	✓
Lindy Coates	DAFQ	Pathology	✓	
Christine Horlock	DAFQ	Pathology	✓	
Ian Newton	QDAF	Entomology	✓	✓
Jose Liberato	NTDITT	Pathology	✓	✓
Stuart Kearns	PHA	Biosecurity	✓	
Victoria Ludowici	PHA	Biosecurity	✓	
Bosibori Bett	PHA	Biosecurity	✓	
Trevor Dunmall	PHA	Biosecurity	✓	✓

Table 6. Scientists and others who contributed information for the review of the biosecurity plan[24]

NAME	ORGANISATION	AREA OF EXPERTISE
Cherie Gambley	QLD DAF	Virology
Danuta Knihinicki	DPI NSW	Entomology
Denis Persley	QLD DAF	Virology
Jennifer Cobon	QLD DAF	Nematology
Marc Poole	WA DPIRD	Entomology
Nanditha Panthania	QLD DAF	Pathology
Peter Gillespie	DPI NSW	Entomology
Tony Pattison	QLD DAF	Pathology
Sharl Mintoff	NT DITT	Pathology
Merran Neilsen	NT DITT	Pathology
Brian Thistleton	NT DITT	Entomology

[24] These people did not attend the technical expert group or biosecurity implementation group meetings but were approached for assistance during the biosecurity plan review process.

Review processes

With the support of the relevant industry bodies and PHA this plan should be reviewed on a 5-year basis. The review process will ensure:

- Threat Summary Tables are updated to reflect current knowledge
- pest risk assessments are current
- changes to biosecurity processes and legislation are documented
- contact details and the reference to available resources is accurate

In addition to the formal review process above, the document should be reviewed/revisited annually by a Biosecurity Reference Panel comprised of industry, government and PHA to ensure currency and relevance and to monitor progress with implementation. As an example, the industry biosecurity priorities identified within the plan could feed directly into industry R&D priority setting activities on an annual basis.

Opportunities to make out-of-session changes to the biosecurity plan, including the addition/subtraction of high priority pests or changes to legislation are currently being investigated. Such changes would need to include consultation and agreement of industry and government. This flexibility will facilitate the plan's currency and relevance.

THREAT IDENTIFICATION AND PEST RISK ASSESSMENTS

Introduction

This section identifies high-risk exotic plant pest threats to the Australian Passionfruit Industry, and presents a framework for assessing the potential economic, social and environmental impacts associated with each threat. This part of the biosecurity plan uses a nationally consistent and coordinated approach to threat identification and risk assessment to provide a strong base for future risk management in the Australian Passionfruit Industry.

By identifying key threats, a pre-emptive approach may be taken to risk management. Under this approach, mechanisms can be put into place to increase our response effectiveness when pest incursions occur. One such mechanism is the EPPRD that has been negotiated between PHA government and industry members. The EPPRD ensures reliable and agreed funding arrangements are in place in advance of EPP incursions and can assist in responses to EPP incursions, particularly for those EPP identified as key threats.

Identification of high-risk exotic plant pests will also assist in the implementation of effective grower and community awareness campaigns, targeted biosecurity education and training programs for growers and diagnosticians, and development of pest-specific incursion response plans.

Established pests of biosecurity significance are also considered in this biosecurity plan. It has been demonstrated that good biosecurity practice is beneficial for the ongoing management of established pests, as well as for surveillance and early detection of exotic plant pests. Established plant pests cause ongoing hardships for growers and these plant pests have been listed with the support of industry and government in recognition that they need a strategic, consistent, scientific and risk-based approach to better manage these plant pests for the benefit of the Australian Passionfruit industry.

Exotic pests of the Passionfruit industry

Threat identification

Information on exotic pest threats to the Passionfruit industry described in this document came from a combination of:

- past records
- industry practice and experience
- relevant published literature
- local industry and overseas research
- specialist and expert judgment

At this time, only invertebrate pests (insects, mites, molluscs and nematodes) and pathogens (disease causing organisms) have been identified, for risk assessment as these are what are responded to under national agreed arrangements, under the EPPRD. If exotic weeds were to be included in the EPPRD then this would be revisited through future reviews of the plan.

Pest risk assessments

The assessment process used in this BP was developed in accordance with the International Standards for Phytosanitary Measures (ISPM) No. 2 and 11 [Food and Agriculture Organization of the United Nations (FAO), 2004; 2007]. A summary of the pest risk analysis protocol followed in this BP is shown in

Table , and the complete protocol used for pest risk analysis in this BP can be found on the PHA website.

While there are similarities in the ranking system used in this document and the Biosecurity Import Risk Analysis (BIRA) process followed by the Department of Agriculture, Water and the Environment (DAWE), there are differences in the underlying methodology and scope of consideration that may result in different outcomes between the two assessment systems. This includes different guidance to assignment of qualitative probabilities when compared with DAWE's BIRA process.

Modifications of the Department's protocol developed in 2011 have been made to suit the analysis required in the BP development process, including, but not limited to:

- Entry potential: The determination of entry potential in this BP takes into account multiple possible pathways for the legal importation of plant material as well as illegal pathways, contamination and the possibility of introduction through natural means such as wind. Therefore, the scope is wider than that used by the DAWE in their BIRA process, which only considers legal importation of plants or plant commodities.
- Potential economic impact of pest establishment in this document only takes into account the impacts on the Passionfruit industry. The DAWE BIRA process has a wider scope, including the effects to all of Australia's plant industries, trade, the environment and public health.
- Risk potentials and impacts: The number of categories used in this BP for describing the entry, establishment, spread, and potential economic impact (see 'Description of terms used in pest risk tables', page 58) differs in comparison to that used in the DA BIRA process.

Table 7. Summary of the pest risk assessment process used in biosecurity plans.

Step 1	**Clearly identify the pest**	• **Generally, pest defined to species level** • **Alternatively, a group (e.g. family, genus level) can be used** • **Sub-species level (e.g. race, pathovar, etc.) may be required**
Step 2	Assess entry establishment and spread likelihoods	• Assessment based on current system and factors • Negligible, low, medium, high or unknown ratings
Step 3	Assess the likely consequences	• Primarily based on likely economic impact to industry based on current factors • Negligible, low, medium, high, extreme or unknown ratings
Step 4	Derive overall risks	• Entry, establishment and spread likelihoods are combined to generate a likelihood score • Likelihood score combined with the likely economic impact to generate an overall risk score
Step 5	Review the risks	• Risk ratings should be reviewed with the BP

The objective of risk assessment is to clearly identify and classify biosecurity risks and to provide data to assist in the evaluation and treatment of these risks. Risk assessment involves consideration of the sources of risk, their consequences, and the likelihood that those consequences may occur. Factors that affect the consequences and likelihood may be identified and addressed via risk mitigation strategies.

Risk assessment may be undertaken to various degrees of refinement, depending on the risk information and data available. Assessment may be qualitative, semi-quantitative, quantitative, or a combination of these. The complexity and cost of assessment increase with the production of more quantitative data. It is often more practical to first obtain a general indication of the level of risk through qualitative risk assessment, and if necessary, undertake more specific quantitative assessment later [Australian Standard/New Zealand Standard (AS/NZS) ISO 31000, 2009].

Ranking pest threats

Key questions required for ranking the importance of pests include the following:

- What are the probabilities of entry into Australia, establishment and spread, for each pest?
- What are the likely impacts of the pest on cost of production, overall productivity and market access?
- How difficult is each pest to identify and control and/or eradicate?

The TST (Appendix 2: Threat Summary Tables) present a list of potential plant pest threats to the Australian Passionfruit Industry and provide summarised information on entry, establishment and spread potential, the economic consequences of establishment and eradication potential (where available). The most serious threats from the TST were identified through a process of qualitative risk assessment and are listed in the HPP list (Table 1).

This document considers all potential pathways by which a pest might enter Australia, including natural and human-assisted spread (including illegal means such as smuggling). This is a broader view of potential risk than the BIRA process conducted by DAWE which focuses only on specific,

regulated import pathways.

When a pest that threatens multiple industries is assessed, the entry, establishment and spread potentials take into account all known factors across all host industries. This accurately reflects the ability of a pest to enter, establish and spread across Australia and ultimately results in different industries, and their biosecurity plans, sharing similar pest ratings. However, the economic impact of a pest is considered at an industry specific level (i.e., only for the Australian Passionfruit Industry in this biosecurity plan), and therefore this rating may differ between biosecurity plans.

Description of terms used in pest risk tables

The descriptions below relate to terms used in table 1. High Priority Pests of the Passionfruit Industry and elsewhere in the document.Error! Not a valid bookmark self-reference. provides an overview of the top ranked biosecurity pest threats (invertebrates, pathogens and nematodes) for the Australian Passionfruit Industry. Further details on each pest along with the basis for the likelihood ratings are provided in the TST (Appendix 2: threat summary tables). Assessments may change given more detailed research, and the priority list will be formally reviewed along with the Biosecurity Plan on an annual basis through the Biosecurity Reference Panel. An explanation of the method used for calculating the overall risk can be found on the PHA website.

Table 1. High Priority pests of the passionfruit industry

Entry potential

Negligible	**The probability of entry is extremely low given the combination of all known factors including the geographic distribution of the pest, quarantine practices applied, probability of pest survival in transit and pathways for pest entry and distribution to a suitable host.**
Low	The probability of entry is low, but clearly possible given the expected combination of factors described above.
Medium	Pest entry is likely given the combination of factors described above.
High	Pest entry is very likely and potentially frequent given the combination of factors described above.
Unknown	The pest entry potential is unknown or very little of value is known.

Establishment potential

Negligible	**The probability of entry is extremely low given the combination of all known factors including the geographic distribution of the pest, quarantine practices applied, probability of pest survival in transit and pathways for pest entry and distribution to a suitable host.**
Low	The probability of entry is low, but clearly possible given the expected combination of factors described above.
Medium	Pest entry is likely given the combination of factors described above.
High	Pest entry is very likely and potentially frequent given the combination of factors described above.
Unknown	The pest entry potential is unknown or very little of value is known.

Spread potential

Negligible	**The pest has very limited potential for spread in Australia given the combination of dispersal mechanisms, availability of hosts, vector presence, industry practices and geographic and climatic barriers.**
Low	The pest has the potential for natural or assisted spread to susceptible hosts within Australia yet is hindered by a number of the above factors
Medium	The pest has an increased likelihood of spread due to the above factors
High	The natural spread of the pest to most production areas is largely unhindered and assisted spread within Australia is also difficult to manage
Unknown	The spread potential is unknown or very little of value is known.

Economic impact

Negligible	**There are very minor, often undetectable, impacts on production with insignificant changes to host longevity, crop quality, production costs or storage ability. There are no restrictions to market access.**
Very low	There are minor, yet measurable, impacts on production including either host longevity, crop quality, production costs or storage ability. There are no restrictions to market access.
Low	There are measurable impacts to production including either host mortality, reduction in yield, production costs, crop quality, storage losses, and/or minimal impacts on market access.
Medium	There are significant impacts on production with either host mortality, reduction in yield, production costs, crop quality, storage losses, and/or moderate impacts on market access.
High	There are severe impacts on production including host mortality and significant impacts on either crop quality or storage losses, and/or severe impacts on market access.
Extreme	There is extreme impact on standing crop at all stages of maturity, with high host mortality or unmanageable impacts to crop production and quality, and /or extreme, long term, impacts on market access.
Unknown	The economic potential of the pest is unknown or very little of value is known.

References

AS/NZS ISO 31000:2009 Risk management - Principles and guidelines. Standards Australia, Sydney, and Standards New Zealand, Wellington.

Australian Government Department of Agriculture and Water Resources 2017, *Final group pest risk analysis for thrips and orthotospoviruses on fresh fruit, vegetable, cut-flower and foliage imports*, Department of Agriculture and Water Resources, Canberra, available at http://www.agriculture.gov.au/biosecurity/risk-analysis/group-pest-risk-analyses/group-pra-thrips-orthotospoviruses/final-report

DAFF (2011) Import Risk Analysis Handbook 2011. Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.

Department of Agriculture and Water Resources 2019b, *Final group pest risk analysis for mealybugs and the viruses they transmit on fresh fruit, vegetable, cut-flower and foliage imports*, Department of Agriculture and

Water Resources, Canberra, available at http://www.agriculture.gov.au/biosecurity/risk-analysis/group-pest-risk-analyses/mealybugs/final-report

FAO (2004) Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms. International Standards for Phytosanitary Measures No. 11. Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations, Rome.

FAO (2007) Framework for pest risk analysis. International Standards for Phytosanitary Measures No. 2. Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations, Rome.

RISK MITIGATION AND PREPAREDNESS

Introduction

There are a number of strategies that can be adopted to help protect Australian plant industries and minimise the risks of Emergency Plant Pests under International Plant Protection Convention (IPPC) standards (ippc.int/standards) and Australian commonwealth and state and territory legislation.

Many pre-emptive practices can be adopted to reduce the risk of exotic pest movement for the Australian Passionfruit Industry (***Figure 2***). Such risk mitigation and preparedness practices are the joint responsibility of governments, industry and the community.

A number of key risk mitigation areas are outlined in this guide, along with summaries of the roles and responsibilities of the Australian commonwealth, state and territory governments, and Australian Passionfruit Industry members. This section is to be used as a guide outlining possible activities that may be adopted by industry and growers to mitigate the risk and prepare for an incursion response. Each grower will need to evaluate the efficacy of each activity for their individual situation.

Figure 2. Examples of biosecurity risk mitigation activities.

Barrier quarantine

Barrier quarantine refers to the biosecurity measures implemented at all levels of the Passionfruit industry including national, state, regional and farm levels.

National level – importation restrictions

The Department of Agriculture, Water and the Environment (DAWE) is the Australian Government department responsible for maintaining and improving international trade and market access opportunities for agriculture, fisheries, forestry and food industries. DAWE achieves this through:

- establishment of science-based quarantine policies,
- provision of effective technical advice and export certification services,
- negotiations with key trading partners,
- participation in multilateral forums and international sanitary and phytosanitary (SPS) standard-setting organisations, and
- collaboration with portfolio industries and exporters.

DAWE is responsible for developing biosecurity (SPS) risk management policy and reviewing existing quarantine measures for the importation of live animals and plants, and animal and plant products for Australia. In particular, DAWE undertakes import risk analyses to determine which products may enter

Australia, and under what quarantine conditions. DAWE also consults with industry and the community, conducting research and developing policy and procedures to protect Australia's animal and plant health status and natural environment. In addition, DAWE assists Australia's export market program by negotiating other countries' import requirements for Australian animals and plants. Further information can be found at agriculture.gov.au.

The administrative authority for national quarantine is vested in DAWE under the Australian *Biosecurity Act 2015*. Quarantine policies are developed on the basis of a BIRA process. This process is outlined in the BIRA Handbook 2011 (https://www.agriculture.gov.au/biosecurity/risk-analysis/plant). DAWE maintains barrier quarantine services at all international ports and in the Torres Strait region. The management of quarantine policy, as it relates to the introduction into Australia of fruit, seed, or other plant material, is the responsibility of DAWE.

The Australian Biosecurity Import Conditions Database (BICON) contains the current Australian import conditions for more than 20,000 foreign plants, animal, mineral and human products and is the first point of access to information about Australian import requirements for a range of commodities. It can be used to determine if a commodity intended for import to Australia requires a quarantine import permit and/or treatment or if there are any other quarantine prerequisites. For import conditions see the BICON database at https://bicon.agriculture.gov.au/BiconWeb4.0. For export conditions see the Manual of Importing Country Requirements (MICoR) database at agriculture.gov.au/micor/plants.

The Australian Government through DAWE is responsible for the inspection of machinery and equipment being imported into Australia. Any machinery or equipment being imported into Australia must meet quarantine requirements. If there is any uncertainty, contact DAWE on (02) 6272 3933 or 1800 900 090, or visit the website at agriculture.gov.au/biosecurity/

The World Trade Organization (WTO) SPS Agreement facilitates international trade while providing a framework to protect the human, animal and plant health of WTO members. SPS measures put in place must minimise negative effects on trade while meeting an importing country's appropriate level of protection. For plant products, these measures are delivered through the IPPC standard setting organisations and collaboration with portfolio industries and exporters. For more information on the IPPC visit ippc.int.

State and regional level – movement restrictions

The ability to control movement of materials that can carry and spread passionfruit pests is of high importance. Each state/territory may have quarantine legislation in place to control the importation of passionfruit and or passionfruit pest carriers interstate and intrastate, and to manage agreed pests if an incursion occurs (contact details in Table 11). Further regulations have been put in place in response to specific pest threats and these are regularly reviewed and updated by state/territory authorities and the Sub-Committee for Domestic Quarantine and Market Access (SDQMA).

Moving plant material between states/territories generally requires permits from the appropriate authority, depending on the plant species and which territory/state the material is being transferred to/from. Moving plant material intrastate may also require a permit from the appropriate authority. Information on pre-importation inspection, certification and treatments and/or certification requirements for movement of passionfruit can be obtained by contacting your local state or territory agriculture department directly (contact details in Table 8), or through the Subcommittee on Domestic Quarantine and Market Access (SDQMA) website https://www.interstatequarantine.org.au/ which lists relevant contacts in each state/territory as well as Interstate Certification Assurance (ICA) documents relating to each state/territory.

The movement of farm vehicles and equipment between states is also restricted because of the high risk of inadvertently spreading pests and weed seed. Each state/territory has quarantine legislation in place

governing the movement of machinery, equipment, and other potential sources of pest contamination. Further information can be obtained by contacting your local state/territory Department of Agriculture (contact details in Table 11).

Table 8. Interstate and interregional movement of plant products – legislation, quarantine manuals and contact numbers.

STATE	ADMINISTERING AUTHORITY	LEGISLATION	LINKS TO QUARANTINE MANUAL	PHONE
ACT	Environment ACT environment.act.gov.au	*Plant Disease Act 2002* *Pest Plants and Animals Act 2005*	See NSW conditions	13 22 81
NSW	Department of Primary Industries dpi.nsw.gov.au	*Biosecurity Act 2015* *Biosecurity Regulation 2017* *Biosecurity Order (Permitted Activities) 2017* and other supporting legislation such as Control Orders	dpi.nsw.gov.au/aboutus/about/legislation-acts/plant-diseases	(02) 6391 3384
NT	Department of Primary Industry, Tourism and Trade ditt.nt.gov.au/	*Plant Health Act 2008* *Plant Health Regulations 2011*	nt.gov.au/industry/agriculture/food-crops-plants-and-quarantine/plants-and-quarantine	(08) 8999 2118
QLD	Biosecurity Queensland, a part of the Department of Agriculture and Fisheries, Queensland daf.qld.gov.au/biosecurity	*Biosecurity Act 2014* *Biosecurity Regulation 2016*	daf.qld.gov.au/plants/moving-plants-and-plant-products	132 523
SA	Primary Industries and Regions SA pir.sa.gov.au	Plant Health Act 2009 Plant Health Regulations 2009	pir.sa.gov.au/biosecurity/plant_health/importing_commercial_plants_and_plant_products_into_south_australia	(08) 8207 7820
TAS	Department of Primary Industries, Parks, Water and Environment dpipwe.tas.gov.au	Plant Quarantine Act 1997 Weed Management Act 1999	dpipwe.tas.gov.au/biosecurity-tasmania/plant-biosecurity/plant-biosecurity-manual	1300 368 550
VIC	Department of Jobs, Precincts and Regions djpr.vic.gov.au	Plant Biosecurity Act 2010 Plant Biosecurity Regulations 2016	agriculture.vic.gov.au/psb	136 186
WA	Department of Primary Industries and Regional Development agric.wa.gov.au/	Biosecurity and Agriculture Management Act 2007	https://www.agric.wa.gov.au/qtine/default.asp	(08) 9368 3333

New South Wales

Information on pre-importation inspection, certification and treatment requirements may be obtained from NSW DPI Regulatory Services by phone 02 6391 3384 or by visiting the NSW Department of Primary Industries website dpi.nsw.gov.au/aboutus/about/legislation-acts/plant-diseases.

Northern Territory

Administrative authority for regional quarantine in the Northern Territory (NT) is vested in the Department of Industry, Tourism and Trade (DITT) under the Plant Health Act 2008 and Plant Health Regulations 2011. The Act enables notifiable pests to be gazetted, quarantine areas to be declared and inspectors appointed to carry out wide ranging control and/or eradication measures. Plant import requirements for particular pests, plants or plant related materials are identified in the Regulations. Further information on NT import requirements and treatments can be obtained by contacting NT Quarantine on (08) 8999 5511 or email quarantine@nt.gov.au.

For more information refer to the NT DPIR website dpir.nt.gov.au/.

Queensland

Information on specific pre-importation inspection, treatments and/or certification requirements for movement of any fruit or plant material into Queensland, as well as maps of pest quarantine areas, may be obtained from the Biosecurity Queensland part of the DAF QLD website (daf.qld.gov.au/plants/moving-plants-and-plant-products).

Further details can be obtained from the DAF Queensland Customer Service Centre by phoning 13 25 23 or by fax 07 3404 6900.

South Australia

Information on pre-importation inspection, certification and treatments and/or certification requirements for movement of fruit or plant material in South Australia (SA) may be obtained from Biosecurity SA - Plant Health by phone (08) 8207 7820 or fax (08) 8207 7844. Further information can be found at pir.sa.gov.au/biosecurity/plant_health.

Primary Industries and Regions South Australia (PIRSA) have strict regulations and requirements regarding the entry of plant material (fruit, vegetables, flowers, plants, soil and seeds) into the State.

For further information on import conditions consult the Plant Quarantine Standard (pir.sa.gov.au/biosecurity/plant_health/importing_commercial_plants_and_plant_products_into_south_australia).

Tasmania

Information on specific pre-importation inspection, treatments and/or certification requirements for movement of any fruit or plant material into Tasmania may be obtained from the Department of Primary Industries, Parks, Water and Environment (DPIPWE) Biosecurity website (www.dpipwe.tas.gov.au/biosecurity) or by phoning 1300 368 550.

General and specific import conditions apply to the importation of plant material into Tasmania to prevent the introduction of pests and diseases into the State. Plants and plant products must not be imported into Tasmania unless State import requirements are met and a Notice of Intention to import has been provided to a Biosecurity Tasmania inspector not less than 24 hours prior to the importation.

For further information on import conditions consult the Plant Quarantine Manual (dpipwe.tas.gov.au/biosecurity-tasmania/plant-biosecurity/plant-biosecurity-manualhttp://dpipwe.tas.gov.au/biosecurity/plant-biosecurity/plant-biosecurity-manual).

Victoria

The movement into Victoria of plants and plant products may be subject to a prohibition, or to one or more conditions which may include chemical treatments. These prohibitions and conditions are described on the Department of Jobs, Precincts and Regions (DJPR) website (see link in ***Table***). Some items may need to be presented to a DJPR inspector or an accredited business, for checking of details such as correct certification, labelling or treatment.

Further information on pre-importation inspection, certification and treatments and/or certification

requirements for movement of fruit or plant material into or within Victoria may be obtained from DJPR on the web at agriculture.vic.gov.au/psb or by phone 136 186.

Western Australia

The lead agency for agricultural biosecurity in Western Australia is the Department of Primary Industries and Regional Development (DPIRD). Western Australia is naturally free from a large number of pests and diseases that are present in many other parts of the world. WA's geographical isolation in conjunction with a robust plant biosecurity system including border and intrastate regulations, industry and public awareness campaigns and surveillance programs maintains this status.

There are general and specific legislative requirements which underpin Western Australian plant biosecurity. Amongst other things the legislation regulates movement of potential carriers (such as plant material, honey, machinery, seeds etc.) into and within the state.

General conditions include (but are not limited to the following):

- The requirement for all potential carriers to be presented to an inspector for inspection upon arrival in WA
- Soil is prohibited entry and imported goods, including containers, must be free from soil
- Freedom from pests and diseases of quarantine concern to WA

In addition to the general requirements, specific requirements are also in place for movement into and within the state.

For further information on requirements contact Quarantine WA on (08) 9368 3333.

Farm level – exclusion activities

A significant risk of spreading pests onto farms arises when propagation material, people, machinery and equipment move from property to property and from region to region. It is the responsibility of the industry and the owner/manager of each property to ensure these risks are minimised.

It is in the interests of industry to encourage and monitor the management of risk at the farm level, as this will reduce the probability of pest entry and increase the probability of early detection. This should in turn reduce the likelihood of a costly incident response, thereby reducing costs to industry, government and the community.

One major way this can be achieved is through management of industry biosecurity at the farm level using exclusion practices. Further detail on potential strategies is included in the Farm Biosecurity section (page 44). The Australian Passionfruit Industry is already a strong supporter of farm biosecurity; but should continue to further extend this message of promoting good farm hygiene in a wide range of ways.

Surveillance

Surveys enhance prospects for early detection, minimises costs associated with eradication and are necessary to meet the treaty obligations of the WTO SPS Agreement with respect to the area freedom status of Australia, Australian states and territories and intra state/territory regions.

The SPS Agreement gives WTO members the right to impose SPS measures to protect human, animal and plant life health provided such measures do not serve as technical barriers to trade. In other words, for countries (such as Australia) that have signed the SPS Agreement, imports of food, including fresh fruit and cherries, can only be restricted on proper, science-based quarantine grounds. Where quarantine conditions are imposed, these will be the least trade restrictive measures available that meet Australia's appropriate level of quarantine protection. The SPS Agreement also stipulates that claims of area freedom must be supported by appropriate information, including evidence from surveillance and monitoring activities. This is termed "evidence of absence" data and is used to provide support that we have actively looked-for pests and not found them.

ISPM No. 6 (ippc.int/sites/default/files/documents/20140528/spec_61_revispm6_2014-05-28_201405281352--150.18%20KB.pdf) provides international guidelines for structured pest surveys. Structured pest survey planning and implementation depends on the risk involved, the resources available, and the requirements of trading

partners (particularly when Australia wishes to access overseas markets). The intensity and timing of surveys also depend on the spread characteristics of the pest, detection techniques available and the potential impact of the pest.

Early detection of an exotic pest incursion can significantly increase the likelihood of a successful eradication campaign and reduce the associated costs. Effective surveillance plays a critical role in working toward this goal. Surveillance can be either targeted toward specific pests, or general in nature. General non-targeted surveillance is based on recognising normal versus suspect plant material. Targeted surveillance is important to determine the presence or absence in each area (state/territory or region.

Industry personnel can provide very effective early detection of new or unusual symptoms through their normal management practices (i.e. 'passive surveillance'), provided individuals are aware of what to look for and of reporting procedures. Consultants and crop scouts can provide valuable information as they are regularly in the field, and hence can observe any unusual pest activity or symptoms on plants.

National surveillance programs

The Department of Agriculture, Water and Environment (DAWE) maintains barrier quarantine services at all international ports on mainland Australia and in the Torres Strait region. DAWE also surveys the northern coast of Australia, offshore islands and neighbouring countries for exotic plant pests that may have reached the country through other channels (e.g. illegal vessel landings in remote areas, bird migrations, wind currents) as part of the Northern Australian Quarantine Strategy (NAQS). NAQS surveillance programs relevant to the Australian Passionfruit Industry are listed in Table .

State surveillance programs

State level surveillance depends on the participation of all stakeholder groups, particularly state/territory agriculture departments, industry representative groups, agri-businesses and growers.

The state/territory agriculture department can provide:

- planning and auditing of surveillance systems,
- coordination of surveillance activities between industry and interstate groups,
- diagnostic services,
- field diagnosticians for special field surveillance,
- surveillance on non-commercial sites,
- liaison services with industry members,
- communication, training and extension strategies with industry,
- biosecurity training, and
- reporting services to all interested parties (Department of Agriculture, national bodies, trading partners and industry).

Various pest surveillance programs are managed by the Department of Agriculture and the state/territory agriculture departments. Many state/territory agriculture agencies run diagnostic programs whereby samples of pests suspected to be EPP or HPP can be forwarded to the local agency and diagnosed for the presence of exotic pests free of charge. Official surveillance programs that target pests of the Australian Passionfruit Industry (exotic or those under official control in a region or state/territory) are shown in Table .

Table 9. Official surveillance programs that target pests of the Tropical Fruit (Lychee, Papaya, Passionfruit) industry (as of July 2020)[25]

SURVEILLANCE PROGRAM	TARGET PEST(S)	TARGET HOST(S)
Australian Government		
External Territories Surveillance Program	High priority exotic pests	Various environmental, production and ornamental plants
International Plant Health Surveillance Program	High priority exotic pests	Tropical horticultural, environmental and agricultural species
National Bee Pest Surveillance Program	*Varroa destructor, V. jacobsoni, Tropilaelaps clareae, T. mercedesae, Acarapis woodi, Oplostoma fuligineus, Braula coeca,* acute bee paralysis virus, deformed wing virus, slow paralysis virus, *Apis cerana, A. dorsata, A. florea, Bombus terrestris* and new exotic swarms of *A. mellifera*	Bee swarms at first points of entry
National Border Surveillance Program	Specific high priority exotic pests and any pest belonging to key taxonomic groups	Plant families of high economic importance and known or potential key hosts of specific exotic pests, focusing on regulatory import pathway risks
National Plant Health Surveillance Program (delivered through states and territories)	High priority exotic pests including exotic gypsy moth and fruit fly species	Various, based on the species surveyed
Northern Australia Quarantine Strategy – exotic fruit fly trapping	Exotic fruit flies including *Bactrocera dorsalis, B. latifrons, B. trivialis, B. umbrosa, Zeugodacus atrisetosa, Z. cucurbitae, Z. decipiens*	Various
Northern Australia Quarantine Strategy – pest and disease surveys	123 high priority exotic pests, diseases and weeds	Tropical horticultural, environmental and agricultural species
Within New South Wales		
Exotic fruit flies – Riverina	Mediterranean fruit fly (*Ceratitis capitata*), other tri lure responsive exotic fruit flies	Various horticultural crops (citrus, stone fruit)
Exotic longhorn beetle trapping	Asian longhorn beetle (*Anoplophora glabripennis*), Japanese pine sawyer beetle (*Monochamus alternatus*), brown mulberry longhorn beetle (*Apriona germari*)	Various hosts around ports
National Bee Pest Surveillance Program	*Varroa destructor, V. jacobsoni, Tropilaelaps clareae, T. mercedesae, Acarapis woodi, Oplostoma fuligineus, Braula coeca,* acute bee paralysis virus, deformed wing virus, slow paralysis virus, *Apis cerana, A. dorsata, A. florea, Bombus terrestris* and new exotic swarms of *A. mellifera*	Ports and surrounding environment

[25] Information presented has been taken from the National Plant Biosecurity Status Report 2020 and confirmed by the Sub-committee on National Plant Health Surveillance (sub-committee of the Plant Health Committee) and NAQS

National Plant Health Surveillance Program – multi pest surveillance	Multiple including *Bactrocera albistrigata, B. carambolae, B. caryae, B. correcta, B. curvipennis, B. dorsalis, B. facialis, B. kandiensis, B. kirki, B. melanotus, B. occipitalis, B. passiflorae, B. psidii, B. trilineola, B. trivialis, B. umbrosa, B. xanthodes, B. zonata, Ceratitis capitata, Zeugodacus cucurbitae, Z. tau,* gypsy moth (*Lymantria* spp.), glassy winged sharpshooter *(Homalodisca vitripennis), Xylella fastidiosa,* fire blight *(Erwinia amylovora),* brown marmorated stink bug *(Halyomorpha halys),* exotic mites *(including Brevipalpus* spp., *Aceria granati*), Asian citrus psyllid *(Diaphorina citri)*, African citrus psyllid *(Trioza erytreae)*, huanglongbing (*Candidatus* Liberibacter asiaticus), citrus canker *(Xanthomonas axonopodis* subsp. *citri)*, and invasive ants *(Solenopsis* spp., *Wasmannia auropunctata*, *Anoplolepis gracilipes*)	Multiple
Serpentine leafminer	Serpentine leafminer (*Liriomyza huidobrensis*)	Multiple horticultural and ornamental hosts
Within the Northern Territory		
Area Freedom Surveillance Program	Queensland fruit fly (*Bactrocera tryoni*)	Horticultural crops
National Bee Pest Surveillance Program	*Varroa destructor, V. jacobsoni, Tropilaelaps clareae, T. mercedesae, Acarapis woodi, Oplostoma fuligineus, Braula coeca, Aethina tumida,* acute bee paralysis virus, deformed wing virus and slow paralysis virus, *Apis cerana, A. dorsata, A. florea, Bombus terrestris,* and new exotic swarms of *A. mellifera*	Ports and surrounding environment
National Plant Health Surveillance Program – multi pest surveillance	Multiple including citrus canker (*Xanthomonas axonopodis* pv. *citri*), huanglongbing (*Candidatus* Liberibacter spp.), Asiatic citrus psyllid (*Diaphorina citri*), giant African snail (*Achatina fulica*), glassy winged sharpshooter (*Homalodisca vitripennis*), Pierce's disease (*Xylella fastidiosa*), banana black sigatoka (*Mycosphaerella fijiensis*), red imported fire ant (*Solenopsis invicta*), electric ant (*Wasmannia auropunctata*), yellow crazy ant (*Anoplolepis gracilipes*), *Bactericera cockerelli*, *Candidatus* Liberibacter solanacearum, potato leafminer, pea leafminer, serpentine leafminer (*Liriomyza huidobrensis*), American leafminer (*Liriomyza trifolii*), vegetable leafminer (*Liriomyza sativae*), exotic fruit flies (*Bactrocera* spp. and *Ceratitis* spp.)	Multiple
Plant Pest Diagnostic Service – horticulture	All pests and pathogens that can affect horticultural crops (mango, chilli, watermelon, Cucurbitaceae)	Horticultural crops
Regional Fruit Fly Monitoring and Surveillance	Exotic fruit flies (*Bactrocera* spp. and *Ceratitis* spp.)	Horticultural crops
Within Queensland		
Area freedom surveys	Multiple pests	Multiple
Exotic Fruit Fly in the Torres Strait Program	Exotic fruit fly including *Bactrocera* and *Zeugodacus* spp.	Multiple

Grow Help Australia diagnostic service project	All pests and pathogens that can affect horticultural crops, national parks, gardens, hobby growers and home gardeners. Commonly encountered pathogens include *Phytophthora* spp., *Fusarium* spp., *Colletotrichum* spp., *Alternaria* spp., *Rhizoctonia* spp., *Pythium* spp., *Ralstonia* spp., *Erwinia* spp. and viruses	Fruit, vegetable and ornamental hosts
National Bee Pest Surveillance Program	*Varroa destructor, V. jacobsoni, Tropilaelaps clareae, T. mercedesae, Acarapis woodi, Oplostoma fuligineus, Braula coeca, Aethina tumida,* acute bee paralysis virus, deformed wing virus and slow paralysis virus, *Apis cerana, A. dorsata, A. florea, Bombus terrestris,* and new exotic swarms of *A. mellifera*	Ports and surrounding environment
National Plant Health Surveillance Program – multi pest surveillance	Multiple, including exotic fruit flies and Mediterranean fruit fly (*Ceratitis capitata*), exotic gypsy moths, Pierce's disease (*Xylella fastidiosa*) and glassy winged sharpshooter (*Homalodisca vitripennis*), and brown marmorated stink bug (*Halyomorpha halys*).	Multiple
Bee pest and pest bee diagnostic service	Multiple pests	European honey bee
Within South Australia		
Area freedom surveys	Multiple pests	Multiple
Bee surveillance – endemic disease	American foulbrood (*Paenibacillus* spp.)	European honey bees
Mediterranean fruit fly	Mediterranean fruit fly (*Ceratitus capitata*)	Horticultural crops
National Bee Pest Surveillance Program	*Varroa destructor, V. jacobsoni, Tropilaelaps clareae, T. mercedesae, Acarapis woodi, Oplostoma fuligineus, Braula coeca,* acute bee paralysis virus, deformed wing virus and slow paralysis virus, *Apis cerana, A. dorsata, A. florea, Bombus terrestris* and new exotic swarms of *A. mellifera*	Ports and surrounding environment
National Plant Health Surveillance Program – multi pest surveillance	Multiple, including exotic invasive ants (tramp ants), Asian and African citrus psyllids (*Diaphorina citri*, *Candidatus* Liberibacter africanus), huanglongbing (*Candidatus* Liberibacter asiaticus), citrus canker (*Xanthomonas axonopodis* pv. *citri*), glassy winged sharpshooters (*Homalodisca vitripennis* and *H. coagulata*), brown mamorated stink bug (*Halyomorpha halys*), xylella (*Xylella fastidiosa*)	Multiple
Ports of Entry Trapping Program	Multiple – *Bactrocera albistrigata, B. carambolae, B. caryae, B. correcta, B. curvipennis, B. dorsalis, B. facialis, B. kandiensis, B. kirki, B. melanotus, B. occipitalis, B. passiflorae, B. psidii, B. trilineola, B, trivialis, B. tryoni, B. umbrosa, B. xanthodes, B. zonata, Ceratitis capitata, C. rosa, Zeugodacus cucurbitae, Z. tau*	Various fruit fly hosts
Mediterranean fruit fly	Mediterranean fruit fly (*Ceratitis capitata*)	Horticultural crops
Queensland fruit fly	Queensland fruit fly (*Bactrocera tryoni*)	Horticultural crops
Within Tasmania		

Bee surveillance – endemic disease and pests	American foulbrood (*Paenibacillus* spp.), European foulbrood (*Melissococcus pluton*), chalkbrood (*Ascophera apis),* sacbrood (*Nosema apis, N. ceranae),* sacbrood virus (*Morator aetatulas*), greater wax moth *(Galleria mellonella)*, lesser wax moth (*G. achroia grisella)*, European wasps (*Vespula germanica*), *Braula coeca,* bumble bee *(Bombus terestris)*	European honey bees
Fruit fly trapping surveillance	*Bactrocera dorsalis, B. tryoni, Ceratitis capitata* and exotic fruit flies	Host fruit trees, fruit and vegetables
National Bee Pest Surveillance Program	*Varroa destructor, V. jacobsoni, Tropilaelaps clareae, T. mercedesae, Acarapis woodi, Oplostoma fuligineus, Aethina tumida*, acute bee paralysis virus, deformed wing virus and slow paralysis virus, *Apis cerana, A. dorsata, A. florea, Bombus terrestris* and new exotic swarms of *A. mellifera*	Ports and surrounding environment
National Plant Health Surveillance Program – multi pest surveillance	Brown marmorated stink bug (*Halyomorpha halys*), citrus canker (*Xanthomonas citri* subsp. *citri*), gypsy moths (including *Lymantria albescens, L. atameles, L. concolor, L. dispar asiatica, L. dispar dispar, L. dispar japonica, L. dissoluta, L. fumida, L. marginata, L. minomonis, L. monacha, L. postalba, L. pulverea, L. sinica, L. umbrosa, L. xylina*), huanglongbing (*Candidatus* Liberibacter asiaticus), *Bactericera cockerelli*, *Diaphorina citri*, *Trioza erytreae*, *B. trigonica*, *Trioza apicallis*, Pierce's disease (*Xylella fastidiosa*), glassy winged sharpshooter (*Homalodisca vitripennis*), *Bactrocera, Zeugodacus* and *Ceratitis spp.* (exotic fruit fly species)	Multiple
Within Victoria		
Alert contacts	All plant pests	All hosts, general surveillance
Exotic fruit flies – Sunraysia	Mediterranean fruit fly (*Ceratitis capitata*)	Various horticultural crops (citrus, stone fruit)
MyPestGuide e-surveillance	All plant pests	All hosts, general surveillance
National Bee Pest Surveillance Program	*Varroa destructor, V. jacobsoni, Tropilaelaps clareae, T. mercedesae, Acarapis woodi, Oplostoma fuligineus, Braula coeca,* acute bee paralysis virus, deformed wing virus, slow paralysis virus, *Apis cerana, A. dorsata, A. florea, Bombus terrestris* and new exotic swarms of *A. mellifera*	Ports and surrounding environment
National Plant Health Surveillance Program – multi pest surveillance	Multiple including citrus canker (*Xanthomonas axonopodis* pv. *citri*), exotic fruit flies (*Bactrocera* spp., *Ceratitis captitata*), Pierce's disease (*Xylella fastidiosa*), glassy winged sharpshooter (*Homalodisca vitripennis*), plum pox virus, Asian gypsy moth (*Lymantria dispar* and other *Lymantria* spp.), brown marmorated stink bug (*Halyomorpha halys*), Asian citrus psyllid (*Diaphorina citri*), African citrus psyllid (*Trioza erytreae*) and spotted wing drosophila (*drosophila suzukii*)	Multiple
Passive MedFly Program	Mediteranean fruit fly (*Ceratitis capitata*)	Fruit trees in backyards

Urban Plant Health Network	Various, including brown marmorated stink bug (*Halyomorpha halys*), Asian citrus psyllid (*Diaphorina citri*), African citrus psyllid (*Trioza erytreae*), Asian honeybee, red imported fire ant (*Solenopsis invicta*), spotted wing drosphila (drosophila suzukii) and glassy winged sharpshooter (*Homalodisca vitripennis*)	Multiple plant hosts in periurban landscape, including community gardens
Within Western Australia		
Ant Blitz	Browsing ant (*Lepisiota frauenfeldi*), Red Imported Fire Ant (*Solenopsis invicta*), Small black sugar ant (*Lepisiota capensis*)	Urban areas
Biosecurity Blitz	All plant pests	General surveillance, all hosts
Medfly Area Freedom (Ord River Irrigation Area)	Mediterranean fruit fly (*Ceratitis capitata*)	Many horticultural hosts
MyPestGuide e-surveillance	All plant pests	All hosts, general surveillance
National Bee Pest Surveillance Program	*Varroa destructor*, *V. jacobsoni*, *Tropilaelaps clareae*, *T. mercedesae*, *Acarapis woodi*, *Oplostoma fuligineus*, *Braula coeca*, acute bee paralysis virus, deformed wing virus, slow paralysis virus, *Apis cerana*, *A. dorsata*, *A. florea*, *Bombus terrestris* and new exotic swarms of *A. mellifera*	Ports and surrounding environment
National Plant Health Surveillance Program – multi pest surveillance	Multiple including Asian citrus psyllid (*Diaphorina citri*), citrus canker (*Xanthomonas axonopodis* pv. *citri*), citrus longicorn beetle (*Anoplophora chinensis*), glassy winged sharpshooter (*Homalodisca vitripennis*), xylella (*Xylella fastidiosa*), brown marmorated stink bug (*Halyomorpha halys*)	Pome and citrus crops
Port of Entry – Asian gypsy moth trapping	Asian gypsy moth (*Lymantria dispar*)	More than 600 forest, orchard, ornamental and native species
Port of Entry – fruit fly trapping	Various *Bactrocera* and *Ceratitis* spp.	Horticultural hosts
Queensland fruit fly surveillance	Queensland fruit fly (*Bactrocera tryoni*)	Many horticultural hosts

Farm level pest monitoring

Farm level monitoring involves the participation and interaction of growers, agribusinesses and industry representative groups. Examples of the surveillance activities that can be carried out by each of these groups are outlined in ***Figure 3***. Conducting regular surveys of farms and nurseries provides the best chance of spotting new plant pests early and implementing eradication or management responses.

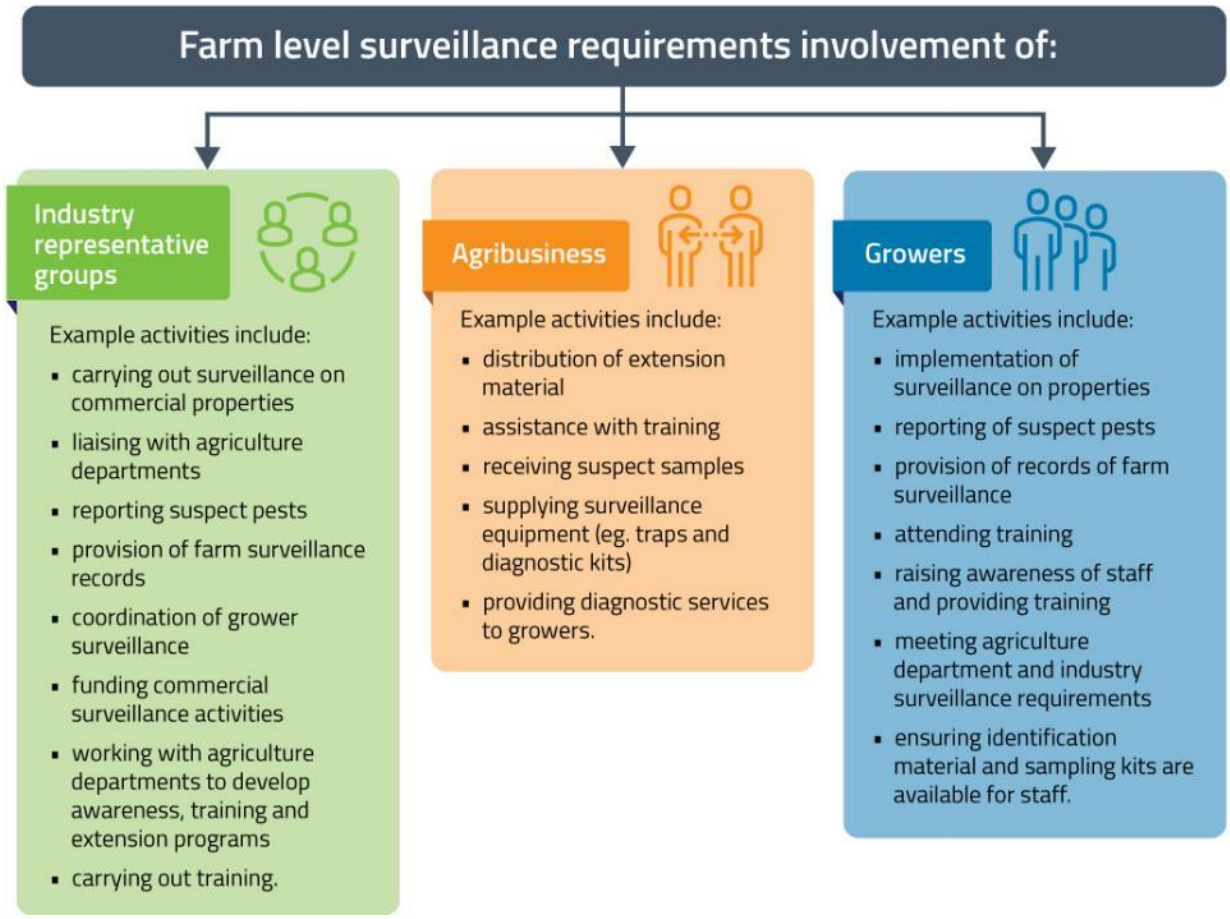

Figure 3. Examples of farm level surveillance activities.

Training

A key component of biosecurity preparedness is ensuring personnel engaged are suitable and effectively trained for their designated roles in a response. Biosecurity preparedness training is the responsibility of all governments and industries, involved in the biosecurity system.

National EPP Training Program

PHA supports members in training personnel through the delivery of the National EPP Training Program. This program is focussed on ensuring personnel from the governments and peak industry bodies who will be involved in responses to EPPs have the skills and knowledge to effectively fulfil the roles and responsibilities of their parties, as signatories to the EPPRD. This covers a range of areas, from representatives on the national decision-making committees (i.e., the Consultative Committee on Emergency Plant Pests and the National Management Group) through to industry liaison personnel in the State Coordination or Local Control Centres.

In addition to face-to-face training delivered to members and the provision of simulation exercises, PHA also offers biosecurity training through the Biosecurity Online Training (BOLT) platform which houses a variety of eLearning courses relevant to plant biosecurity. Access to BOLT is free and open to any stakeholder interested in biosecurity and is available through planthealthaustralia.com.au/bolt.

For more information on the National EPP Training program, refer to planthealthaustralia.com.au/training.

Awareness

Early reporting enhances the chance of effective control and eradication. Awareness activities raise the profile of biosecurity and exotic pest threats to the Passionfruit industry, which increases the chance of early detection and reporting of suspect pests. Responsibility for awareness material lies with industry and government, with assistance from PHA as appropriate. Any unusual plant pest should be reported immediately to the relevant state/territory agriculture department through the Exotic Plant Pest Hotline (1800 084 881).

High priority plant pest related documents

Pests listed in Table 1 have been identified as high priority threats to the Passionfruit industry by members of the TEG. They have been assessed as having high entry, establishment and spread potentials and/or a high economic impact. This list should provide the basis for the development of awareness material for the industry.

Further information on high priority pests

The websites listed below contain information on pests across most plant industries, including the Passionfruit industry.

Table 10. Sources of information on high priority pest threats for the Passionfruit industry.

CABI – Crop Protection Compendium	cabi.org/cpc/
DAF Queensland A-Z list of significant plant pests and diseases	daf.qld.gov.au/plants/health-pests-diseases/a-z-significant
Department of Agriculture	agriculture.gov.au
European and Mediterranean Plant Protection Organization (EPPO)	eppo.int/DATABASES/pqr/pqr.htm
Plant Health Australia (PHA)	planthealthaustralia.com.au/
Pest and Disease Image Library (PaDIL)	padil.gov.au/
University of California Statewide Integrated Pest Management (IPM) Program	ipm.ucdavis.edu/EXOTIC/exoticpestsmenu.html

Further information/relevant websites

A range of government and grower organisation details and websites for persons seeking further information on Passionfruit industry biosecurity (

Table).

Table 11. Industry and government contact details

AGENCY	WEBSITE/EMAIL	PHONE	ADDRESS
National			
Passionfruit Australia	passionfruitaustralia.org.au/		PO Box 507, Murwillumbah NSW 2484
Department of Agriculture, Water and the Environment	agriculture.gov.au	(02) 6272 3933 1800 020 504	GPO Box 858 Canberra, ACT 2601
Plant Health Australia	planthealthaustralia.com.au biosecurity@phau.com.au	(02) 6215 7700	Level 1, 1 Phipps Cl Deakin, ACT 2600
New South Wales			
Department of Primary Industries	dpi.nsw.gov.au/biosecurity/plant	(02) 6391 3535	Locked Bag 21 Orange, NSW 2800
Queensland			
Biosecurity Queensland, a part of the Department of Agriculture and Fisheries, Queensland	daf.qld.gov.au	13 25 23[26] (07) 3404 6999[27]	41 George St Brisbane, QLD 4000
Northern Territory			
Department of Industry, Tourism and Trade	dpir.nt.gov.au/about	(08) 8999 5511	Berrimah Farm, Makagon Road Berrimah, NT 0828
South Australia			
Primary Industries and Regions SA	pir.sa.gov.au	(08) 8207 7820	GPO Box 1671 Adelaide, SA 5001
Biosecurity SA-Plant Health	pir.sa.gov.au/biosecuritysa/planthealth PIRSA.planthealth@sa.gov.au	(08) 8207 7820	33 Flemington Street Glenside, SA 5065
Biosecurity SA-Plant Health	IRSA.planthealthmarketaccess@sa.gov.au	(08) 8207 7814	

[26] Within QLD
[27] Interstate

AGENCY	WEBSITE/EMAIL	PHONE	ADDRESS
Market access and Interstate Certification Assurance			
Biosecurity SA-Plant Health Transport manifest lodgement	pirsa.planthealthmanifest@sa.gov.au	Fax: (08) 8124 1467	
South Australian Research and Development Institute	sardi@sa.gov.au	(08) 8303 9400	2b Hartley Grove Urrbrae, SA 5064
Tasmania			
Department of Primary Industries, Parks, Water and Environment	dpipwe.tas.gov.au BPI.Enquiries@dpipwe.tas.gov.au	1300 368 550	GPO Box 44, Hobart, TAS 7001
Victoria			
Department of Jobs, Precincts and Regions	economicdevelopment.vic.gov.au/	136 186	CPHO Group, Division of Market Access and Regulation, Biosecurity Branch Department of Jobs, Precincts and Regions 475 Mickleham Road, Attwood, Victoria 3047
Western Australia			
Department of Primary Industries and Regional Development	agric.wa.gov.au/	(08) 9368 3333	DPIRD, 1 Nash Street, Perth, Western Australia 6000 DPIRD, Locked Bag 4, Bentley Delivery Centre, WA 6983

Farm biosecurity

Introduction

Plant pests can have a major impact on production if not managed effectively. This includes pests already present in Australia and a number of serious pests of passionfruit that are not currently known to be present in Australia.

Farm biosecurity measures can be used to minimise the impacts of both exotic and established plant pests The farm biosecurity and hygiene measures outlined in this section, can be considered as options for each farm's risk management. Many of these measures can be implemented in a range of different ways, so that the individual needs of any given farm can be addressed, and each farm can have an appropriate level of biosecurity.

Farm biosecurity measures, reporting procedures and hygiene strategies that reduce the impact of plant pest threats covered in this document are:

- selection and preparation of appropriate planting material,
- appropriate use of chemical and other plant pest control measures,
- control of vectors,
- control of alternative hosts,
- management of neglected farms and volunteer plants,
- post-harvest handling and produce transport procedures,
- use of warning and information signs,
- managing the movement of vehicles and farm equipment,
- managing the movement of people,
- how to safely visit other farms/orchards (including interstate and international trips) – what to watch out for when you return,
- including farm biosecurity in industry best management practice and quality assurance schemes, and
- an example farm biosecurity checklist.

Development of a specific farm biosecurity plan tailored to the needs of an individual business or farm is a good way to integrate best practice biosecurity into day-to-day operations (farmbiosecurity.com.au/planner/).

Further information on farm biosecurity can be found at farmbiosecurity.com.au or by contacting Passionfruit Australia.

Reporting suspect emergency plant pests

Rapid reporting of exotic plant pests is critical as early detection gives Australia the best chance to effectively control and eradicate pests. If you find something you believe could be an exotic plant pest, call the Exotic Plant Pest Hotline immediately to report it to your local state or territory government.

The one phone number – 1800 084 881 – will connect to an automated system that allows the caller to choose the state or territory that the report relates to. The caller will then be connected to the relevant authority for that jurisdiction. Most lines are only monitored during business hours. Messages can be left outside of those hours and calls will be returned as soon as an officer is available. A summary of the opening hours for each state and territory is provided in Table . Each jurisdiction also has an alternative contact to ensure no report is missed. It does not matter which of these methods is used to report a suspect exotic plant pest. The important thing is to report it.

Calls to the Exotic Plant Pest Hotline will be answered by an experienced person, who will ask some questions to help understand the situation, such as:

- What was seen (describe the pest or send a photo)
- Where it was found
- What it was found on
- How many pests are present/how infected is the crop
- How widely distributed it is
- When it was first noticed

It is important not to touch or move the suspect material as this may spread the exotic pest or render samples unsuitable for diagnostic purposes. A biosecurity officer may attend the location to inspect and collect a sample. In some cases, the biosecurity officer will explain how to send a sample for testing. In this circumstance they will explain how to do this without risk of spreading the pest and ensuring it arrives at the laboratory in a suitable condition for identification.

Every report will be taken seriously, will be followed up and treated with confidentiality.

Table 12. Exotic Plant Pest Hotline hours of operation and Alternate contact information for reporting per jurisdiction.

STATE/TERRITORY	HOTLINE HOURS	ALTERNATIVE CONTACT
NSW	Operates 08:30 – 16:30 Monday to Friday. After hours answering machine service with messages followed up the next business day.	biosecurity@dpi.nsw.gov.au
NT	Operates 08:00 – 16:30 Monday to Friday. After hours answering machine service with messages followed up the next business day.	quarantine.NT@nt.gov.au
QLD	Operates 08:00-17:00 Monday to Friday (09:00-17:00 Thursday). Calls outside these hours answered by a third party who will take the message and depending on the urgency of the report, organise a response from a biosecurity officer as soon as possible.	Biosecurity Queensland on 13 25 23
SA	Operates 24 hrs/ 7 days	Online plant pest report form
TAS	Operates 24 hrs/ 7 days	Biosecurity Tasmania on (03) 6165 3777
VIC	Operates 08:00 – 18:00 Monday to Friday. After hours answering machine service with messages followed up the next business day. Option also to forward to the 24 hr Emergency Animal Disease Watch Hotline.	plant.protection@ecodev.vic.gov.au
WA	Operates 08:30 – 16:30 Monday to Friday. After hours answering machine service with messages followed up the next business day.	info@agric.wa.gov.au

Recent changes to legislation in some states includes timeframes for reporting and have implications for those who do not report. It is important that individuals know the obligations for their state or territory.

Some passionfruit pests are notifiable under each state or territory's quarantine legislation. Each state or territory's list of notifiable pests are subject to change over time so contacting your local state/territory

agricultural agency (

Table) will ensure information is up to date. Landowners and consultants have a legal obligation to notify the relevant state/territory agriculture agency of the presence of those pests within a defined timeframe.

Preparedness

Pest-specific preparedness and response information documents

To help prepare for an incursion response a list of pest-specific preparedness and response information documents are provided in ***Table 4***. Over time, as more resources are produced for pests of the Australian Passionfruit Industry they will be included in this document and made available through the PHA website. Resources include the development of pest-specific information and emergency response documents, such as fact sheets, contingency plans, diagnostic protocols and a summary of surveillance programs currently in operation for these HPP (see www.planthealthaustralia.com.au/pidd). These documents and programs should be developed over time for all medium to high-risk pests listed in the TST (**APPENDIX 2: THREAT SUMMARY TABLES**).

Fact sheets

Fact sheets or information sheets are a key activity of biosecurity extension and education with growers. Fact sheets provide summary information about the pest, its biology, what it looks like and what symptoms it may cause. They also contain detailed images. Refer to **Error! Reference source not found.** for a list of current fact sheets available for passionfruit producers.

Contingency Plans

Contingency Plans provide background information on the pest biology and available control measures to assist with preparedness for incursions of a specific pest into Australia (**Error! Reference source not found.**). A contingency plan provides guidelines for steps to be undertaken and considered when developing a response plan for the eradication of that pest. Any response plan developed using information in whole or in part from a contingency plan must follow procedures as set out in PLANTPLAN and be endorsed by the National Management Group prior to implementation.

For a list of current contingency plans see planthealthaustralia.com.au/pidd.

National Diagnostic Protocols

Diagnostic protocols are documents that contain information about how to diagnose or identify a specific plant pest, or related group of pests. National Diagnostic Protocols (NDP) are nationally agreed diagnostic protocols for the unambiguous taxonomic identification of a pest in a manner consistent with ISPM No. 27 – Diagnostic Protocols for Regulated Pests. NDP include diagnostic procedures and data on the pest, its hosts, taxonomic information, and detection and identification.

Australia has a coherent and effective system for the development of NDP for plant pests managed by the Sub-Committee on Plant Health Diagnostics (SPHD). NDP are peer reviewed and verified before being endorsed by Plant Health Committee (PHC).

Endorsed NDP are available on the National Plant Biosecurity Diagnostic Network (NPBDN) website (plantbiosecuritydiagnostics.net.au), together with additional information regarding their development and endorsement.

Diagnostic information for some passionfruit pests is available through the PHA website planthealthaustralia.com.au/pidd. For diagnostic information on fruit flies, refer to the Australian Handbook for the Identification of Fruit Flies, available from the PHA website.

Research Development and Extension

Research, Development and Extension – Linking Biosecurity Outcomes to Priorities

Through the biosecurity planning process, gaps in knowledge or the extension of knowledge will have been identified and documented in the implementation table. Some of these gaps will require further research and development (e.g. understanding risk pathways, developing surveillance programs or diagnostic protocols, developing tools to facilitate preparedness and response, developing IPM or resistance breeding strategies), other gaps will require communication or extension of that knowledge to various target audiences (developing awareness raising materials, undertaking training exercises, running workshops, consideration of broader target audiences).

It is important that the RD&E gaps identified through this plan feed directly into the normal annual RD&E priority setting and strategic planning activities that an industry undertakes. This is fundamental if an industry is to progress biosecurity preparedness and response goals throughout the life of the biosecurity plan.

Market access

As an active trading nation, Australia has entered into a number of multilateral and bilateral trade agreements that influence its plant biosecurity system. On a multilateral level, Australia's rights and obligations in relation to plant biosecurity are set out under World Trade Organization (WTO) agreements, particularly the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), although others may apply in certain circumstances.

The SPS Agreement provides WTO member countries with the right to use sanitary and phytosanitary measures to protect human, animal and plant life or health. Under this agreement countries are allowed to specify consistent, science-based conditions aimed at providing sanitary and phytosanitary protection but not unnecessarily restricting trade. The establishment of exotic pests in Australia may result in conditions on Australian exports that previously did not apply and in some cases, may result in the short or long-term loss of overseas markets, depending on the significance of the pest to the trading partner and the availability of options to reduce the risk to acceptable levels. These options could include measures such as pest free areas or places of production or treatments e.g. cold or fumigation. The time taken to regain access will depend on the availability and acceptance of measures to reduce risk and the receiving markets risk appetite.

Market access for the Passionfruit industry

Export is currently not a major focus for the industry although individual growers may participate in limited export opportunities. There is limited data to support evidence of substantial export volumes.

Implementation actions

To help maintain or facilitate market access, in the event of an incursion, the Passionfruit industry in partnership with the Department of Agriculture, Water and the Environment and the relevant state and territory governments should develop the following, for the HPP pests:

- Surveillance plan including a method for collecting and storing surveillance data
- Diagnostic protocols that have been assessed in the Australian environment

- Biosecurity treatment measures (e.g., irradiation or fumigation)

Implementation of these actions is recommended for pests with market access implications as this data will also be crucial for maintaining interstate trade should an incursion occur within Australia, resulting in a restricted distribution or quarantine zone. A single system will facilitate market access discussions for both domestic and international trade and will minimise the potential disruption to the industry.

References

Department of Agriculture, Fisheries and Forestry (2011) Import Risk Analysis Handbook 2011. Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.

CABI (2019) CABI Crop Protection Compendium. Available at: cabi.org/cpc/

RESPONSE MANAGEMENT

Introduction

No matter how many preparedness activities are undertaken or how much surveillance is done at the border, a small number of plant pests will inevitably make their way into Australia. This section outlines the national agreements and processes in place to effectively respond to such incursions.

Gathering information, developing procedures, and defining roles and responsibilities during an incident response can be extremely difficult. To address this area, PHA coordinated the development of PLANTPLAN, a national set of incursion response guidelines for the plant sector, detailing the procedures required and the roles and responsibilities of all Emergency Plant Pest Response Deed (EPPRD) signatories affected by the detection of an Emergency Plant Pest (EPP) within Australia.

The following section includes key contact details and communication procedures that should be used in the event of an exotic plant pest incursion affecting the Australian Passionfruit Industry. A list of pest-specific documents that may support incident response activities, are also provided. Over time, documents produced for plant pests relevant to the Australian Passionfruit Industry will be included in updated versions of this biosecurity plan and made available through the PHA website.

The Emergency Plant Pest Response Deed

A fundamental component of the Australian plant biosecurity system is the EPPRD, which is an agreement between the Australian commonwealth, state and territory governments, 38 plant industries (including Passionfruit Australia) and PHA (collectively known as the signatories), that facilitates the rapid and efficient responses EPP incursions. The EPPRD is a legally binding document that outlines the basic operating principles and guidelines for EPP eradication responses.

The EPPRD provides:

- A national response management structure that enables all governments and plant industry signatories affected by the EPP to contribute to the decisions made about the response.
- An agreed structure for the sharing of costs associated with eradication activities undertaken in response to the detection of EPP in Australia. Costs are divided between signatories affected by the EPP in an equitable manner based on the relative potential impact of the EPP.
- A mechanism to encourage reporting of suspected EPP detections and the implementation of risk mitigation activities.
- A mechanism to reimburse growers whose crops or property are directly damaged or destroyed as a result of implementing a Response Plan
- Mechanisms to support early detection and response to EPP.
- Rapid responses to EPPs (excluding weeds)

- A framework to ensure that decisions to eradicate are based on appropriate criteria (e.g. eradication must be technically feasible and cost beneficial).
- An industry commitment to biosecurity and risk mitigation and a government commitment to best management practice.
- An Agreed Limit for Cost Sharing.
- An effective industry/government decision-making process.

For further information on the EPPRD, including copies of the EPPRD, fact sheets or Frequently Asked Questions, visit planthealthaustralia.com.au/epprd and planthealthaustralia.com.au/epprd-qa.

PLANTPLAN

PLANTPLAN outlines the generic approach to response management under the EPPRD and introduces the key roles and positions held by industry and government during a response. The document is supported by several operating guidelines, job cards and standard operating procedures that provide further detail on specific topics. PLANTPLAN underpins the EPPRD and is endorsed by all EPPRD signatories.

The current version of PLANTPLAN and supporting documents are available on the PHA website (planthealthaustralia.com.au/biosecurity/incursion-management/plantplan/).

For more information about PLANTPLAN and the supporting document visit planthealthaustralia.com.au/biosecurity/incursion-management/plantplan/

Funding a response under the EPPRD

The following section outlines how eradication responses are nationally cost shared between affected industries and governments.

A copy of the EPPRD can be downloaded from the PHA website planthealthaustralia.com.au/epprd.

Cost sharing a response

Affected industries and governments invest in the eradication of EPPs and share the costs of an agreed response plan, this is referred to as 'cost sharing'. Not all activities in a response are eligible to be cost shared, with some activities considered as normal commitments for signatories.

The cost shared costs of a response are divided between affected industries and governments in an equitable manner directly related to the benefit obtained from eradicating the EPP. These relative benefits are represented by the category of the pest, with the overall view that 'the higher the benefit, the greater the investment'.

There are four categories for EPPs (***Table 1***). The category indicates how the funding will be split between government and industries; with the government funding the share of public benefit and industry funding the share of private benefit. It does not indicate its likelihood of eradication or its overall importance i.e., an EPP listed as Category 1 is not deemed to be any more or less important than an EPP listed as Category 4.

Table 1. Response funding allocation between Government and Industry for an EPP.

CATEGORISING OF EPP	GOVERNMENT FUNDING	INDUSTRY FUNDING
Category 1	100%	0%
Category 2	80%	20%
Category 3	50%	50%
Category 4	20%	80%

Pest categorisation

The list of categorised EPPs can be found in Schedule 13 of the EPPRD. If a response plan is endorsed for an uncategorised EPP, cost sharing will commence using the default category (Category 3) and may be revised later.

Any signatory to the EPPRD can request for additional pests to be categorised and added to Schedule 13 of the EPPRD. Contact EPPRD@phau.com.au for more information and guidance on this process.

Once a substantiated request has been received by PHA a group of independent scientific technical experts (known as the categorisation group) will be convened to assess all known information about the EPP to identify the public and private benefits. Full details can be found in *Clauses 7 and 9 of the EPPRD*.

Passionfruit EPPs categorised to date

EPPs relevant to the Passionfruit industry that are categorised and listed within Schedule 13 of the EPPRD are listed in Table 2.

Table 24. Formal categories for pests of the Passionfruit industry listed in Schedule 13 of the EPPRD (as of July 2021).

FORMAL CATEGORY	SCIENTIFIC NAME	COMMON NAME
2	*Bactrocera dorsalis* (syn. *B. invadens, B. papayae, B. philippiensis*)	Oriental fruit fly

How to respond to a suspect EPP

Following the detection of a suspect EPP, the relevant state agency will be notified either directly or through the Exotic Plant Pest Hotline. Within 24 hours of the state agency having a reasonable suspicion that they are dealing with an EPP, the Chief Plant Health Manager (CPHM) of the state or territory will inform the Australian Chief Plant Protection Officer (ACPPO). All signatories affected by the EPP (both government and industry) are then notified immediately, and a Consultative Committee on Emergency Plant Pests (CCEPP) meeting is convened (this process is outlined in ***Figure 4***). Only the industry signatories affected by the EPP are engaged in the response process. These are determined based on the known hosts of the EPP. All positive detections of EPPs or suspect EPPs must undergo secondary identification from an independent laboratory. Confirmation of the identification should not delay the reporting of the EPP to the ACPPO or the CCEPP.

Figure 4. Reporting of suspect EPPs and notification process.

Once a pest is notified to the CCEPP, all signatories that are affected by the EPP play a part in the national management of EPP response. This is primarily through the two national decision-making committees, both of which Passionfruit Australia have a representative on:

- The Consultative Committee on Emergency Plant Pests (CCEPP) which provide technical expertise on the response
- The National Management Group (NMG) which acts on recommendations from the CCEPP and make the final decisions about EPP responses and funding.

Technical and economic considerations are reviewed, and a decision made on whether to eradicate using the cost sharing mechanisms under the EPP (i.e., develop a response plan) or take another course of action (potentially to contain or do nothing which will mean long term management of the pest).

The relevant state/territory agriculture department is responsible for the on-ground response to EPPs and will adopt precautionary emergency containment measures if appropriate. Depending on the nature of the EPP, measures could include:

- restriction of operations in the area
- disinfection and withdrawal of people, vehicles and machinery from the area
- restricted access to the area
- control or containment measures.

Each response to an EPP is applied differently due to the nature of the incursion, however, each follows the defined phases of a response as outlined at planthealthaustralia.com.au/biosecurity/incursion-management/phases-of-an-emergency-plant-pest-response/.

Owner reimbursement costs

Owner Reimbursement Costs (ORCs) are included in the shared costs of a response and are available to eligible growers to alleviate the financial impacts of crops or property that are directed to be destroyed under an agreed response plan.

ORCs were developed to encourage early reporting and increase the chance of successful eradication. ORCs are paid to the owner and cover direct costs associated with implementing a response plan, including:

- Value of crops destroyed,
- Replacement of lost capital items and
- Fallow periods

ORCs are only available when there is an approved response plan under the EPPRD, and only to industries that are signatories to the EPPRD, such as the Passionfruit industry.

The value of ORCs is directed by the ORC Evidence Frameworks and is based on an agreed valuation approach developed for each industry.

Further information about ORCs is available from planthealthaustralia.com.au/biosecurity/incursion-management/owner-reimbursement-costs/

Industry specific response procedures

Industry communication

Passionfruit Australia is the peak industry body for the Australian Passionfruit industry, i.e., signatory to the EPPRD and will be the key industry contact point if a plant pest affecting the Passionfruit industry is detected and responded to using the arrangements in the EPPRD. Passionfruit Australia will have responsibility for relevant industry communication and media relations (see PLANTPLAN for information on approved communications during an incursion). The contacts nominated for the CCEPP and the NMG by Passionfruit Australia will be contacted (***Table 3***) regarding any meetings of the CCEPP or NMG. It is important that all Parties to the EPPRD ensure their contacts for these committees are nominated to PHA and updated swiftly when personnel change.

Close cooperation is required between relevant government and industry bodies to ensure the effective development and implementation of a response to an emergency plant pest, and the management of media/communication and trade issues. Readers should refer to PLANTPLAN or undertake the relevant BOLT courses for further information.

Table 3. Contact details for Passionfruit Australia

Website	**passionfruitaustralia.org.au**
Postal address	PO Box 507 Murwillumbah, NSW, 2484
Email	admin@passionfruitaustralia.org.au
Phone	

References

PLANTPLAN (2018) PLANTPLAN Australian Emergency Plant Pest Response Plan. Version 3.2. (planthealthaustralia.com.au/plantplan).

APPENDIX 1: PROFILE OF THE AUSTRALIAN PASSIONFRUIT INDUSTRY

To develop any biosecurity plan it is critical to understand the profile and context of the industry.

Passionfruit Australia Inc

Passionfruit Australia is the recognised body representing the Australian Passionfruit industry along with its growers, industry people, associated businesses and its members. It was formed to represent the interests of Australian passionfruit growers and foster the growth of the industry.

All commercial passionfruit growers in Australia pay statutory national levies which are used for research and development (R&D) and marketing. These levies are collected by the Australian Government. Passionfruit Australia works closely with Hort Innovation through the Passionfruit Strategic Industry Advisory Panel (SIAP) to ensure that the R&D and marketing levies are well directed to the needs of the industry. The Passionfruit Strategic Investment Plan 2017-2021 provides guidance in the investment of Passionfruit marketing and R&D levies.

Table 4. Current passionfruit levies and their rates (DAWE 2021)

LEVIES	CENTS PER KILOGRAM
Research and Development (fresh)	20c/carton, 20c/8kg, effectively 2.5c/kg
Research and Development (processing)	1.5c/kg
Marketing (fresh)	20c/carton, 20c/8kg, effectively 2.5c/kg
Marketing (processing)	1.5c/kg
Total (fresh)	40c/carton, 40c/8kg, effectively 5c/kg
Total (processing)	3.0c/kg

Industry profile

The Australian passionfruit industry has growers across Australia, with Queensland (60%) and New South Wales (25%) dominating production. In 2019/2020 Australian production was 4,783 tonnes with a farmgate value of $23.6 million (Australian Horticulture Statistics Handbook 2019/20).

Passionfruit are originally from Brazil in South America. The Australian passionfruit industry began with the import of fruit from Brazil in the early 1900s. It is cultivated in tropical and subtropical regions

Panama style varieties are normally hand-picked from the vine when they reach maturity and the right stage of ripeness. Growers will harvest regularly during the season to ensure fruit is picked at its optimum maturity stage. Purple style varieties ripen and fall from the vine to the ground when they are ready to eat

All varieties grown in Australia are sorted by size and graded according to their external skin quality and their eating quality

The major passionfruit production areas are the Wide Bay region, Cooktown, Daintree and Mareeba, Sunshine Coast and northern New South Wales . Queensland accounts for around 60 per cent of production. Northern New South Wales is the second biggest producing region with 25 per cent. Passionfruit production also occurs in Victoria (8 per cent), Western Australia (5 per cent) and South Australia (2 per cent).

Many growers produce passionfruit as a second, third or fourth crop and have minimal engagement with industry bodies or supply chains . Passionfruit farm establishment requires a high initial outlay due to the costs of the trellis infrastructure, high use of grafted vines, grading and packing equipment, cold room and associated farm machinery. The vines usually come into production six to 12 months after planting and reach mature phase yields in 12 to 24 months.

The industry is primarily dependent on the purple varieties, Misty Gem and Sweetheart, and two Panama varieties Pandora and McGuffies Red. In areas with subtropical climates, such as South-East Queensland and Northern New South Wales, hybrids (Australian hybrid varieties are known to have a greater depth of flavour) of the purple passionfruit (Passiflora edulis) and the panama passionfruit (Passiflora edulis f. flavicarpa) are preferred for commercial production. In Northern Queensland, Panama, P. edulis f. flavicarpa hybrids (golden passionfruit resistant to Fusarium wilt) are grown . The purple varieties must be grafted each year. Some growers keep their plants for three years but most only keep purple vines for two years. Yields of between 10 to 25 tonnes. Only seven per cent of product is sent for processing for the pulp and seeds due to the low prices that achieved for factory grade fruit .

References

Horticulture Statistics Handbook 2019/20. Hort Innovation 2020.

Passionfruit Industry Strategic Plan 2017-2021. Hort Innovation 2017.

APPENDIX 2: THREAT SUMMARY TABLES

Tropical Fruits (lychee, papaya, passionfruit) industries threat summary tables

The information provided in the threat summary tables is an overview of exotic plant pest threats to the three industry, lychee, papaya and passionfruit. More than 300 exotic plant pests were identified. Summarised information on entry, establishment and spread potentials and economic consequences of establishment are provided where available. Pests under official control[28] or eradication may be included in these tables where appropriate. However, Passionfruit pests that are established but regionalised within Australia are not covered by TSTs but may be assessed in state biosecurity plans. Assessments may change given more detailed research and will be reviewed with the biosecurity plan. Full descriptions of the risk rating terms can be found on page 28. An explanation of the method used for calculating the overall risk can be found on the PHA website[29]. Additional information on several the pests listed in the TSTs can be found in pest-specific information document (***Table 4***).

Invertebrates

Table 16. Tropical Fruit invertebrate threat summary table.

Scientific name	Common name	Primary hosts	Affected plant part	Movement & dispersal	Geographic range	Entry potential	Est. potential	Spread potential	Economic impact	Overall risk
Amblypelta cocophaga[30]	Coconut bug	**Papaya**, navel orange, coconut, melon, mango, cassava, peach, sugarcane, cocoa, kapok, *Passiflora quadrangularis*, winged bean, *Eucalyptus deglupta*, *E. terecornis*, *E. urophylla*	Stems, growing points, fruit	Infested plant material and machinery. Adult females capable of flight. Nymphs are active crawlers.	Asia (Singapore) Oceania (Fiji, Papua New Guinea, Solomon Islands)	HIGH	HIGH	HIGH	HIGH	HIGH

[28] Official control defined in ISPM No. 5 as the active enforcement of mandatory phytosanitary regulations and the application of mandatory phytosanitary procedures with the objective of eradication or containment of quarantine pests or for the management of regulated non-quarantine pests.

[29] Available from planthealthaustralia.com.au/biosecurity/risk-mitigation

[30] Numerous Amblypelta species are established in Australia making diagnostics difficult. This pest can fly but only over short distances making natural dispersal into new areas unlikely (CABI). Causes reduced fruit set and fruit damage. Eggs are not ususally laid on fruit making it unlikely that this pest would enter Australia through infested fruit. Long range dispersal is generally through infested planting material.

Anoplophora maculata	White spotted longicorn beetle[31]	**Lychee**, citrus, Chinese date, Indian plum	Branches, shoots		Asia (China, Taiwan)	MEDIUM	HIGH	HIGH	HIGH	HIGH
Aristobia reticulator	Lychee longicorn beetle[32]	**Lychee,** guava, longan	Branches		China, India, Bangladesh, Laos, Myanmar, Nepal, Thailand, Vietnam	MEDIUM	HIGH	HIGH	HIGH	HIGH
*Conopomorpha sinensis (*Syn. *Acrocercops cramerella)*[33]	Lychee fruit borer (Syn. Lychee stem-end borer)	**Lychee,** longan, Cocoa (*Theobroma cacao*), Cola (*Cola acuminata*), Rambutan (*Nephelium lappaceum*), Pometia pinnata (*fijian longan*)	Trunk, branches, Fruit, leaf, shoot		Asia (Brunei Darussalam, China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Taiwan, Thailand) Oceania (Papua New Guinea, Samoa)	MEDIUM	HIGH	HIGH	HIGH	HIGH
Cricula trifenestrata (Syn. *C. trifenestrata javana; C. trifenestrata kransi*)	Tea flush worm	**Lychee**, okra, cashew nut, groundnut, tea, cinnamon, Citrus, mango, avocado, black pepper, common jujube, jujube.	Leaves, whole plant		Asia (Bangladesh, Brunei Darussalam, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Pakistan, Philippines, Thailand, Vietnam)	MEDIUM	HIGH	HIGH	HIGH	HIGH
Dysmicoccus grassii (Syn. *D. alazon, Pseudococcus grassi*)	piojo harinoso de la pina	Polyphagous including fig, acacia, pineapple, mango, asparagus, avocado, oleander, banana, **passionfruit**, coffee, hibiscus, **papaya**, prickly pear, sugar apple	Leaves, fruit, stems	Infested soil and plant material. Adult males capable of flight over short distances.	Africa (Canary Islands, Nigeria) Asia (Malaysia) Europe (France, Italy, Sicily, Spain) North America (Bahamas, Belize, Cuba, Costa Rica, Dominican Republic, Haiti, Honduras, Mexico, Panama, Puerto Rico & Vieques Island, Trinidad and Tobago, United States) South America (Colombia, Brazil, Ecuador, Peru)	MEDIUM	HIGH	HIGH	HIGH	HIGH

[31] Wen, H. C. (1987). Field investigation of white spotted longicorn beetle (Anoplophora maculata) on Indian jujube and control. Chung-hua nung yeh yen chiu= Journal of agricultural research of China.
Koul, B., & Taak, P. (2017). Lychee (Litchi chinensis Sonn.): Pre-and Post-harvest Disease Management. In Lychee Disease Management (pp. 1-26). Springer, Singapore.
Waite, G. K., & Hwang, J. S. (2002). Pests of litchi and longan. Tropical fruit pests and pollinators: biology economic importance, natural enemies and control. Wallingford: CABI, 331-359.

[32] Agarwala, B. K., & Bhattacharjee, P. P. (2015). Redescription of Aristobia reticulator (F., 1781)(Coleoptera: Cerambycidae: Lamiinae), with a taxonomic note and record of a new food plant for adults in northeastern India. The Coleopterists Bulletin, 69(2), 205-212.

[33] Eradicated from Australia (DAFF, 2014a; DAFF, 2014b; CIE, 1984; Australia Biosecurity Queensland, 2011) DAFF, 2014a. Cocoa pod borer. Queensland Department of Agriculture, Fisheries and Forestry (DAFF). January 16, 2014., Australia: Queensland Department of Agriculture, Fisheries and Forestry (DAFF). http://www.daff.qld.gov.au/plants/health-pests-diseases/a-z-significant/cocoa-pod-borer#

Dysmicoccus nesophilus[34]	Mealybug	Polyphagous including sweet orange, grapefruit, lemon, **papaya**, mango, avocado, pines, taro, ginger, tamarillo, figs, coffee	Leaves, flowers, fruit	Infested plant material. Adult males capable of flight over short distances.	Oceania (Cook Islands, Fiji, Kiribati, Papua New Guinea, Tonga, Tuvalu, Western Samoa)	HIGH	HIGH	HIGH	HIGH	HIGH
Eriophyes dimocarpi[35]	Longan and lychee witches' broom disease	**Lychee**, Longan tree, rambutan	Inflorescence, leaves		Asia (Cambodia, Vietnam)	HIGH	HIGH	HIGH	HIGH	HIGH
Helopeltis clavifer	Cocoa mirids	**Passionfruit**, tea, cocoa; cashew, sweet potato and other host plants reported from New Guinea include *Acalypha caturus, Annona spp., Bixa orellana, Camellia sinensis, Cassia fistula, Centrosema pubescens, Eucalyptus deglupta, Flemingia strobilifera, Glincidia sepium, Ixora sp., Leucaena leucocephala, Mangifera indica, Mimosa invisa, Passiflora edulis, Persea americana, Polyscias sp., Psidium guajava and Pueraria phaseoloides*	Pods	Infested plant materials	Asia (Indonesia, Malaysia) Oceania (Papua New Guinea); New Britain and New Ireland	HIGH	HIGH	HIGH	HIGH	HIGH
Lymantria dispar (Syn. *Bombyx dispar; Hypogymna dispar; Liparis dispar; Ocneria dispar; Phalaena dispar; Porthesia dispar; Porthetria dispar*)[36]	Asian gypsy moth	Polyphagous: Acacia (wattles), Acer (maples), Alnus (alders), Betula (birches), Carpinus (hornbeams), Carya (hickories), Castanea (chestnuts), Cedrus (cedars), Eucalyptus, Fagus (beeches), Juglans (walnuts), Larix (larches), Liquidambar styraciflua (Sweet gum), **Litchi chinensis** (lichi), *Lithocarpus edulis, Malus* spp (ornamental species apple), Picea (spruces), Pinus (pines), Pistacia vera (pistachio), Populus (poplars), Prunus (stone fruit), *Pyrus communis* (European pear), Quercus (oaks)	Leaves, flowers		Asia (Afghanistan, Armenia, Azerbaijan, China, India, Iran, Iraq, Israel, Japan, Kazakhstan, DPR Korea, Republic of Korea, Kyrgyzstan, Lebanon, Mongolia, Syria, Taiwan, Tajikistan, Turkey, Turkmenistan, Uzbekistan) Africa (Algeria, Morocco, Tunisia) North America (Canada, USA) Europe (Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Macedonia, Moldova, Netherlands, Poland, Portugal, Romania, Russian Freedom, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK, Ukraine, Yugoslavia (Serbia and Montenegro)	HIGH	HIGH	HIGH	HIGH	HIGH

[34] http://scalenet.info/catalogue/Dysmicoccus%20nesophilus/

[35] https://www.pestnet.org/SummariesofMessages/Pests/PestsEntities/VirusesPhytoplasmas/Flowerfruitabortion,longan,Cambodia.aspx

[36] Eradicated in New Zealand

Nipaecoccus nipae[37]	Coconut mealybug, spiked mealybug, nipa mealybug, avocado mealybug, sugar apple mealybug, Kentia mealybug	Polyphagous including breadfruit, pigeon pea, **papaya**, citrus, coconut, fig, rubber plant, soursop, sugar apple, breadfruit, pigeon pea, sweet potato, mango, cassava, mulberry, banana, olive, orchids, avocado, guava, potato, cocoa, grape, ginger	Fruit, leaves, stems, growing point	Infested plant material and machinery, adult males capable of flight.	Africa (Algeria, Madagascar, Morocco, South Africa, Zimbabwe) Asia (Bangladesh, China, Georgia, India, Indonesia, Pakistan, Philippines, South Korea, Thailand, Turkey, Vietnam) Europe (Austria, Belgium, Czechoslovakia, France, Hungary, Italy, Poland, Portugal, , Russia, Spain, United Kingdom) North America (Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Jamaica, Mexico, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, U.S. Virgin Islands, United States) Oceania (Federated States of Micronesia, Fiji, Guam, Samoa, Solomon Islands) South America (Argentina, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela)	HIGH	HIGH	HIGH	HIGH	HIGH
Pseudotheraptus wayi	Coconut bug	Coconut, cashew, pecan, cinnamon, loquat, **lychee**, macadamia, mango, avocado, guava, cocoa	Fruit, flowers, young stem, leaves, inflorescences	Both nymphs and adults feed on the host plant, causing wilting and necrosis of young stems, leaves, inflorescences, and fruits as they suck sap and inject toxins into the host tissue.	Africa (Botswana, Cote d'Ivoire, Kenya, South Africa, Tanzania, Zambia)	MEDIUM	HIGH	HIGH	HIGH	HIGH
Rastrococcus invadens	Fruit tree mealybug	Breadfruit, **papaya,** Citrus, figs, mango, banana, passionflower, frangipani, guava	Fruit, inflorescence, leaves, stems		Africa (Benin, Burkina Faso, Congo, Democratic Republic of the, Congo, Republic of the, Côte d'Ivoire, Gabon, Ghana, Nigeria, Senegal, Sierra Leone, Togo) Asia (Bangladesh, Bhutan, China, Hong Kong, India, Indonesia, Malaysia,	HIGH	HIGH	HIGH	HIGH	HIGH

[37] http://www.cabi.org/cpc/datasheet/36334
http://entnemdept.ufl.edu/creatures/orn/mealybug/coconut_mealybug.htm
N. nipae is polyphagous and attacks 80 genera of plants belonging to 43 families.

					Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam) South America (French Guiana)					
Selenaspidus articulatus [(Syn. *Aspidiotus* (Selanaspidus) *articulatus; Aspidiotus* (Selenaspidus) *articulatus v. simplex; Aspidiotus articulatus; Aspidiotus rufescens; Aspidiotus simplex; Pseudaonidia articulatus* (Morgan)*; Selenaspis articulatus* (Morgan)]	West Indian red scale	**Lychee**, cashew nut, cherimoya, soursop, jackfruit, bilimbi, carambola, sea poison tree, camel's foot, beauty-leaf, tea, citrus, coconut, croton, coffee, fig, forest trees (woody plants), round kumquat, cape jasmine, gliricidia, shrubby althaea, flame of woods, jasmine, lantana, mamey apple, mango, banana, plantain, European olive, **passionfruit,** avocado, date-palm, Mexican frangipani, roses, sugarcane, mahogany, Indian tamarind, grapevine	Fruit, leaves, stem, growing point	Infested plant material and windborne crawlers; Adults capable of flight.	Asia (Philippines, Sri Lanka, Taiwan), Africa (Angola, Benin, Cameroon, Côte d'Ivoire, Eritrea, Ethiopia, Ghana, Guinea, Kenya, Madagascar, Mali, Mauritius, Mozambique, Niger, Nigeria, Réunion, Sao Tome and Principe, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe) North America (Bermuda, Mexico, USA) Central America and Caribbean (Antigua and Barbuda, Bahamas, Barbados, Belize, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Montserrat, Nicaragua, Panama, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago) South America (Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela) Oceania (Fiji, Solomon Islands)	LOW	HIGH	HIGH	HIGH	MEDIUM
Tetranychus piercei[38] (Syn. *T. manihotis*)	Pierce's spider mite; Red spider mite	Highly polyphagous including peanut, **papaya,** butterfly-pea, sweet potato, banana, bean, castor bean, Ageratum spp., cucurbits, maize, rose, banana, grapevine, cassava, eggplant, mulberry, **passionfruit**, peach, oil palm, lab lab, soybean, maize, turmeric, grape, capsicum, jasmine, rose, frangipani, taro, wild ginger, cowpea, mungbean	Above ground plant parts (Leaves, fruits)	Infested plant material and machinery, natural dispersal from PNG (wind dispersal for localised spread)	Asia (Bangladesh, China, Indonesia, Malaysia, Japan, Philippines, Taiwan, Thailand, South Korea, Vietnam) North America (Suriname) Oceania (Papua New Guinea)	MEDIUM Papaya	HIGH Papaya	HIGH Papaya	MEDIUM - HIGH Papaya	MEDIUM – HIGH Papaya
Anoplophora chinensis	Citrus longicorn beetle, Black and white citrus longhorn, citrus trunk borer	Polyphagous attacking living trees including Citrus spp., Acacia spp., apple, pear, willow, **lychee**, fig, poplar, maple, rose	Trunk		Asia (China, Indonesia, Japan, Democratic Republic of Korea, Republic of Korea, Malaysia, Myanmar, Philippines, Taiwan, Turkey, Vietnam), Europe (Croatia, Guernsey, Italy,	MEDIUM	HIGH	HIGH	HIGH	HIGH

[38] Present in the Philippines Modelling of potential distribution does not put Australia as an area the mite may expand to
After spraying to control banana weevil, mites become more abundant and are currently causing damage in the Australian banana industry. This mite species could cause significant issues if it becomes established in Australian banana growing regions. *T. piercei* is found in the Far northern biosecurity zone.

					Switzerland, UK)					
Anastrepha ludens	Mexican fruit fly	Cashew nut, cherimoya, hardshell custard-apple, soursop, sugar apple, papaya, *Citrus* spp., coffee, persimmon, apple, mango, passionfruit, avocado[208], peach, strawberry guava, guava, pomegranate, European pear, rose apple	Fruit	Infested plant material, machinery and soil. Adults are capable of flight over long distances [209]. Transmitted via infested plant material (fruit and puparia in soil or packaging with plants that have already fruited).	North America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, United States)	LOW Papaya Passionfruit,	HIGH Papaya LOW Passionfruit	HIGH Papaya LOW Passionfruit	HIGH Papaya MEDIUM Passionfruit	MEDIUM Papaya LOW Passionfruit
Anastrepha striata	Guava fruit fly	Cherimoya, soursop, carambola, navel orange, sapote, Surinam cherry, mango, cassava, passionfruit, avocado[208], peach, guava, strawberry guava, mombin, rose apple, Malay apple, Singapore almond.	Fruit	Adults capable of flight over long distances[207].Infested plant material (including fruit), soil and machinery. Adults capable of flight over long distances. Pupariation is in the soil[220]	North America (Belize, Costa Rica, Guatemala, Honduras, Mexico, Netherlands Antilles, Nicaragua, Panama, Trinidad and Tobago, United States)South America (Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela)	LOW Passionfruit	LOW Passionfruit	LOW Passionfruit	MEDIUM Passionfruit	LOW Passionfruit
Anastrepha suspensa (Syn. *A. longimacula; A. unipuncta; Trypeta suspensa*)	Caribbean fruit fly	Polyphagous: papaya, Citrus spp., peach, guava, *Eugenia uniflora* (Cayenne cherry), *Syzygium jambos* (roseapple), *Terminalia catappa* (tropical almond), mango, pear, plum apple, Japanese plum, pomelo, capsicum, persimmonn, loquat, cherries, fig, plum, bitter gourd, guava, pomegranate, limeberry	Fruit	Infested plant material (fruit), soil and machinery. Adults capable of flight. Pupae soilborne.	Central America and Caribbean, South America (French Guiana), Bahamas, British Virgin Islands, Cuba, Dominican Republic, Haiti, Puerto Rico, Jamaica, Hispaniola, French Guiana, North America (USA - Florida)	LOW Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya	MEDIUM Papaya
Anastrepha spp, Inc. *A. distincta* *A .fraterculus* *A. pseudoparallela* *A. serpentina*		Polyphagous, wide variety of hosts including Papaya, mango, citrus, guava, caimito, kiwifruit, cherimoya, soursop, sugar apple, carambola, coffee, quince, persimmon, loquat, common fig, round kumquat, walnut…	Fruit	Infested plant material (including fruit), soil and machinery. Adults capable of flight over long distances. Pupariation is in the soil	North, central and South America (Species have different geographical ranges	LOW Papaya Passionfruit	MEDIUM Papaya Passionfruit	MEDIUM Papaya Passionfruit	MEDIUM Papaya Passionfruit	LOW Papaya Passionfruit

Bactrocera carambolae	Carambola fruit fly	Highly polyphagous (75 hosts from 26 families) including grapefruit, orange, lemon, lime, mandarin, cashew, breadfruit, jackfruit, soursop, carambola, capsicum, mango, guava, **passionfruit**, **papaya**, banana, avocado, tomato, bell pepper, coco plum, navel orange, pomegranate, mangrove, common jujube	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	Asia (Brunei, India, Indonesia, Malaysia, Singapore, Thailand) South America (Brazil, French Guiana, Guyana, Suriname)	HIGH Papaya, Passionfruit	HIGH Papaya, Passionfruit	HIGH Papaya, Passionfruit	HIGH Papaya, Passionfruit	HIGH Papaya, Passionfruit
Bactrocera correcta	Guava fruit fly	Cashew nut, carambola, **papaya**, *Citrus* spp., melon, longan tree, mango, sapodilla, Spanish cherry, plantain, cherry, peach, guava, black plum, rose apple, Malay apple, water apple, Singapore almond, common jujube	Fruit		Asia (Bhutan, China, India, Japan, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan, Thailand) North America (United States)	HIGH Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya
Bactrocera curvipennis (Syn. *Chaetodacus curvipennis; Dacus curvipennis; Strumeta curvipennis*)	Banana fruit fly	Polyphagous (41 hosts from 20 families) including *Citrus spp*., mango, **papaya**, grape, tomato, bell pepper, capsicum, nectarine, peach, plum, coffee, sweet pepper, strawberry	Fruit	Infested plant material (fruit), soil and hitchhiking. Adults capable of flight. Pupation occurs in the soil.	New Caledonia, Vanuatu, Fiji	UNKNOWN Papaya	UNKNOWN Papaya	UNKNOWN Papaya	UNKNOWN Papaya	UNKNOWN Papaya
Bactrocera diversa (Syn. Asiadacus diversus; Dacus diversus)	Fruit fly, three striped	Citrus spp., **papaya**, gourd, pumpkin, guava, jamun, marrow	Fruit		Asia (China, India)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Bactrocera dorsalis (Syn. Bactrocera; Bactrocera invadens; Bactrocera papayae; Bactrocera philippinensis;	Oriental fruit fly, Philippine fruit fly, Invasive fruit fly, Asian Papaya fruit fly	**Lychee, papaya, passionfruit**, red fruit passion flower, giant granadilla, corkystem passionflower, red-bead tree, cashew nut, cherimoya, pond apple, soursop, bullock's heart, wild custard apple, sugar apple, black currant tree, coral berry, sugar palm, breadfruit, jackfruit, champedak, monkey jack, bilimbi, carambola, Akee apple, toddy palm, Alexandrian laurel, perfume tree, Indian caper, bell pepper, chilli, tummy wood, caranda, white sapote, evergreen chinkapin, Chittagong wood, Citrus, watermelon, scarlet-fruited ivy gourd, coffee, melon, cucumber, giant pumpkin, marrow, Burma simpoh, longan tree, persimmon, loquat, weeping fig, Indian laurel tree, cluster tree, sacred fig tree, sycamore fig, governor's plum, rukam, round kumquat, oval kumquat, mangosteen, dragon fruit, wild mango, bottle gourd,	Fruit	Infested plant material (including fruit), soil and hitchhiking. Adults capable of flight. Pupation occurs in the soil[33]	Asia (Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Christmas Island (Indian Ocean), India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Oman, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, United Arab Emirates, Vietnam) Africa, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Democratic Republic of Congo, Cote d'Ivoire, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Liberia, Madagascar, Mali, Mauritania, Mayotte, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe) North America (USA) Europe (Italy)	HIGH Lychee, Papaya, Passionfruit	HIGH Lychee, Papaya, Passionfruit	HIGH Lychee, Papaya, Passionfruit	HIGH Papaya, Passionfruit LOW Lychee	HIGH Papaya, Passionfruit, LOW Lychee

		langsat, Indian laurel, acerola, apple, mango, sapodilla, Spanish cherry, bitter gourd, black mulberry, banana, plantain, avocado, common bean, cutleaf groundcherry, black pepper, fijian longan, Trifoliate orange, canistel, apricot, sweet cherry, sour cherry, plum, peach, Japanese plum, strawberry guava, guava, pomegranate, European pear, Oriental pear tree, mangrove, Downy rose-myrtle, marula, grey bitter-apple, tomato, aubergine, watery rose-apple, clove, black plum, sea apple, rose apple, Malay apple, water apple, Singapore almond, cocoa, limeberry, christmas palm, shea tree, common jujube, jujube, pomelo, tropical almond, star fruit, sour orange, calamondin orange			Oceania (Federated states of Micronesia, French Polynesia, Northern Mariana Islands, Palau, Papua New Guinea)					
Bactrocera facialis	Tongan fruit fly, tropical fruit fly	Citrus spp., mango, **papaya,** avocado, **passionfruit**, peach, guava, cashew nut, capsicum, tomato, breadfruit, longan tree	Fruit	Infested plant material (including fruit), soil and hitchhiking. Adults capable of flight. Pupation occurs in the soil.	Oceania (Tonga)	HIGH Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya
Bactrocera kandiensis	Sri Lankan fruit fly	cashew nut, jackfruit, carambola, **papaya**, pummelo, mango, avocado, guava, pomegranate, clove, rose apple, calamandarin	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	Asia (Sri Lanka)	UNKNOWN Papaya	UNKNOWN Papaya	UNKNOWN Papaya	UNKNOWN Papaya	UNKNOWN Papaya
Bactrocera kirki[39]	Fijian fruit fly	Pineapple, carambola, Capsicum (bell pepper), chilli, Citrus spp., mango, passionfruit, peach, guava, rose apple, pumpkin, avocado, Surinam cherry, Malay apple, Singapore almond, zucchini, pomelo, avocado, custard apple, noni, sweet pepper, tomato, eggplant, cashew nut	Fruit	Infested plant material (fruit). Adults capable of flight. Long distance dispersal. Pupae are soilborne.	Oceania (American Samoa, Fiji, French Polynesia, Niue, Samoa, Tonga, Niue, Tahiti, Wallis & Futuna)	HIGH Papaya Passionfruit	HIGH Papaya Passionfruit	HIGH Papaya Passionfruit	HIGH Papaya Passionfruit	HIGH Papaya Passionfruit

[39] https://fruitflyidentification.org.au/species/bactrocera-kirki/
http://www.pestnet.org/fact_sheets/fruit_flies__tonga_171.htm

Bactrocera melanotus	Asian papaya fruit fly, Cook Islands fruit fly	**Papaya**, *Citrus spp*., mango, longan, guava	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	Oceania (Cook Islands)	MEDIUM Papaya	MEDIUM Papaya	MEDIUM Papaya	HIGH Papaya	MEDIUM Papaya
Bactrocera passiflorae	Fijian fruit fly	Polyphagous (49 hosts in 28 families) including Cashew, breadfruit, **papaya**, lime, mandarin, mango, **passionfruit**, giant granadilla, avocado, guava, eggplant, cocoa	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	Oceania (Fiji, Niue, Tonga, Tuvalu, Wallis & Futuna)	HIGH Papaya, Passionfruit	HIGH Papaya, Passionfruit	HIGH Papaya, Passionfruit	HIGH Papaya, Passionfruit	HIGH Papaya, Passionfruit
Bactrocera psidii	South sea guava fruit fly	Candlenut tree, mango, pummelo, mango, fig, cashew, custard apple, granadilla, strawberry guava, guava, rose apple, **papaya**, carambola, peach, plum, grape	Fruit	Infested plant material (including fruit), soil and hitchhiking. Adults capable of flight. Pupation occurs in the soil.	Oceania (New Caledonia)	HIGH Papaya	HIGH Papaya	HIGH Papaya	UNKNOWN Papaya	Unknown Papaya
Bactrocera tau (Syn. *Zeugodacus tau*)	Pumpkin fruit fly	**Passionfruit,** wax gourd, bell pepper, watermelon, melon, cucumber, pumpkin, marrow, longan tree, cluster tree, loofah, mango, sapodilla, bitter gourd, common bean, guava, snake gourd	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	Asia (Bangladesh, Bhutan, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Laos, Malaysia, Myanmar, Singapore, Taiwan, Thailand, Vietnam)	LOW Passionfruit	MEDIUM Passionfruit	MEDIUM Passionfruit	MEDIUM Passionfruit	LOW Passionfruit
Bactrocera trilineola[40]	Vanuatu fruit fly	**Papaya**, *Citrus* spp., guava, Malay apple, Suriname cherry, tropical almond, Tahitian chestnut, carambola, avocado, mango, soursop, pineapple, cashew, breadfruit, plantain, guava, kumquat, Pacific lychee, *Syzygium* spp., *Indian almond*, *Musa* spp.	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	Oceania (New Caledonia, Vanuatu)	MEDIUM Papaya	MEDIUM Papaya	HIGH Papaya	MEDIUM Papaya	LOW Papaya
Bactrocera tuberculata[41]	No common name	Mango, **papaya,** *Syzygium* spp., peach, sapodilla	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	Asia (Bangladesh, Bhutan, China, Myanmar, Thailand, Vietnam)	MEDIUM Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya

[40] Leblanc, L., Vueti, E. T., & Allwood, A. J. (2013). Host plant records for fruit flies (Diptera: Tephritidae: Dacini) in the Pacific Islands: 2. Infestation statistics on economic hosts.
[41] https://fruitflyidentification.org.au/species/bactrocera-tuberculata/#host-range

Bactrocera xanthodes[42]	Pacific fruit fly	**Papaya, passionfruit**, breadfruit, mandarin, guava, tomato, soursop, mango, tropical almond, watermelon, avocado, Tahiti chestnut, jackfruit, round kumquat, tangerine, sweet orange, star apple, pomelo, capsicum	Fruit	Infested plant material (fruit). Adults capable of flight. Pupae are soilborne.	Oceania (American Samoa, Cook Islands, Fiji, Nauru, New Zealand, Niue, Samoa, Tonga, Tuvalu, Vanuatu, Wallis and Futuna)	LOW Papaya Passionfruit	LOW Papaya Passionfruit	LOW Papaya Passionfruit	LOW Papaya UNKNOWN Passionfruit	NEGLIGIBLE Papaya UNKNOWN Passionfruit
Bactrocera zonata	Peach fruit fly/ guava fruit fly	**Papaya**, golden apple, sugar apple, *Citrus* spp., Quince, fig, apple, mango, bitter gourd, date-palm, peach, guava, pomegranate, potato	Fruit	Infested plant material (fruit), soil and hitchhiking. Adults capable of flight. Pupae are soilborne.	Africa (Egypt, Libya, Mauritius, Réunion, Sudan) Asia (Bangladesh, Bhutan, India, Indonesia, Iran, Iraq, Israel, Laos, Myanmar, Nepal, Oman, Pakistan, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates, Vietnam, Yemen) North America (United States)	LOW Papaya	LOW Papaya	LOW Papaya	LOW Papaya	NEGLIGIBLE Papaya
Ceratitis rosa	Natal fruit fly	Polyphagous; **Lychee**, cashew, **papaya**, citrus, grape, soursop, sugar apple, carambola, chilli, coffee, pumpkin, longan tree, persimmon, loquat, mangosteen, apple, mango, blackberry, *Musa* spp., avocado, prickly pear, apricot, plum, peach, nectarine, guava, European pear, tomato, tobacco, cocoa, grapevine, common jujube	Fruit	Infested plant material, adults capable of flight. Larvae pupate in the soil	Africa (Ethiopia, Kenya, Lesotho, Malawi, Mozambique, South Africa, Swaziland, Tanzania, Zambia)	LOW Lychee, Papaya	HIGH Lychee, Papaya	MEDIUM Lychee, Papaya	MEDIUM Lychee, Papaya	LOW Lychee, Papaya
Lissachatina fulica (Syn. Achatina fulica)	Giant African land snail, Giant Ghana snail	Polyphagous: cassava, lettuce, **papaya**, sweet potato, orange, oil palm, pear, cereals, yam, onion, Oriental garlic, pineapple, cherimoya, soursop, Anthurium, peanut, breadfruit trees, breadfruit, jackfruit, carambola, Bougainvillea, *Brassica* spp., canola, cauliflower, cabbage, pigeon pea, tea, capsicum, chrysanthemum, watermelon, Citrus spp., butterfly-pea, coffee, taro, melon, melo, cucumber, giant pumpkin, marrow, carrot, white yam, oil palm, eucalyptus, soyabean, short staple cotton, sunflower, hyacinth bean, bottle gourd, leucaena, ornamental species	Whole plant, above ground (Leaves, stems, roots, growing points and fruit)	Infested plant material, contaminated soil, tools and machinery and hitchhiking.	Africa (Central African Republic, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Madagascar, Mauritius, Morocco, Nigeria, Réunion, Seychelles, South Africa, Tanzania, Togo) Asia (Bangladesh, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Israel, Japan, Malaysia, Maldives, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam, Europe, Spain, North America, Anguilla, Antigua and Barbuda, Barbados, Cuba, Dominica, Guadeloupe, Martinique, Netherlands Antilles, Saint Lucia, Trinidad and	HIGH Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya

[42] Leblanc, L., Vueti, E. T., & Allwood, A. J. (2013). Host plant records for fruit flies (Diptera: Tephritidae: Dacini) in the Pacific Islands: 2. Infestation statistics on economic hosts.

		apple, cassava, bitter gourd, horse radish tree, banana, wild banana, oleander, tobacco, prickly pear, rice, yam bean, passionflower, beans, gooseberry, pea, radish, castor bean, roses, sage, sesame, tomato, eggplant, potato, sorghum, spinach, teak, cocoa, pointed gourd, vanilla, cowpea, grapevine, maize			Tobago, United States) Oceania (American Samoa, Christmas Island, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, U.S. Minor Outlying Islands, Vanuatu, Wallis and Futuna) South America (Argentina, Bolivia, Brazil, Colombia, Ecuador, Paraguay, Peru, Venezuela)					
Aepytus serta	Passionfruit stem borer	**Passionfruit**	Roots, stems		North America (Costa Rica)	LOW	LOW	MEDIUM	HIGH	LOW
Aleurocanthus woglumi	Citrus black fly	Polyphagous: Citrus, avocado, cashew nut, jackfruit, **papaya**, coconut, coffee, lychee, mango, sapodilla, banana, **passionfruit**, quince, guava, frangipani, pomegranate, pears, roses, grapevine, ginger	Leaves, stems	Infested plant material and machinery, adults capable of flight. Natural movement, infested soil and plant material and vectors	Asia (Bangladesh, Bhutan, Cambodia, China, Christmas Island (Indian Ocean), India, Iran, Laos, Malaysia, Maldives, Myanmar, Nepal, Oman, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, United Arab Emirates, Vietnam, Yemen), Africa (Kenya, Seychelles, South Africa, Swaziland, Tanzania, Uganda, Zimbabwe), North America (Bermuda, Mexico, USA), Central America and Caribbean (Antigua and Barbuda, Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Guadeloupe, Guatemala, Haiti, Jamaica, Netherlands Antilles, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago), South America (Brazil, Ecuador, French Guiana, Guyana, Suriname, Venezuela), Oceania (Papua New Guinea)	HIGH Papaya Passionfruit	HIGH Papaya Passionfruit	MEDIUM Papaya Passionfruit	LOW Papaya Passionfruit	LOW Papaya Passionfruit

Aonidomytilus albus	Tapioca scale	**Papaya,** mango, cassava, roses, sage, Solanum (nightshade)	Leaves, stems		Africa (Angola, Cabo Verde, Democratic Republic of the Congo, Côte d'Ivoire, Gambia, Ghana, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mauritius, Mozambique, Nigeria, Senegal, Somalia, Tanzania, Uganda, Zambia) Asia (Bahrain, China, Hong Kong, India, Indonesia, Malaysia, Sri Lanka, Taiwan, Thailand) North America (Antigua and Barbuda, Bahamas, Barbados, British Virgin Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, U.S. Virgin Islands, United States) South America (Argentina, Brazil, Colombia, French Guiana, Guyana, Peru, Suriname)	MEDIUM	HIGH	HIGH	LOW	LOW
Aphis illinoisensis	Grapevine aphid[43]	**Papaya,** grapevine, mango	Shoots, leaves and fruit	Infested plant material	Africa (Algeria, Libya, Tunisia, Asia, Israel, Turkey, Europe, Albania, Cyprus, Greece, Italy, Malta, Montenegro, Spain) North America (Belize, Canada, Costa Rica, Cuba, Dominican Republic, El Salvador, Guadeloupe, Haiti, Honduras, Jamaica, Mexico, Panama, Puerto Rico, United States) South America (Argentina, Brazil, Chile, Colombia, Uruguay, Venezuela)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Apoderus blandus	Red weevil[44]	**Lychee**	Young Leaves		Asia (India)	LOW	UNKNOWN	MEDIUM	LOW	LOW

[44] Kumar, A. Kumar A., Nath, V. Kumar, R. New threats of insect pests and disease in litchi (Litchi chinensis Sonn.) in India. Acta Horticulturae 2014 No.1029 417-424. http://www.actahort.org/books/1029/1029_53.htm

Archips micaceana	Leaf rolling moth, Bell moth, Soybean leafroller	Polyphagous including eucalyptus, grapes, **lychee**, citrus, mango, soybean, tea, pineapple, strawberry and peanut/groundnut, breadfruit, coffee	Leaves, stems and fruit		Asia (Laos, Malaysia, Myanmar, Singapore, Thailand, Vietnam)	LOW	HIGH	HIGH	MEDIUM	LOW
Asterolecanium pustulans (Syn. *Asterolecanium sambuci; Russelaspis pustulans*)[45]	Oleander pit scale, akee fringed scale	Sugar apple (sweet sop), **papaya**, akee apple, pigeon pea, tea, coconut, coffee, silky oak, leucaena, mango, sapodilla, aubergine, cocoa, oleander, cabbage, broccoli, cauliflower, kale, Brussels sprouts, collard greens, savoy, Australian pine tree, Euphorbia, Acacia, *Bauhinia tomentosa*, pigeon pea, Leucaena, cotton, Hibiscus, fig tree, plantain, Eucalyptus, guava, Syzygium, Bougainvillea, jasmine, **passionfruit**, olive, Grevillea, Prunus, roses, citrus, chilli pepper, Solanum (nightshade), tea, lantana, grapevine	Stems, branches		Africa (Egypt, São Tomé and Príncipe, Mozambique, Tanzania, South Africa, Sierra Leone, Seychelles, Rodrigues Island, Madagascar, Malawi, Kenya, Comoros, Gabon) Asia (China, Cape Verde, India, Indonesia, Iran, Israel, Taiwan, Oman, Pakistan, Yemen, Sri Lanka, Saudi Arabia, Bonin Islands - Ogasawara Islands) Europe (Cyprus, Italy, Malta, United Kingdom) North America (Agalega Islands, Anguilla, Antigua and Barbuda, Bahamas, Barbados, Bermuda, Costa Rica, Cuba, Curaçao, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Haiti, Hawaiian Islands, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Panama Canal Zone, Puerto Rico and Vieques Island, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Saint Martin and Saint Barthelemy, Saint Croix, Trinidad and Tobago, U.S. Virgin Islands, USA) Oceania (Fiji, French Polynesia, Guam, Papua New Guinea, Tuvalu, New Caledonia, Kiribati) South America (Brazil, Colombia, Ecuador, Guyana, Peru, Venezuela, Galapagos Islands)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW

[45] http://scalenet.info/catalogue/Russellaspis%20pustulans/

Azamora penicillana[46]	No common name	**Passionfruit**, passionflower	Leaves, fruits, branches		South America (Brazil)	LOW	LOW	LOW	HIGH	LOW
Brachylybas variegatus[47]	Brown coreid bug, passionvine bug	Polyphagous including giant passionfruit, **papaya**, taro, pumpkin, tomato, coconut, fig, sugarcane, Eucalyptus, cabbage, banana, ginger	Leaves, stem, fruit	Infested plant material and machinery, adults capable of flight.	Fiji, Tonga	MEDIUM	LOW	HIGH	MEDIUM	LOW
Chramesus bispinus[48]	No common name	**Passionflower**, banana passionfruit (*Passiflora mollisima*)	Stems		South America (Colombia)	LOW	LOW	MEDIUM	HIGH	LOW
Corynothrips stenopterus	Cassava thrips	**Papaya**, cassava	Leaves, stems, fruit		North America (Antigua and Barbuda, Barbados, Dominica, Grenada, Guadeloupe, Martinique, Mexico, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago) South America (Guyana, Suriname)	MEDIUM	MEDIUM	MEDIUM	LOW	LOW
Cryptophlebia peltastica[49]	No common name	**Lychee**, macadamia, sweet orange, jackbean, wonderbean, tamarind	Fruit		Africa (Madagascar, Mauritius, Seychelles, South Africa)	LOW	HIGH	HIGH	MEDIUM	LOW
Cyclocephala melanocephala	Masked chafer	**Passionfruit**, Sunflower	Flowers, leaves		South America (Brazil)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Diaprepes abbreviatus	Citrus weevil, West Indian weevil, sugarcane rootstalk borer	Wide host range including citrus, sugarcane, vegetables, potato, **papaya**, guava, woody field grown ornamentals strawberry, sweetpotato, mahogany, containerized ornamentals, non-cultivated wild plants	Flowers, leaves, roots	Infested plant material, contaminated soil, tools and machinery. Pupation occurs in the soil.	North America (Antigua and Barbuda, Barbados, Costa Rica, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States) South America (French Guiana)	MEDIUM	HIGH	HIGH	LOW	LOW

[46] Pirovani, V. D., Fancelli, M., Moreira, B. M., Silveira, L. F. V., & Pratissoli, D. (2020). Azamora penicillana occurrence in sour passion fruit in the state of Minas Gerais. Revista Brasileira de Fruticultura, 42(1).
[47] https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/ba/plant/2013/islandcabbage/Final-PRA-Island-Cabbage.pdf
[48] Wood, S. L. (1982). New species of American bark beetles (Coleoptera: Scolytidae). The Great Basin Naturalist, 223-231.
Also: https://www.barkbeetles.info/regional_chklist_target_species.php?lookUp=816
[49] http://idtools.org/id/leps/tortai/Cryptophlebia_peltastica.htm

Eumeta crameri (Syn. *Clania crameri; Cryptothelea crameri*)[50]	Faggot worm	**Lychee**, tea, coconut, Indian tamarind, cocoa, gliricidia	Leaf		Asia (India, Indonesia, Vietnam) Africa (Sierra Leone)	MEDIUM	HIGH	MEDIUM	MEDIUM	LOW
Gatesclarkeana erotias (Syn. *Argyroploce erotias* Meyrick)	No common name	**Lychee**, carambola, tea, mango, lantana	Leaves, stems		Asia (India, Sri Lanka, Timor, Thailand)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Gonimbrasia belina (Syn. *Acanthocampa belina; Imbrasia belina; Nudaurelia belina; Saturnia belina*)	Mopane worms	**Lychee,** radiata pine	Leaves		Africa (Angola, Botswana, Cameroon, Chad, D R Congo, Eritrea, Ethiopia, Kenya, Mozambique, Namibia, South Africa, Tanzania, Uganda, Zambia, Zimbabwe)	LOW	UNKNOWN	UNKNOWN	MEDIUM	LOW
Indarbela dea (Syn. *Arbela dea; Lepidarbela dea*)	Bark borer	**Lychee** , jackfruit, casuarina, longan, pineapple, leucaena, pomegranate	Trunk, branches		Asia (China, India, Vietnam)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Indarbela quadrinotata (Syn. *Arbela quadrinotata; Cossus abruptus; Lepidarbela quadrinotata; Squamura quadrinotata*)	Bark eating caterpillar	**Lychee**, wattles, cashew nut, tea, citrus, loquat, eucalyptus, common fig, rubber, mango, sapodilla, Spanish cherry, horse radish tree, mulberry, Indian gooseberry, poplars, apricot, guava, pomegranate, roses, teak, cocoa, jujube	Trunk, branches		Asia (Bangladesh, India, Myanmar, Pakistan, Sri Lanka)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Lymantria mathura[51]	Pink gypsy moth; rosy gypsy moth; Russian gypsy moth	Polyphagous: **Lychee**, chestnut, mango, oaks, larches, poplars, pines, stone fruit, black plum, beech	Leaves, flowers		Asia (Bangladesh, China, India, Japan, DPR Korea, Republic of Korea, Nepal, Taiwan) Europe (Russian Federation)	HIGH Lychee	MEDIUM Lychee	MEDIUM Lychee	MEDIUM Lychee	LOW Lychee
Oligonychus gossypii	Spider mite; cotton red mite	Polyphagous including **Papaya,** cotton, cassava, beans, peach, citrus, okra, peanut, and a range of ornamentals including rose	Leaves		Africa (Benin, Republic of Congo, Gabon, Nigeria, Angola, Cameroon, Chad, Ivory Coast, Kenya, Madagascar, Senegal, Sierra Leone, Tanzania, Uganda) South America (Brazil, Venezuela, Colombia, Ecuador), Central America (Costa Rica, Honduras)	MEDIUM	HIGH	HIGH	LOW	LOW
Planococcus litchi	Mealybug	**Lychee**, longan, rambutan, loquat, sugar apple	Fruit, leaves, branches		Asia (Brunei, China, Hong Kong, Japan, Philippines, Singapore, Thailand, Vietnam)	MEDIUM	HIGH	HIGH	LOW	LOW

[50] Kumar, V., Kumar, A., Nath, V. and Kumar, R. (2014) Acta Horticulturae No.1029, 417-424

[51] Intercepted only in USA, Widespread in Bangladesh, China and India

Pseudococcus comstocki	Comstock mealybug	Polyphagous; **Lychee**, longan, citrus, coffee, apple, pear, banana, stone fruit, common fig, mulberry tree, pomegranate (over 35 hosts)	Whole plant, leaves, stems, fruit		Asia (Armenia, Azerbaijan, Cambodia, China, Republic of Georgia, Japan, Kazakhstan, Korea, DPR, Korea, Republic of, Kyrgyzstan, Sri Lanka, Syria, Taiwan, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam) Africa (Saint Helena) North America (Canada, Mexico, USA) South America, Argentina, Brazil) Europe (Croatia, France, Russian Federation, Ukraine)	LOW	MEDIUM	MEDIUM	LOW - MEDIUM	LOW
Stenygra conspicua	No common name	**Passionfruit** (*Passioflora* spp.)	Stems		South America (Argentina, Brazil, Paraguay)	LOW	LOW	MEDIUM	HIGH	LOW
Stizocera spp.	No common name	**Passionfruit** (*Passioflora* spp.)	Stems		South America (Neotropical region - Brazil, Bolivia)	LOW	LOW	MEDIUM	HIGH	LOW
Tessaratoma quadrata	Stink bug	**Lychee**, longan, apple, pear	Fruit, flowers		Asia (China, India, Indo-China, Nepal, Vietnam)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Trialeurodes variabilis (Syn. *Aleurochiton variabilis, Aleurodes variabilis, Aleurodicus variabilis, Asterochiton variabilis, Metaleurodicus variabilis, Trialeurodes caricae*)	Papaya whitefly	Polyphagous: **Papaya**, cassava	Leaves		North America (Cuba, Trinidad and Tobago)South America (Colombia)	LOW	MED	HIGH	MED	LOW
Xylosandrus compactus[52]	Black twig borer, Shot-hole borer	Wide host range including coffee, tea, avocado, macadamia, **lychee**, eucalypts, soursop, sugar apple, chestnuts, Spanish cedar, cinnamon, mango, chinaberry, pines, pomegranate, cocoa.	Branches		Asia (Cambodia, China, East Timor, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam) Africa (Benin, Cameroon, Central African Republic, Comoros, Congo, Congo Democratic Republic, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Mauritania,	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW

[52] Restricted distribution in East Timor and USA

					Mauritius, Nigeria, Réunion, Senegal, Seychelles, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zimbabwe) North America (USA) Central America and Caribbean (British Virgin Islands, Cuba, Curaçao, Netherlands Antilles, Puerto Rico, US Virgin Islands) South America (Brazil, Peru) Europe (Italy) Oceania (American Samoa, Fiji, Papua New Guinea, Samoa, Solomon Islands)					
Cryptophlebia illepida (Syn. *Argyroploce illepida* (Butler)*; Argyroploce vulpes; Cryptophlebia illepida illepida* (Butler)*; Cryptophlebia illepida* var. fulva*; Cryptophlebia illepida* var. suffusa*; Cryptophlebia tetrao; Cryptophlebia vulpes; Olethreutes illepida; Teras illepida*)	Koa seedworm	**Lychee**, koa (Acacia koa), macadamia, mango, Bauhinia (camel's foot), Leucaena, Phaseolus (beans)	Fruit Nut (Macadamia)		North America (Hawaii)	LOW Lychee	HIGH Lychee	HIGH Lychee	MEDIUM Lychee	LOW Lychee
Potosia brevitarsis (Syn. *Ceotocia brevitarsis* Lewis*; Neotocia brevitarsis* (Lewis)*; Liocola brevitarsis* (Lewis)*; Potosia brevitarsis* (Lewis)*; Protaetia (Calopotosia) brevitarsis* (Lewis)	White spotted flower chafer; Flower beetle	Polyphagous; **Lychee**, grape, corn, sunflower, peach	Flowers, fruit		Asia (China, Republic of Korea) Europe	LOW	MEDIUM	MEDIUM	MEDIUM - HIGH	LOW - MEDIUM
Veneza zonatus (Syn. *Leptoglossus zonatus*)	Western leaf-footed bug; large-legged bug	**Passionfruit** (*Passiflora spp*.), pecan, lime, navel orange, melon, pumpkin, cotton, jatropha, avocado, guava, pomegranate, tomato, eggplant, sorghum, maize, peach, watermelon	Leaves, fruit		North America (Mexico, United States) Central America (Nicaragua, Honduras, El Salvador) South America (Brazil, Venezuela, Colombia)	LOW	MEDIUM	MEDIUM	MEDIUM - HIGH	LOW - MEDIUM
Chondracris rosea	Citrus locust	Polyphagous; Citrus, rice, soyabean, sweet potato, **lychee**, tea, rambutan, cotton, groundnut, hemp, coconut, durian, *Musa* spp., guava, castor bean, sugarcane, teak, cocoa, maize	Leaves, stems and growing tips		Asia (China, Indonesia, Japan, Republic of Korea, Laos, Malaysia, Pakistan, Philippines, Taiwan, Thailand, Vietnam)	LOW Lychee	MEDIUM Lychee	MEDIUM Lychee	MEDIUM Lychee	LOW Lychee

Oligonychus annonicus	Spider mite	**Papaya**, *Annona* spp., *Erythrina* spp., coffee	Leaves	Infested plant material and soil	South America (Ecuador)	MEDIUM Papaya	HIGH Papaya	HIGH Papaya	LOW Papaya	LOW Papaya
Frankliniella insularis (Syn. *Euthrips insularis, Frankliniella fortissima, Franklinothrips insularis, Franklinothrips caribae)*[53]	Blossom thrips, Cuban flower thrips, West Indian flower thrips, bean-flower thrips	Pigeon pea, capsicum, **papaya**, citrus, coconut, sweetpotato, banana, tobacco, beans, tomato	Whole plant, above ground, Leaves, flowers	Infested plant material, contaminated soil, tools and machinery. Pupation occurs in the soil.	Asia (Singapore) North America (Barbados, Bermuda, Cuba, Guadeloupe, Jamaica, Martinique, Mexico, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States) South America (Guyana) Oceania (Fiji)	LOW Papaya	HIGH Papaya	HIGH Papaya	LOW Papaya	LOW Papaya
Tetranychus yusti[54]	Yustin mite	Polyphagous including common bean, cucurbits, sweetpotato, wheat, millet, cowpea, maize, peanut, barley, soybean, sunflower, pigeon pea, cotton, *Musa* spp. (including hybrids of *M. acuminata* and *M. balbisiana*), *Xanthosoma sagittifolium*, **passionfruit,** strawberry and several ornamentals	Above ground plant parts	Infested plant material and machinery.	Africa (Nigeria) Asia (Thailand) Europe (Greece) North America (Mexico, United States) South America (Brazil, Colombia, Ecuador, El Salvador, Guadeloupe, Honduras, Venezuela, Cape Verde) Oceania (Cook Islands, French Polynesia)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM
Myllocerus undecimpustulatus	Sri Lankan weevil	Golden apple, groundnut, pigeon pea, mulberry, sorghum, black plum, mung bean, jujube, sugarcane, mango, pomegranate, citrus, peach, **lychee**, eggplant	Leaf		Asia (India, Indonesia, Pakistan), USA (Florida)	UNKNOWN	MEDIUM	HIGH	LOW-MEDIUM	LOW-MEDIUM
Ceroplastes pseudoceriferus (Valid name: Ceroplastes ceriferus (Scalenet - http://scalenet.info/catalogue/Ceroplastes%20cerif erus/)	Horned wax scale	Malabar ebony, **lychee**, mango	Leaves, flowers		Asia (China, Republic of Korea)	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Crypticerya multicicatrices	Multicicatrices fluted scale	Breadfruit, **papaya**, mango, avocado, soursop, coconut,	Leaves, branches		South America (Colombia)	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM

[53] Frankliniella insularis is a vector of plant viruses (Bailey 1935)
[54] T. yusti may be of quarantine concern to Australia (Flechtmann et al., 2002).

Davara caricae	Papaya webworm	**Papaya**	Stem, fruit		North America (Cuba, USA)	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM
Dione juno[55]	Silverspot butterfly	**Passionfruit**, passionflower	Leaves, buds, flowers		North America (Trinidad and Tobago) South America (Brazil, Colombia, Venezuela)	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Empoasca papayae	Papaya leaf hopper	**Papaya**	Leaves, stem (known vector of bunchy top)		North America (Antigua and Barbuda, Barbados, Grenada, Montserrat, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Trinidad and Tobago)	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Empoasca stevensii	Stevens leaf hopper	Polyphagous; **Papaya**, avocado, plumeria	Leaves, stem (known secondary vector of bunchy top)		North America (Antigua and Barbuda, Barbados, Grenada, Montserrat, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Trinidad and Tobago)	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Eutetranychus africanus	Spider mite, citrus brown mite, African red mite, Texas citrus mite, Oriental red mite, Oriental mite [125]	Polyphagous; **Papaya**, citrus, cotton, cassava, castor bean, pea, peach, durian, apple, grape, guava, eggplant, sweet potato, fig, corn, and a variety of ornamentals	Leaves, stem, fruit		Africa (Reunion, Comoros, Kenya, Madagascar, Mauritius, Mayotte, Mozambique, South Africa) Asia (Iran, Japan, Taiwan, Thailand, India, Myanmar-Burma, Egypt) Oceania (Papua New Guinea, French Polynesia, Vanuatu) South America (Bolivia, Brazil, Chile, Colombia, Peru)	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM
Eutetranychus banksi (Syn. *Tetranychus banksi*)	Citrus mite	Polyphagous including: **Papaya**, breadfruit, castor bean, *Citrus* spp., lima bean, plumeria, lablab bean leaves, *Annona* spp. (sousop, sugar apple, cherimoya, wild sweetsop, pond apple), oleaner, taro, elephant ear (arrowroot/coco yam), curcubits, purple yam, *Euphorbia*, cassava, castor oil plant, peanut, *Bauhinia* spp., pigeon pea, cotton, *Hibiscus*, cocoa, black pepper, coffee, black nightshade, grapevine; many other ornamentals and economic	Leaves		North America (Costa Rica, Cuba, Mexico, Colombia, Cuba, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, Panama, USA) South America (Venezuela, Argentina, Brazil, Peru, Paraguay, Uruguay) Africa (Mozambique), Egypt, Iran, Portugal, Spain	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

[55] Aguiar-Menezes, E. L., Menezes, E. B., Cassino, P. C. R., & Soares, M. A. (2002). 12 Passion Fruit. Tropical Fruit Pests and Pollinators: Biology, Economic Importance, Natural Enemies, and Control, 361.

		plants including: date palm (*Phoenix dactylifera*)								
Gymnandrosoma aurantianum (Syn. *Ecdytolopha aurantium* (Lima); *Ecdytolopha torticornis*)	No common name	**Lychee**, Citrus, macadamia, plantain, cocoa	Fruit		Central America and Caribbean (Costa Rica, Trinidad and Tobago)South America (Argentina, Brazil)	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Odontotermes formosanus (Syn. *Coptotermes formosanus*)	Formosan subterranean ant	**Lychee**, tea, coffee, sugarcane, red maple, Atlantic white cedar, citrus, eucalyptus, pines, bald cypress	Roots, stems	Infested soil, machinery and plant material. Natural dispersal distance by annual flight is approx. 1 km per decade	Asia (China, Japan, Taiwan) Africa (South Africa) North America (USA) Central America and Caribbean (United States Virgin Islands) Oceania (Marshall Islands, US Minor Outlying Islands)	HIGH	HIGH	HIGH	MEDIUM	MEDIUM
Paracoccus burnerae	Oleander mealybug; Oleander scale	Indian mangrove, oleander, Chinese cinnamon, cotton, Hibiscus fuscus, Asparagus, mallow, cocoa, neem tree, guava, olive, **passionfruit**, sugar plum, coffee, bitter orange, hopbush, potato	Fruit, leaves, stems	Infested plant material	Africa (Ascension Island, Angola, Cote d'Ivoire, Comoros, Kenya, Madagascar, Namibia, Reunion, Seychelles, Saint Helena Island, South Africa, Swaziland, Zambia, Zimbabwe) Asia (China, India, Iran, Sri Lanka, Thailand, Vietnam, Yemen) Europe (Spain, United Kingdom)	HIGH	HIGH	HIGH	MEDIUM	MEDIUM
Paracoccus marginatus[56]	Papaya mealybug	Polyphagous (over 55 plants from 25 genera) including *Citrus* spp., **papaya**, avocado, mango, cherry, pineapple, pomegranate, hibiscus, cotton, tomato, eggplant, capsicum, bean, pea, sweet	Fruit, growing point, inflorescence, leaves, stems, whole plant	Infested plant material, contaminated soil, tools and machinery.	Africa (Benin, Cameroon, Gabon, Ghana, Kenya, Mauritius, Mozambique, Nigeria, Réunion, Tanzania, Togo) Asia (Bangladesh, Cambodia, China, India, Indonesia, Israel, Laos, Malaysia,	HIGH	HIGH	HIGH	MEDIUM	MEDIUM

[56] Highly polyphagous-has been recorded on >55 host plants. Females have no wings and move by crawling short distances or by being blown in air currents. The range of this pest has expended consistently since it was first recorded outside the Caribbean in 1994, reaching as far as Micronesia (CABI). Has been expending its range ever since it was first recorded outside the Caribbean in 1994 and has reached as far as Micronesia (CABI, 2017). Feeding by the papaya mealybug causes chlorosis, stunting and honey dew. It is native to Central America.

		potato, coffee, acacia, cassava, guava, cocoa		Hitchhiking. Males are capable of flight. Dispersed over short distances by crawling and over long distances by wind currents]	Maldives, Oman, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Timor Leste) North America (Antigua and Barbuda, Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Costa Rica, Cuba, Dominican Republic, Grenada, Guadeloupe, Guatemala, Haiti, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Martin, Sint Maarten, U.S. Virgin Islands, United States) Oceania (Federated States of Micronesia, Guam, Northern Mariana Islands, Palau) South America (French Guiana)					
Paradasynus longirostris	Hong Kong stink bug	**Lychee**, longan	Fruit, leaves		Asia (China, Thailand)	LOW	HIGH	HIGH	HIGH	MEDIUM
Parlatoria cinerea	Apple parlatoria	Polyphagous, **Lychee**, Annona muricata, Bougainvillea, Citrus spp., Cupressus, Gardenia, Jasminum, Malus sylvestris, Mangifera indica, Rosa, Viburnum and Vitis vinifera	Branches, stems, flowers, fruit, and post-harvest stages and rarely on roots of citrus		Asia (Israel) South America (Argentina, Brazil)	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM
Philonis spp. (P. passiflorae, P. obesus, P. crucifer)	No common name	**Passionfruit** (*Passioflora* spp.)	Stems		South America (Brazil)	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Planococcus spp. (including P. angkorensis, P. halli, P. kraunhiae)	Japanese mealybug	Citrus, coffee, sugarcane, *Dioscorea* Spp., fig, **lychee**, guava, pomegranate, jam, persimmon, citrus, pear, coffee, fig, olive, grape, yam, rose apple	Twigs, leaves, stems, roots	Infested plant material and machinery	North America (Caribbean) South America (Brazil, Colombia)	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM
Scaphytopius nitridus[57]	Leafhopper	Polyphagous including *Citrus* spp., rice, barley, corn, sugarcane, wheat, sorghum, apple, pear, palms, grapevine, carrot, potato, tomato, **papaya,** peach, strawberry, *Rubus* spp., ornamentals, weeds, other grasses and cereals	Leaves	Infested plant parts (leaves and fruit), soil and hitchhiking	Asia (Turkey)North America (Mexico, USA)	LOW	HIGH	HIGH	MEDIUM to HIGH	MEDIUM

[57] Vector of Western X-disease phytoplasma 16SrIII-A

Tessaratoma papillosa	Lychee stink bug	**Lychee**, longan, citrus, plum, peach, pear, olive, banana	Above ground plant parts: Fruit, flowers, stems	Infested plant material and machinery, adults capable of flight.	Asia (China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam) Middle East	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Toxotrypana curvicauda (*Syn. T. fairbatesi Munro*)	Papaya fly	**Papaya**, mango	Fruit, seed	Infested plant material (fruit). Adults capable of flight.	North America (Bahamas, Belize, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Mexico, Netherlands Antilles, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Trinidad and Tobago, US Virgin Islands, USA) South America (Colombia, Venezuela)	LOW Papaya	HIGH Papaya	HIGH Papaya	HIGH Papaya	MEDIUM Papaya
Oligonychus litchi	Spider mite	Polyphagous: **Lychee**, mango, grape, peach, apple, avocado, persimmon, pear and a range of ornamentals	Leaves		China, Taiwan	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Tetranychus bastosi	Spider mite	Polyphagous: reported from 25 plant species including **papaya**, bean, cassava, sweet potato	Leaves		South America (Brazil)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Tetranychus macfarlanei (Syn. *T. malaysiensis*) *Tetranychus malaysiensis* (Syn. *T. macfarlanei*). This should be the other way around i.e., *T. malaysiensis* is a junior synonym of *Tetranychus macfarlanei*	Spider mite	**Papaya**, grapefruit, manihot spp., argyreia spp., chempedak, gumbo, okra, cotton, eggplant	Leaves		Asia (India) Europe (Spain), Africa (Madagascar, Mauritius), Asia (Bangladesh, China, India, Malaysia, Philippines, Thailand)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Tetranychus merganser	Spider mite	Polyphagous: **Papaya**, Capsicum, prickly pear, squash, cassava, European privet, strawberry, jasmine, desert ash, blackberry nightshade	Leaves		Asia (China, Thailand) North America (Mexico, USA)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Tetranychus nakahari	Spider mite	**Papaya**, cocoa, cassava, okra (gumbo), *Citrus* spp., *Citrofortunella* spp.	Leaves		North America (El Salvador, Guatemala, Suriname, Trinidad and Tobago)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH

https://www.catalogueoflife.org/col/details/species/id/527ea2303b252ef8238450f44d185708

Tetranychus papayae	Spider mite	**Papaya**	Leaves		Asia (India)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Tetranychus paraguayensis	Spider mite	**Papaya**, citrus	Leaves		South America (Paraguay)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Tetranychus puschelii	Spider mite	Polyphagous; **Papaya**, capsicum, Cucurbits, bottle gourd, basil, *Ranunculus* spp., okra, jasmine, Capsicum, *Cannabis sativa,*	Leaves		Africa (South Africa) Asia (India)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Tetranychus recki	Spider mite	**Papaya**, chenille	Leaves		North America (Costa Rica, Honduras)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Tetranychus truncatus	Spider mite	Polyphagous: peanut, melon, carrot, cotton, cassava, castor bean, eggplant, maize, white mulberry, **papaya**, bean, rice, corn, cabbage, canola, *Citrus* spp., soybean, garden pea, mung bean, capsicum, tomato, grapevine, cowpea, sweetpotato, brown mustard, cauliflower, watermelon, muskmelon, cucumber, squash, silky gourd (ridged gourd, chinese okra), castor bean/castor oil plant, common bean, lima bean, winged bean, broad bean, mung bean, okra, neem tree, moringa (horseradish tree), guava, sesame, rice, jujube, Asian pear, *Rosa hybrida*, sweet peppers, chili peppers, black nightshade, garlic	Leaves		Asia (Bangladesh, China, India, Iran, Japan, Malaysia, Philippines, Republic of South Korea, Taiwan, Thailand, Vietnam, Indonesia) North America (USA) Oceania (Guam)	MEDIUM	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Oligonychus thelytokus	Spider mite	Polyphagous including **Lychee**, mango, cotton, rose, azalea, coffee, avocado, citrus, cassava, cotton, pepper, strawberry and a range of ornamentals (e.g., azalea and roses)	Leaves	Infested plant material, machinery and wind dispersal	Africa (South of Sahara, Comoros, East Africa, Madagascar, Seychelles, Reunion, Ivory Coast, Congo) Oceania (New Caledonia, French Polynesia, Papua New Guinea, Indonesia), Japan	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

Tetranychus mexicanus	Spider mite	Polyphagous; **Papaya**, cotton, **lychee**, **passionfruit**, Spanish cedar, Citrus, Cocoa, pecan, coconut, avocado, banana, peanut, guava, sugar cane, strawberry, pear, apple, peach, star fruit, bean, cassava; wide range of ornamental plants	Leaves		Central America and Caribbean (Barbados, Costa Rica, Cuba, Nicaragua, El Salvador, Honduras, Guadeloupe, Martinique) South America (Brazil, Suriname, Argentina, Columbia, Paraguay, Peru, Uruguay, Venezuela)	MEDIUM Lychee, Papaya, Passionfruit	HIGH Lychee, Papaya, Passionfruit	HIGH Lychee, Papaya, Passionfruit	MEDIUM Lychee, Papaya, Passionfruit	MEDIUM Lychee, Papaya, Passionfruit
Oligonychus (Tetranychus) bicolor[58] *Oligonychus yothersi (Syn. Tetranychus yothersi).* These two species should be included & categorised separately, each with their own data (for information. They are both separate species. See: https://www1.montpellier.inra.fr/CBGP/spmweb/notespecies.php?id=473 and https://www1.montpellier.inra.fr/CBGP/spmweb/notespecies.php?id=559	Spider mite; avocado red mite	Polyphagous; **Lychee**, grape, oak, chestnut, hickory, maple, spruce, birch, **papaya**, mango, coffee, castor bean, *Eucalyptus* spp.	Leaves, foliage	Infested plant material and soil	Asia (Iran, Taiwan)North America (Canada, United States)Central America and Caribbean (Costa Rica, Cuba)	MEDIUM Lychee, Papaya	HIGH Lychee, Papaya	HIGH Lychee, Papaya	MEDIUM Lychee, Papaya	MEDIUM- Lychee, Papaya
Oligonychus (Tetranychus) bicolor; Oligonychus yothersi (Syn. Tetranychus yothersi). These two species should be included & categorised separately, each with their own data (for information. They are both separate species. See: https://www1.montpellier.inra.fr/CBGP/spmweb/notespecies.php?id=473 and https://www1.montpellier.inra.fr/CBGP/spmweb/notespecies.php?id=559	Spider mite; avocado red mite	Polyphagous; **Lychee,** grape, oak, chestnut, hickory, maple, spruce, birch, **papaya**, mango, coffee, castor bean, *Eucalyptus* spp.	Leaves, foliage	Infested plant material and soil	Asia (Iran, Taiwan) North America (Canada, United States) Central America and Caribbean (Costa Rica, Cuba)	MEDIUM Lychee, Papaya	HIGH Lychee, Papaya	HIGH Lychee, Papaya	MEDIUM Lychee, Papaya	MEDIUM Lychee, Papaya

[58] The environment in parts of Australia is likely to be suitable for the establishment of O. yothersi.

Oligonychus yothersi (Syn. *Tetranychus yothersi*)	Spider mite; avocado red mite	Polyphagous including **lychee, papaya**, mango, coffee, avocado, banana, cassava, pomegranate, grape, castor bean, *Eucalyptus grandis* and *Eucalyptus urophylla,* other *Eucalyptus* spp., *Grevillea* sp., *Camellia sinensis;* also, a range of ornamental plants	Leaves Foliage	Infested plant material and soil	Asia (Iran) North America (USA [Hawaii]), , Central America and Caribbean (Costa Rica, Cuba, Nicaragua), South America (Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru), China	MEDIUM Lychee, Papaya	HIGH Lychee, Papaya	HIGH Lychee, Papaya	MEDIUM Lychee, Papaya	MEDIUM Lychee, Papaya
Tetranychus tumidus	Spider mite	Wide host range including **papaya**, Araceae, sweetpotato, banana, corn, cotton, bean, canola, common bean, cassava, cotton, garlic, taro, celery, coconut, maize, potato, tomato, sunflower, mint	Leaves	Infested plant material, and hitchhiking. Wind dispersal for localised spread.	North America (Antigua and Barbuda, Barbados, Cuba, Saint Lucia, USA, American Samoa, Guam, Costa Rica, Panama, Puerto Rico) South America (Colombia) Europe (Greece)	MEDIUM Papaya	HIGH Papaya	HIGH Papaya	MEDIUM Papaya	MEDIUM Papaya
Tetranychus cinnabarinus. This species is a synonym of *Tetranychus urticae* which is an endemic species in Australia with a very wide host range. Hence, this species information can be removed from here.	Carmine spider mite	Okra, onion, garlic, peanut, broccoli, tea, peppers, **papaya,** chrysanthemum, watermelon, Citrus, taro, morning glory, melon, cucumber, pumpkin, marrow, cucurbits, carnation, yam, strawberry, soyabean, cotton, sweetpotato, apple, cassava, lucerne, banana, beans, common beans, peach, castor bean, tomato, eggplant, potato, sorghum, spinach, cowpea, grapevine, elephant ear, maize, common jujube	Leaves	Infested plant material, machinery, personal effects, hitchhiking. Wind dispersal for localised spread.	Africa (Cape Verde, Egypt, Kenya, Libya, Morocco, South Africa, Togo, Tunisia, Uganda, Zimbabwe) Asia (China, India, Indonesia, Iran, Israel, Japan, Malaysia, Singapore, Taiwan, Thailand, Turkey) Europe (Austria, Bulgaria, France, Montenegro, Poland, Portugal, Spain, United Kingdom) North America (Costa Rica, Mexico, United States) South America (Brazil, Colombia, Peru, Venezuela)	MEDIUM Papaya	HIGH Papaya	HIGH Papaya	MEDIUM Papaya	MEDIUM Papaya
Calacarus citrifolii	Citrus grey mite/ citrus blotch mite	Polyphagous including Citrus, banana, cotton, peanut, **passionfruit, papaya**, cassava, beans, sugarcane, pigeon pea, okra, sweetpotato, soursop, Tannia, eggplant, capsicum, tomato, taro, pumpkin, giant passionfruit, *Poinsettia* spp., *Rhus* spp., *Holmskioldia* spp., *Brunsfelsia* spp., *Pappea capensis*, *Rhamnus prinoides*, *Lippia javanica*, *Duranta repens*, *Mimusops seyheri*, *Euphorbia pulcherrima*, Musa paradisiaca, *Capsicum chinense* (chilli pepper)	Leaves, fruit, twigs	Infested plant material and machinery.	South Africa, India, Taiwan, Cuba, Angola, Zimbabwe, Mozambique, Zambia, Nigeria	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

Adoretus versutus	Rose beetle	Polyphagous: **Lychee**, Acacia, cashew nut, groundnut, camel's foot, Bougainvillea, **papaya**, Citrus spp., coffee, taro, yam, fig, sweetpotato, apple, plantain, banana, avocado, beans, longan, plum, guava, pear, radish, roses, sugarcane, aubergine, sorghum, Malay apple, Singapore almond, cocoa, cowpea, cowpea, grape, ginger, Eucalyptus	Leaves Foliage (adults), roots (larvae) for cut flowers inflorescence	Infested plant material and machinery, adults capable of flight, eggs and larvae are soilborne	Asia (Bangladesh, British Indian Ocean Territory, India, Indonesia, Malaysia, Pakistan, Sri Lanka), Africa (Madagascar, Mauritius, Réunion, Saint Helena, Seychelles) Oceania (American Samoa, Cook Islands, Fiji, Samoa, Tonga, Vanuatu, Wallis and Futuna Islands)	MEDIUM Lychee UNKNOWN Papaya	MEDIUM Lychee UNKNOWN Papaya	MEDIUM Lychee UNKNOWN Papaya	HIGH Lychee UNKNOWN Papaya	MEDIUM Lychee UNKNOWN Papaya
Eotetranychus lewisi[59]	Lewis spider mite	Polyphagous; **Papaya**, citrus, grape, castor bean, poinsettia, clover, peach, pear, Rosa species, strawberry, olive, cotton, *Ipomoea* sp., *Cucurbita* sp., *Euphorbia* spp., *Acacia* spp., *Pinus* spp., *Rubus* spp., *Solanum* spp.	Leaves, fruit	Infested plant material, soil and machinery. Can be transported in wind currents.	Africa (Libya, South Africa, Asia (Taiwan, Philippines), Iran,Europe (Austria, Netherlands, Portugal [Madeira I], United Kingdom)North America (Canada, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, United States)South America (Bolivia, Brazil, Chile, Colombia, Ecuador, Peru)	MEDIUM Papaya	HIGH Papaya	HIGH Papaya	MEDIUM Papaya	MEDIUM Papaya
Dasineura papivora	Papaya midge	Papaya	Fruit		Asia (India)	LOW	Low	LOW	LOW	NEGLIGIBLE
Agraulis vanillae	Silverspotted flambeau, Gulf fritillary	Passionfruit, passionflower, morning glory, red fruit passionflower	Leaves		North America (United States) South America (Colombia, Venezuela)	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
Anomala cupripes	Large green chafer beetle	Soyabean, potato, clove, cowpea, maize	Leaves		Asia (China, Malaysia, Singapore, Thailand, Vietnam)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Aphis middletonii	Erigeron root, aphid	Papaya	Roots, trunk, stem, leaves		Asia (Turkey) North America (El Salvador, USA)	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
Apogonia cribricollis	Chafer beetle	Polyphagous; Coffee, cocoa, sweet potato, African oil palm	Leaves		Asia (Indonesia, Malaysia, Singapore)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Aspidiotus excisus (Syn. Aglaonema scale; Cyanotis scale (*Temnaspidiotus excisus*)	Green scale	Polyphagous including banana, *Citrus* spp., papaya, coconut, *Ipomoea* spp., sugar apple, pineapple, orchids, grapevines, eggplant	Above ground plant parts	Infested plant material and machinery.	Widespread throughout South, Central and North America, Asia (India), South America (Suriname)and the Pacific	MEDIUM	LOW	LOW	LOW	NEGLIGIBLE

[59] https://www1.montpellier.inra.fr/CBGP/spmweb/notespecies.php?id=168

Aulacaspis longanae	Longan diaspidid scale[60]	Longan, lychee	Leaves		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Biston (= *Buzura*) *suppressaria*	Tea looper	Polyphagous; Lychee, tea, mango, guava, wattles, chrysanthemum, eucalyptus, plum	Leaves		Asia (China, India, Indonesia, Sri Lanka)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Cossus cossus	Carpenter moth, goat moth	Sweet cherry, lychee, citrus, apple, olive, peach, pear, plum, quince, artichoke, walnut, grapevine, chestnut, ash, oak, poplar, willow, maples, beetroot, birches	Trunk, branches, stems	Adults capable of flight	Asia (Armenia, Cambodia, China, Georgia (Republic of), India, Tajikistan, Turkey, Turkmenistan, Uzbekistan) Africa (North Africa) Europe (Belgium, Bulgaria, Finland, France, Hungary, Ireland, Italy, Netherlands, Poland, Russian Federation, United Kingdom)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Cossus spp.	Carpenter moths	Polyphagous; Lychee, longan, maples, beetroot, birches, chestnuts, walnut, apple, olive, american plum, sweet cherry, plum, peach, japanese plum, european pear, common oak, willows, limes, grape	Trucks, branches		Asia (Armenia, Cambodia, China, Georgia (Republic of), India, Tajikistan, Turkey, Turkmenistan, Uzbekistan), Africa (North Africa), Europe (Belgium, Bulgaria, Finland, France, Hungary, Ireland, Italy, Netherlands, Poland, Russian Federation, UK)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Dudusa synopla[61]	Leaf-eating caterpillar	Lychee, rambutan, lac tree	Leaves		Asia (Thailand, India)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Ernothrips lobatus[62]	Thrips	Lychee, Longan	Leaves, shoots		Asia (China, Indonesia, Thailand, Japan, Taiwan, Malaysia)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Eueides isabella	Isabella tiger	Passionfruit, passionflower	Leaves		North America (Trinidad and Tobago) South America (Brazil, Venezuela)	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE

[60] Chen, F. G., Wu, Z. Q., & Su, D. K. (1980). New coccids of the genus Aulacaspis in China. Acta Zootaxonomica Sinica, 5(3), 289-296.

[61] http://www.mothsofborneo.com/part-4/dudusa/notodontidae_2_2.php

https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/ba/memos/2004/plant/ll_finalb.pdf

[62] Bagnall, R. S. (1926). XII.—Brief descriptions of new Thysanoptera.—XV. Annals and magazine of natural history, 18(103), 98-114.

Bhatti, J. S. (1967). Thysanoptera nova Indica. Published by the author. Delhi, 1-24.

Mound, L. A. (1968). A review of RS Bagnall's Thysanoptera collections. Bulletin of the British Museum (Natural History)(Entomology), 11, 1-181.

Gargaphia lunulata	No common name	Okra, gotani bean, showy rattlepod, passionfruit, common rue, jack bean	Leaves		South America (Argentina, Brazil, Colombia, Paraguay, Uruguay)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Homona coffearia Nietner (Syn. *Capua coffearia; Godana simulana; Homona fasciculana; Homona fimbriana; Homona menciana; Homona socialis; Tortrix coffearia)* [63]	Leaf roller (Syn. Tea tortrix; tea flushworm; tea tortricid)	Lychee, Acacia, groundnut, jackfruit, carambola, cabbage, tea, Siam weed, chrysanthemum, camphor laurel, cinnamon, Citrus, coffee, Crotalaria, quince, jewelvine, December tree, Eucalyptus, batai wood, strawberry, soyabean, silky oak, rosemallows, indigo, apple, mango, rambutan, tobacco, pelargoniums, fijian longan, guava, hoary-pea, cocoa, cowpea	Leaves		Asia (Bangladesh, China, India, Indonesia, Japan, Laos, Malaysia, Philippines, Sri Lanka, Taiwan, Vietnam) Oceania (Australia, Papua New Guinea, Solomon Islands)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Homona difficilis	Leaf roller	Lychee, longan, rambutan	Leaves		Asia (Vietnam, Borneo, Thailand)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Leptostylus praemorsus	Boring beetle	Papaya, Citrus	Trunk, stems		North America (Antigua and Barbuda, Barbados, Bermuda, Dominica, Mexico, Saint Lucia)	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
Maladera castanea	Asiatic garden beetle	Polyphagous; Lychee, Longan, Sweetpotato, Turfgrasses	Leaves, flowers, fruit		Asia (Republic of Korea)	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
Miresa albipuncta	Leaf-eating caterpillar (Syn. Slug caterpillar)	Lychee, longan, rambutan, cacao, Indian jujube	Leaves, trunks		Asia (India)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Perixera illepidaria (Syn: Anisodes illepidaria)	Leaf-eating caterpillar	Lychee, mango	Leaves		Asia (India)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Pococera spp.	No common name	Passionfruit (*Passioflora* spp.)	Calyx, fruit		North America (United States)	LOW	LOW	LOW	LOW	NEGLIGIBLE

[63] H. coffearia does not occur in Australia and Australian records under this name should be referred to as H. spargotis (Whittle et al., 1987). Whittle, C. P., Bellas, T. E., Horak, M., & Pinese, B. (1987). The sex pheromone and taxonomic status of Homona spargotis Meyrick sp. rev., an Australian pest species of the coffearia group (Lepidoptera: Tortricidae: Torticinae). Australian Journal of Entomology, 26(2), 169-179.

Proctophana tomentosa	No common name	Lychee	Leaves		Brazil	LOW	LOW	LOW	LOW	NEGLIGIBLE
Pseudaulacaspis papayae (Syn. *Phenacaspis papayae*; *Chionaspis papayae*)[205]	No common name	Papaya	Leaves, fruit		Asia (Indonesia, Thailand)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Sabulodes spp.	No common name	Passionfruit (*Passioflora* spp.)	Leaves		North America (United States) South America (Peru)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Spodoptera eridania	Southern armyworm	Okra, onion, Welsh onion, garlic, red ginger, celery, peanut, asparagus, beetroot, *Brassica napus* var. oleifera, black mustard, cabbages, cauliflowers, collards, cruciferous crops, bell pepper, papaya, quinoa, chickpea, watermelon, Citrus, lemon, navel orange, coffee, coriander, melon, cucumber, pumpkin, carrot, carnation, yam, Eucalyptus, soyabean, cotton, sunflower, kenaf, China-rose, sweetpotato, lettuce, lavender, leucaena, flax, apple, cassava, lucerne, mints, Peppermint, Spear mint, banana, watercress, oleander, tobacco, rice, passionfruit, elephant grass, avocado, beans, lima bean, common bean, pea, Poaceae (grasses), guava, European pear, rhubarb, castor bean, roses, raspberry, willows, Brazilian pepper tree, tomato, eggplant, potato, spinach, dandelion, clovers, blueberry, cranberry, faba bean, cowpea, grapevine, cocoyam, maize	Fruits, leaves		Africa (Benin, Cameroon, Gabon, Nigeria) Europe (Denmark, Netherlands, Slovenia) North America (Antigua and Barbuda, Bahamas, Barbados, Bermuda, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States) South America (Argentina, Brazil, Chile, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Statherotis discana (*Syn. Olethreutes discana, Statherotis leucaspis, Platypeplus leucaspsis Meyr.*)	Lychee leaf roller	Lychee, longan, rambutan, carambola	Leaves		Asia (China, India, Indonesia, Japan, Laos, Malaysia, Philippines, Taiwan, Thailand, Vietnam)	LOW	LOW	LOW	LOW	NEGLIGIBLE

Tessaratoma javanica	Longan stink bug	Lychee, longan tree, honey tree	Fruit, flowers		Asia (India, Indonesia, Philippines, Thailand, Vietnam)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Thaumatotibia leucotreta (Syn. *Cryptophlebia roerigii; Cryptophlebia leucotreta; Olethreutes leucotreta; Thaumatotibia roerigii*)[64]	False codling moth	Polyphagous: **Lychee**, pineapple, carambola, cotton, Citrus spp., capsicum, cotton, mango, avocado, peach, maize, soursop, guava, lima bean, common bean, sorghum, cowpea, olive, *Prunus* spp., cherry, macadamia, castor bean, pomegranate, Australian brush-cherry, water apple, tomato (secondary host)	Leaves, fruit, seed	Infested plant material and soil. Adults capable of flight.	Asia (Israel), Africa (Angola, Benin, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo Democratic Republic, Côte d'Ivoire, Eritrea, Ethiopia, Gambia, Ghana, Kenya[14], Madagascar, Malawi, Mali, Mauritius, Mozambique, Niger, Nigeria, Réunion, Rwanda, Saint Helena, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe), Europe (Denmark, Finland, Germany, Italy, Netherlands, Spain, Sweden, UK)	LOW Lychee	LOW Lychee	HIGH Lychee	MEDIUM Lychee	VERY LOW Lychee
Thysanofiorinia leei	Scale	Lychee, rambutan	Leaves, stems		Hawaiian Islands, Hong Kong, India, Taiwan, USA	LOW	LOW	LOW	LOW	NEGLIGIBLE
Zapriothrica salebrosa	No common name	*Passiflora* spp.	Flowers, buds		South America (Colombia, Ecuador, Peru, Venezuela)	Low	LOW	LOW (	LOW	NEGLIGIBLE
Aponychus sulcatus[65]	No common name	Papaya, tar vine, giant reed, wild sugarcane, giant cane (elephant grass)	Leaves		India, Pakistan	LOW	LOW	LOW	LOW	NEGLIGIBLE
Disella litchii[66]	Mite	Lychee	Leaves		Asia (China)	LOW	LOW	LOW	LOW	NEGLIGIBLE

[64] Intercepted only in Denmark, Finland, Italy, Spain, Sweden and UK. Eradicated from Netherlands

[65] Bolland, H. R., Gutierrez, J., & Flechtmann, C. H. (1998). World catalogue of the spider mite family (Acari: Tetranychidae). Brill. https://www1.montpellier.inra.fr/CBGP/spmweb/notespecies.php?id=30

[66] https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/ba/memos/2004/plant/ll_finalb.pdf Zhang, Z. Q., Hong, X. Y., Fan, Q. H., & Xin, J. (2010). Xin Jie-Liu Centenary: Progress in Chinese Acarology. Magnolia Press.

Popillia mutans	Scarab beetle	**Lychee**, longan, pineapple	Leaves, flowers, fruit, roots (pineapple)	Infested soil and plant material. Adults are capable of flight	Asia	LOW Lychee	MEDIUM Lychee	MEDIUM Lychee	LOW Lychee	VERY LOW Lychee
Cnesteboda celligera[67]	Leaf roller	**Lychee**, mango, rambutan, lac tree	Leaf		Asia (Taiwan, Hong Kong, Sri Lanka)	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN
Cratopus humeralis[68]	No common name	Citrus, lychee	Leaves, flowers, fruit, roots		Island of Reunion	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN
Dolichothrips indicus[69]	No common name	Lychee	Flowers		Asia (India)	MEDIUM	UNKNOWN	UNKNOWN	LOW	UNKNOWN
Eccopsis praecedens (Syn. Olethreutes praecedens)[70]	Leaf roller	Lychee	Leaves, flowers, fruit		Asia (China, India)	LOW	LOW	UNKNOWN	LOW	UNKNOWN
Indarbela tetraonis (Syn. *Arbela tetraonis*)	Bark borer	Lychee, cashew nut, citrus, jackfruit, guava	Trunk, branches		Asia (Bangladesh, India)	LOW	UNKNOWN	UNKNOWN	LOW-MEDIUM	UNKNOWN
Rapala varuna orseis	Indigo flash	Lychee, rambutan, red ash, loquats	Flowers, leaves		Asia (Bangladesh)	LOW	LOW	LOW	UNKNOWN	UNKNOWN
Statherotis leucaspis (Syn: Olethreutes leucaspis)	Litchi Leaf roller	Lychee, longan	Leaves		Asia (China, India)	LOW	UNKNOWN	UNKNOWN	LOW - MEDIUM	UNKNOWN

[67] https://www.gbif.org/species/1743998

[68] Waite, G. K., & Hwang, J. S. (2002). Pests of litchi and longan. Tropical fruit pests and pollinators: biology economic importance, natural enemies and control. Wallingford: CABI, 331-359. Quilici, S., & Langlois, A. (1993). Bioecological survey of weevils damaging fruit crops in Reunion Island. IOBC/WPRS Bulletin, 16(7), 30-40.

[69] Menzel, C. M., & Waite, G. K. (2005). Litchi and longan: botany, production and uses. Cabi Publishing.

[70] Peña, J. E., Sharp, J. L., & Wysoki, M. (Eds.). (2002). Tropical fruit pests and pollinators: biology, economic importance, natural enemies, and control. CABI.

Zeuzera coffeae (Syn. *Zeuzera roricyanea*) & *Z. reticulata*[71]	Coffee carpenter	Polyphagous; **Lychee**, longan, grape, walnut, tea, coffee, cotton, apple, cassava, avocado, citrus, okra, breadfruit trees, hickories, cinnamon, leucaena, teak, mahogany, grapevine, cocoa	Stems, branches		Asia (Bangladesh, China, India, Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam) Oceania (Papua New Guinea)	LOW Lychee	UNKNOWN Lychee	UNKNOWN Lychee	LOW Lychee	UNKNOWN Lychee
Comoritis albicapilla (Syn. *Comocritus albicapilla*)[72]	No common name	Lychee	Trunk		Asia (China)	LOW	LOW	LOW	LOW - MEDIUM	NEGLIGIBLE
Anastrepha serpentina	Sapodilla fruit fly; Sapote fruit fly	Cherimoya, pond apple, wild cherry, Citrus (sour orange, pummelo, mandarin, navel orange, grapefruit), quince, sapote, loquat, apple, mango, sapodilla, avocado, peach, guava, mombin **passionfruit**, cherry, European pear	Fruit	Infested plant material (including fruit), soil and machinery. Adults capable of flight over long distances. Pupariation is in the soil	North America (Belize, Costa Rica, Guatemala, Honduras, Mexico, Netherlands Antilles, Panama, Trinidad and Tobago, United States) South America (Argentina, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela)	NEGLIGIBLE Passionfruit	NEGLIGIBLE Passionfruit	NEGLIGIBLE Passionfruit	NEGLIGIBLE Passionfruit	NEGLIGIBLE Passionfruit
Amorbia emigratella	Mexican leafroller	Polyphagous including avocado, broccoli, cocoa, Citrus spp., cotton, eggplant, green beans, guava, macadamia, orchids, **papaya, passionfruit**, potato, rose, sweetpotato, tomato, pineapple, other ornamentals, shrubs, fruit trees and indigenous plants in the mountains, corn, blackberry, peanut, gorse	Leaves, fruit, flowers, shoots	Infested soil and plant material. Adults are capable of flight	North America (Costa Rica, Hawaii, Mexico, USA)	LOW Papaya Passionfruit	LOW Papaya Passionfruit	MEDIUM Papaya Passionfruit	LOW Papaya Passionfruit	NEGLIGIBLE Papaya Passionfruit
Adoretus sinicus	Chinese rose beetle	Polyphagous: *Acalypha* (Copperleaf), *Alocasia*, *Cajanus cajan* (pigeon pea), Canna, *Glycine max* (soyabean), *Hibiscus tiliaceus* (coast cottonwood), **lychee**, *Rosa* (roses), *Theobroma cacao* (cocoa), *Vitis vinifera* (grapevine)	Leaves	Infested plant material and machinery, adults capable of flight, eggs are soilborne	Asia (China, India, Indonesia, Republic of Korea, Malaysia, Singapore, Taiwan, Thailand, Vietnam) North America (USA) Oceania (Federated states of Micronesia, Hawaii, Guam, Northern Mariana Islands, Palau)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

[71] This pest could be a threat, but only if infested plant material is brought into the country. As Australia does not import coffee plants the threat should be minimal.
Can cause significant damage to coffee. Control measures are limited from overseas experience. Chemicals used previously are no longer available in Australia. Biologicals are yet to be fully proven effective. Larvae tunnel through coffee branches, nominally in the upper part of the trees. Branches and the top part of the main stem easily break off but the tree usually survives (Winston et al., 2005 and Kuit et al., 2004).

[72] Waite, G. K., & Hwang, J. S. (2002). Pests of litchi and longan. Tropical fruit pests and pollinators: biology economic importance, natural enemies and control. Wallingford: CABI, 331-359.

Acicnemis crassiusculus	Weevil	Papaya	Foliage		Oceania (Fiji, French Polynesia, Tonga, Vanuatu)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Anisocelis flavolineata	Flag footed bug	Passiflora spp.	Leaves, buds, fruit		North America (Costa Rica, Panama)	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
Anisocelis foliacea	Passion vine leaf footed bug[73]	Passiflora spp.	Leaves, buds, fruit		South America (Suriname)	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
Bemisia tabaci (MED) [(Syn. Bemisia tabaci biotype Q, Bemisia tabaci Q, Mediterranean (MED) species (Bemisia tabaci)]	Silverleaf whitefly	Okra, maples, cauliflower, cruciferous crops, Capsicum (bell pepper), **papaya,** pumpkin, Bourbon cotton, lettuce, cassava, **Passifloraceae**, Rosaceace, tomato, eggplant	Leaves, stems, whole plant (early senescence)		Africa (South Africa) Asia (China, Israel, Japan, South Korea, Turkey) Europe (Finland, Greece, Italy, Sweden, United Kingdom) North America (Bermuda, Canada, Costa Rica, Guatemala, Mexico, United States) South America (Argentina, Brazil, Uruguay)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Gymnoscelis imparatalis	Leaf-eating caterpillar	**Lychee**, longan, cinnamon, shaddock, mango, rambutan, pinwheel flower	Leaves, flowers		Asia (Thailand)	LOW	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Neosilba pendula	Cassava shoot fly	**Passionfruit**, Citrus, cassava, coffee, jatropha	Flowers, buds		North America (Haiti, Mexico, Trinidad and Tobago) South America (Brazil, Venezuela)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Odonna passiflorae	No common name	**Passionfruit** (*Passioflora* spp.)	Stem		South America (Colombia)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Pingasa ruginaria	Flower eating caterpillar	**Lychee**, longan, cashew, cinnamon	Leaves, flowers		Asia (Malaya)	LOW	LOW	LOW	UNKNOWN	UNKNOWN
Remelana jangala[74]	Chocolate royal	Coffee**, lychee**, durian, *Cleistocalyx operculata* and *Kandelia candel,* larvae are also found feeding on flower buds of *Eurya jarponica*	Fruit	Infested plant material. Adults are capable of flight	Asia (Hong Kong, Indonesia, Malaysia, India, Thailand, Malaysia, Philippines, Singapore, China, Bhutan)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

[73] Brathwaite, C. W., Marte, R., & Porsche, E. (1985). Pests and diseases as constraints in the production and marketing of fruits in the Caribbean (No. IICA-PRRET A2/TT No. 86-001). IICA, Port of Spain (Trinidad and Tobago).

[74] https://www.gbif.org/species/1924458/metrics There are many subspecies with varying distributions in India. Candidate for natural dispersal from the North.

Sphecosesia litchivora	No common name	**Lychee**, longan	Leaves		Asia (China)	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN
Spodoptera cosmioides	Armyworm	***Passiflora edulis***, soybean, cotton, wheat, rice, corn.	Leaves, flowers, fruits		South America (Brazil)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Attacus atlas	Atlas moth	**Lychee, papaya**, mango, avocado, guava, water apple, citrus, soursop, sugar apple, jackfruit, tea, camphor, cinnamon, coffee, turmeric, cardamon, pepper, castor bean, big leaved mahogany, cocoa, carambola, cinchona	Leaves	Flight, machinery and infested plant material.	Asia (Bangladesh, Brunei Darussalam, Cambodia, China, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Singapore, Taiwan, Thailand, Vietnam)	MEDIUM Lychee UNKNOWN Papaya	HIGH Lychee UNKNOWN Papaya	HIGH Lychee UNKNOWN Papaya	UNKNOWN Lychee, Papaya	UNKNOWN Lychee, Papaya
Adoretus compressus	Rose beetle	Polyphagous including oil palm, sugarcane, sorghum, cocoa, maize, rice, banana, **lychee**, okra, rambutan, cotton, sweetpotato, coffee, tea, rose, grape	Leaves	Infested plant material, contaminated soil and tools/machinery and hitchhiking. Adults capable of flight. Eggs are soilborne.	Asia (Malaysia, India, Indonesia, Singapore, Sri Lanka, Thailand, Vietnam, Brunei) Africa (Mauritius, South Africa) Oceania (Hawaii, Papua New Guinea)	UNKNOWN Lychee	UNKNOWN Lychee	UNKNOWN Lychee	UNKNOWN Lychee	UNKNOWN Lychee
Parasa lepida (Syn. *Latoia lepida; Limacodes graciosa; Neaera media; Noctua lepida; Nyssia latitascia; Parasa lepida lepidula*)	Nettle caterpillar, blue striped nettle bug	Polyphagous: tea, citrus, coconut, coffee, **lychee**, mango, cassava, banana, poplar, winged bean, cocoa, coffee, capsicum, rubber, pineapple, gardenia, *Eugenia* spp., palm, *Cassia* spp., citrus, *Gliricidia* spp., *Nephelium* spp., *Rosa* spp., rice, cocoa, pea, cotton	Leaves, fruit	Infested plant material and machinery, adults capable of flight.	Asia (Bangladesh, Cambodia, China, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam)	MEDIUM Lychee	HIGH Lychee	HIGH Lychee	UNKNOWN Lychee	UNKNOWN Lychee
Adoxophyes cyrtosema	Citrus brown banded tortrix	Polyphagous: Lychee, Citrus, Dimocarpus longan, groundnut, Juglans, Clerodendrum, Morus alba, tea	Leaves	Plant material, adults are capable of flight	Asia (China), Oceania (Tonga, New Hebrides, New Guinea)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW

Bagrada hilaris[75]	Bagrada bug ; Painted stink bug	Broccoli, cabbage, mustard, cauliflower, kale, turnip, radish, canola, swede, bok choy, Chinese cabbage, purple-vein rocket, black gram, maize, sorghum, potato, cotton, sunflower, papaya, pea, wheat, bean, shepherds' purse and others	Whole plant, above ground		Africa (Angola, Botswana, Cape Verde, Congo, Democratic Republic of the, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Senegal, Seychelles, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe) Asia (Afghanistan, India, Iran, Iraq, Myanmar, Nepal, Pakistan, Sri Lanka, Yemen) Europe (Italy, Malta) North America (Mexico, United States) South America (Chile)	MEDIUM	MEDIUM	MEDIUM	LOW	VERY LOW
Carpophilus obsoletus	Corn sap beetle	Lychee, onion, date-palm, dried stored products, cocoa, maize	Post-harvest		Asia (Indonesia, Malaysia) North America (USA) Central America and Caribbean (Saint Lucia, Trinidad and Tobago)	HIGH	MEDIUM	MEDIUM	LOW	VERY LOW
Ceroplastes cirripediformis[76]	Barnacle scale, barnacle wax scale	Polyphagous: Sweetpotato, Citrus, arabica coffee, cassava, Indian tamarind, *Chrysophyllum cainito* (caimito), grape, passionfruit, avocado, guava, mango, soursop, oleander, grapevine	Stems and leaves	Infested plant material.	North America (Antigua and Barbuda, Barbados, Bermuda, Dominica, Grenada, Guadeloupe, Jamaica, Martinique, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States) South America (Argentina, Brazil, Bolivia, Chile, Greece, Indonesia, Italy, Peru, Philippines)	LOW	HIGH	HIGH	LOW	VERY LOW
Corythucha gossypii	Cotton lacebug; bean lacebug	Polyphagous including okra, peanut, pigeon pea, bell pepper, papaya, cassava, banana, beans, castor bean, sugarcane, eggplant, sweetpotato, soursop, *Tannia*, capsicum, tomato, eggplant, cotton, pumpkin, giant passionfruit, taro, pumpkin, Breadfruit, soursop and sweet potato	Leaves	Infested plant material and machinery, adults capable of flight.	North America (Antigua and Barbuda, Barbados, Belize, Caribbean, Costa Rica, El Salvador, Cuba, Dominica, Dominican Republic, Guadeloupe, Guatemala, Haiti, Honduras, Nicaragua, Panama, Jamaica, Martinique, Montserrat, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, USA) South America (Colombia, Venezuela)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW

[75] LeVeen, E., & Hodges, A. C. (2014). Bagrada bug, painted bug, Bagrada hilaris Burmeister (Insecta: Hemiptera: Pentatomidae). Department of Entomology and Nematology, UF/IFAS Extension. Available in: http://edis. ifas. ufl. edu.(Sin fecha de consulta).
Native to Africa, also present in southern Asia and Europe and recently (2008) introduced into the United States (Le Veen and Hodges 2014)
Spread with infested material. Reported to be found on trucks travelling between states in the United States (Le Veen and Hodges 2014)

[76] http://scalenet.info/catalogue/Ceroplastes%20cirripediformis/

Cratopus angustatus (Syn. *Cratopus bunnipes*)[77]	No common name	Citrus, lychee	Leaves, flowers, fruit, roots		Island of Reunion	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Crocidosema litchivora	Litchi moth	Lychee	Flowers		North America (United States)	LOW	LOW	LOW	MEDIUM	VERY LOW
Darna diducta	Nettle caterpillar	Annona spp. (soursop, sugar apple), sugar plum, tea, papaya, coconut, banana, cocoa	Leaves		Asia (Indonesia, Malaysia, Philippines, Thailand)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Dasiops inedulis	Passion fruit flower bud fly	Passionfruit	Flowers, Buds		South America (Colombia)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Dryadula phaetusa[78]	Banded orange heliconian	Passiflora spp.	Leaves		North America (Costa Rica, Panama) South America (Brazil)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Elytrurus griseus[79]	Weevil	Papaya, Hibiscus, *Citrus* spp.	Leaves, young stem		Oceania (Fiji)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Empoasca fabalis[80]	Leafhopper	Pigeon pea, sweetpotato, beans, Ipomoea spp., Japanese honeysuckle, morning glory, white clover, cotton, maize, **papaya**, bean, beet, carrot, cowpea, melon, malojillo, potato, tomato	Leaves	Infested plant material. Adults are capable of flight.	North America (Barbados, Haiti, Puerto Rico, USA) South America (Argentina, Brazil, Colombia, Peru)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW

[77] Waite, G. K., & Hwang, J. S. (2002). Pests of litchi and longan. Tropical fruit pests and pollinators: biology economic importance, natural enemies and control. Wallingford: CABI, 331-359.
Quilici, S., & Langlois, A. (1993). Bioecological survey of weevils damaging fruit crops in Reunion Island. IOBC/WPRS Bulletin, 16(7), 30-40.

[78] León-Cortés, J. L., Caballero, U., & Almaraz-Almaraz, M. E. (2015). Diversity and eco-geographical distribution of insects. In Biodiversity and Conservation of the Yucatán Peninsula (pp. 197-226). Springer, Cham.

[79] http://www.padil.gov.au/maf-border/pest/host%20family-maf-border/142444

[80] https://www.discoverlife.org/20/q
http://dmitriev.speciesfile.org/taxahelp.asp?hc=19748&key=Erythroneura&lng=En

Empoasca solana[81]	Southern garden leafhopper	Sweetpotato, beans, banana, beet, blackeye bean, celery, cowpea, cucumber, eggplant, garden bean, green bean, lettuce, lima beans, melon**,** **papaya**, peanut, potato, summer squash, Swiss chard, tomato, watermelon. Yellow cosmos and other ornamental plants. Several weeds, such as amaranth, castor bean, and Datura, are reservoir hosts of this pest.	Leaves	Infested plant material. Adults are capable of flight.	Widespread throughout North America (Barbados, Haiti, United States), Central and South America, Europe, Asia and South Africa	LOW	HIGH	HIGH	LOW	VERY LOW
Epicauta atomaria	No common name	Passionfruit	Leaves		South America (Brazil)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Erinnyis alope	Papaya hornworm	Papaya, cassava	Leaves		Europe (Austria, Netherlands, Portugal, United Kingdom)	LOW	HIGH	HIGH	LOW	VERY LOW
Erinnyis ello	Cassava hornworm	Papaya, rubber, cassava, sesame, guava	Leaves		North America (Antigua and Barbuda, Bahamas, Barbados, Belize, British Virgin Islands, Canada, Cayman Islands, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, U.S. Virgin Islands, United States) Oceania (Papua New Guinea) South America (Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela)	LOW	HIGH	HIGH	LOW	VERY LOW
Euryscopa cingulata	No common name	Passiflora spp.	Leaves		North America (Panama)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Hexaleurodicus spp.	No common name	Passionfruit	Leaves, stems		South America (Colombia)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW

[81] http://www.extento.hawaii.edu/kbase/crop/Type/e_solana.htm

Holhymenia clavigera	No common name	Passiflora spp., guava	Stems, leaves, fruit, buds		South America (Brazil)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Holhymenia histrio	No common name	Passiflora spp.	Stems, leaves, fruit, buds		South America (Brazil)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Hypomeces pulviger	Green weevil, Gold dust weevil	Polyphagous: Acacia auriculiformis (northern black wattle), Acacia mangium (brown salwood), Artocarpus heterophyllus (jackfruit), Azadirachta excelsa, Azadirachta indica (neem tree), Bauhinia (camel's foot), Bombax ceiba (silk cotton tree), Cassia fistula (Indian laburnum), Casuarina equisetifolia (casuarina), Ceiba pentandra (kapok), Citrus, Corymbia torelliana (cadaga), Eucalyptus camaldulensis (red gum), Eucalyptus grandis (saligna gum), Eugenia, Falcataria moluccana (batai wood), Flindersia brayleana, Gossypium (cotton), Helianthus annuus (sunflower), Hevea brasiliensis (rubber), Hibiscus (rosemallows), Ipomoea batatas (sweet potato), Ipomoea purpurea (tall morning glory), Lagerstroemia speciosa (Pride of India), Mangifera indica (mango), Manilkara zapota (sapodilla), Morus alba (mora), Neolamarckia cadamba (common bur-flower tree), Neolamarckia cadamba (common bur-flower tree), Nephelium lappaceum (rambutan), Nicotiana tabacum (tobacco), Oryza sativa (rice), Palaquium gutta (gutta percha tree), Persea americana (avocado), Persea bombycina, Pterocarpus indicus (red sandalwood), Saccharum officinarum (sugarcane), Tectona grandis (teak), Theobroma cacao (cocoa), Vernicia montana (Chinese wood oil tree), Vigna unguiculata (cowpea), Zea mays (maize)	Above ground		Asia (Brunei Darussalam, Cambodia, China, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Taiwan, Thailand, Vietnam), Timor Leste	MEDIUM	MEDIUM	MEDIUM	LOW	VERY LOW

Icerya samaraia	Steatococcus scale	**Papaya**, Acacia, soursop, pigeon pea, *Citrus* spp., coconut, coffee, taro, mango, banana, guava, Rosa (roses), cocoa	Leaves, fruit	Plant materials, adults are usually stationary or completely immobile on the host plant; Hitchhiker; Seedlings, Micro propagated plants	Asia (Indonesia) Oceania (Federated states of Micronesia, Guam, New Caledonia, Northern Mariana Islands, Palau, Papua New Guinea, Solomon Islands)	LOW	LOW	LOW	MEDIUM	VERY LOW
Kerria lacca	Lac insect	Polyphagous; **Lychee**, longan, mango, northern black wattle, gum arabic tree, white siris, sickle bush, jujube, pigeon pea, sacred fig tree, golden champa, macassar oil tree	Leaves		Asia (Bangladesh, China, Indonesia, Taiwan)	LOW	LOW	LOW	MEDIUM	VERY LOW
Langsdorfia spp.	No common name	Passionfruit	Stems		South America (Colombia)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Lonchaea cristula	No common name	Passionfruit	Flower bud		Europe (Spain) South America (Colombia)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Lymantria xylina (Syn. *Lymantria nigricosta*)	Casuarina moth	Polyphagous; **Lychee**, longan, camellia, casuarina, guava, castor bean, weeping willow, sweet potato, turf grasses	Leaves		Asia (Taiwan)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Maladera insanabilis (Syn. *Maladera matrida*)[82]	White grub	Sweetpotato, apple, pear, peach, loquat, guava, persimmon, cherimoya (Annona cherimola), groundnut**, papaya**, grapefruit, lemon, pomegranate and **lychee**	Leaves, flowers, roots	Infested plant material, contaminated soil, machinery and tools. Adults capable of flight. Eggs are soilborne.	Asia (Israel, Middle East)	LOW Lychee, Papaya	MEDIUM Lychee, Papaya	MEDIUM Lychee, Papaya	LOW Lychee, Papaya	VERY LOW Lychee, Papaya
Megymenum brevicorne	Shield bug	Polyphagous; Giant granadilla, lime, cucumber, giant pumpkin, cassava, bitter gourd, malabar spinach, eggplant, bitter gourd	Fruit, stems, leaves, growing point		Asia (China, India, Indonesia, Laos, Malaysia, Myanmar, Singapore, Sri Lanka, Thailand, Vietnam)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW

[82] Adults feed on leaves, buds and flowers, larvae feed on the roots

Orgyia turbata (Syn. *Notolophus turbatus*)	Tussock moth	Polyphagous: **Lychee**, groundnut, coconut, durian, tobacco, cocoa, cowpea	Leaves		Asia (Malaysia, Myanmar, Thailand, Vietnam)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Orothalassodes falsaria (Syn: Thalassodes falsaria)	Leaf-eating looper	**Lychee**, longan, mango, rambutan, shaddock, langsat, lac tree, citrus (pomelo), ceylon oak	Leaves, flowers		Asia (India, Thailand)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Oryctes rhinoceros (Syn. *Oryctes stentor; Scarabaeus rhinoceros*)	Coconut rhinoceros beetle; Asiatic rhinoceros beetle; black beetle; coconut black beetle; coconut palm rhinoceros beetle; date palm beetle; dung beetle; rhinoceros beetle; scarab beetle	Coconut, pineapple, palms (including oil palm, date palm, sago palm), taro, sugarcane, lantana, plantain, banana, **papaya**, pine	Leaves	Infested plant material and machinery, adults capable of flight.	Africa (Mauritius, Réunion)Asia (Bangladesh, British Indian Ocean Territory, Brunei, Cambodia, China, Cocos Islands, Hong Kong, India, Indonesia, Iran, Japan, Laos, Malaysia, Maldives, Myanmar, Oman, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam, Yemen)North America (United States)Oceania [American Samoa, Federated States of Micronesia, Fiji, Guam, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, (Wallis and Futuna), Vanuatu]	MEDIUM	MEDIUM	MEDIUM	LOW	VERY LOW
Oxycetonia jucunda	Flower chafer	**Lychee**, longan, citrus, apple, pear, *Camellia oleifera* (Oil seed camellia or tea oil camellia)	Fruit, flowers		China	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Peridroma saucia[83]	Pearly underwing moth; variegated cutworm	**Passionfruit**, firs, maples, onion, celery, peanut, asparagus, oats, beetroot, sugarbeet, canola, black mustard, cabbages, cauliflowers, turnip rape, bell pepper, quinoa, daisy, chickpea, chicory, thistle, watermelon, lemon, navel orange, melon, cucumber, pumpkin, globe artichoke, carrot, carnation, strawberry, cotton, sunflower, barley, hop, sweet potato, lettuce, sweet pea, flax, rye grasses, apple, lucerne, honey clover, Peppermint, Spear mint, tobacco, avocado, lima bean, common bean, white spruce, pea, poplars, stone fruit, apricot, sour cherry, plum, peach, Japanese plum, European pear, radish, rhubarb, gooseberry, roses, blackberry, raspberry, common sage, rye, white mustard, tomato, potato	Fruit, Growing point, Inflorescence, leaves, seeds, stems, whole plant	Flight. Migratory flight - Adults capable of flight	Africa (Burundi, Democratic Republic of the Congo, Republic of the Congo, Côte d'Ivoire, Ghana, Kenya, Malawi, Mauritius, Nigeria, Rwanda, Sierra Leone, Sudan, Tanzania, Togo, Uganda, Zimbabwe)	LOW Passionfruit	LOW Passionfruit	LOW Passionfruit	MEDIUM Passionfruit	VERY LOW Passionfruit

[83] Occurs in Europe, northern Africa, Middle east, North and South America and parts of Asia (including China, Korea, Japan, Sri Lanka and India) (CABI 2015g) Defoliator

Phaedon brassicae	Daikon leaf beetle, Brassica leaf beetle	Polyphagous. **Lychee**	Leaves		Asia (China, Japan, Republic of Korea, Taiwan, Vietnam, Italy)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Philaethria dido	Dido longwing	***Passiflora* spp.**	Leaves		South America (Neotropic region including Brazil, Colombia, Guyana, Honduras, Venezuela, Panama)	LOW	LOW	LOW	MEDIUM	VERY LOW
Pseudoparlatoria ostreata	Acalypha scale	**Papaya**, agave, banana, *passiflora laurifolia*, pepper, Vitis; avocado	Leaves, stem	Infested plant material and machinery.	Africa (Democratic Republic of the Congo) Europe (United Kingdom) North America (Cuba)	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Salagena sp.	Bark borer	**Lychee**	Branches		Asia (India, Philippines, Taiwan, Thailand) South Africa	LOW	LOW	LOW	MEDIUM	VERY LOW
Trichaltica bogotana	No common name	**Passionfruit** (*Passiflora spp*.)	Leaf		South America (Colombia, Panama)	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
Popillia quadriguttata (Syn. *Trichius biguttatus* Fabricius; *Popillia bogdanowi* Ballion, *Popillia castanoptera* Hope, *Popillia chinensis* Frivaldszky, *Popillia dichroa* Blanchard, *Popillia frivaldszkyi* Kraatz, *Popillia purpurarescens* Kraatz, *Popillia ruficollis* Kraatz, *Popillia sordida* Kraatz, *Popillia straminipennis* Kraatz, *Popillia uchidai* Niijima and Kinoshita)	Scarab beetle	Polyphagous; **Lychee**, longan, peach, pear, corn, Asian hazel, soybean, bush clover, paradise apple, Sargent cherry, Asian raspberry, lyre leaf nightshade, grass	Leaves, flowers, fruit		Asia (Vietnam, China, Taiwan, Korea) Europe (Russia)	LOW	MEDIUM	MEDIUM	LOW - MEDIUM	VERY LOW - LOW
Protaetia nitididorsis (Syn. *Cetonia esquiroli* Pouillaude; *Liocola nitididorsis* Fairmaire; *Liocola speculifera* Schwartz)	Scarab beetle; Chafer; flower beetle; metallic beetle	**Lychee**, longan	Fruit		Asia (China)	LOW	MEDIUM	MEDIUM	LOW - MEDIUM	VERY LOW - LOW

Lepidiota stigma	Sugarcane white grub	Broad host range including **lychee**, watermelon, coffee, cassava, grasses, sugarcane, maize, pineapple, agave and rubber	Below ground, seedlings Roots (Pineapple)	Infested soil and plant material. Adults are capable of flight	Widespread throughout Southeast Asia (China, India, Indonesia, Japan, Malaysia, Singapore, Thailand)	MEDIUM Lychee)	MEDIUM Lychee	MEDIUM Lychee	LOW lychee	VERY LOW Lychee
Orgyia postica[84] (Syn. *Lacida postica; Notolophus australis; Notolophus postica; Notolophus posticus; Orgyia australis postica; Orgyia ceylanica; Orgyia ocularis; Orgyia posticus*)	Cocoa tussock moth	Polyphagous: **Lychee**, acerola, mango, rambutan, orchids, poplar, pear, castor bean, roses, black plum, cocoa, mung bean, grapes, common jujube, durian, eucalyptus, mangosteen, table grapes, tea, coffee, soybean, Orchidaeceae, black plum, lilium	Leaves, flower buds		Asia (Bangladesh, Brunei Darussalam, China, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Sri Lanka, Taiwan, Thailand, Vietnam) Oceania (Papua New Guinea)	LOW Lychee	MEDIUM Lychee	MEDIUM Lychee	LOW Lychee	VERY LOW Lychee
Anomala cuprea	Cupreous chafer, Oriental beetle, Japanese scarab	Polyphagous: **Lychee**, beans, groundnut, sweetpotato, grape, soybean, sugarcane, peanuts, strawberry	Above ground Sweetpotato: leaves, roots	Infested plant material, contaminated soil, tools and machinery. Eggs are soilborne.	Asia (Japan, Republic of Korea)	MEDIUM	MEDIUM	MEDIUM	LOW	VERY LOW
Adoxophyes orana	Apple peel tortricid (Syn. Summer fruit tortrix; Smaller tea tortrix, reticulated tortrix)	Highly polyphagous: Apple, European pear, apricot, quince, blackcurrant, raspberry, peach, roses, short staple cotton, hop, Medicago spp., sweet cherry, sour cherry, plum, bird cherry, red currant, gooseberry, blackberry, raspberry, lilac, blueberries, hazelnut, peanut, soybean, chestnut, oak, upland cotton, sour cherry, citrus, **lychee**, tea, willow, maple, birches, staple cotton, hop, gooseberry, lilac, blueberries	Whole plant leaves, growing points, flowers, and fruits.	Plant material; adults capable of flight (Cherry)	Asia (Armenia, Azerbaijan, China, Georgia (Republic of), Japan, Republic of Korea), Europe (Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Netherlands, Norway, Poland, Romania, Russian Federation, Serbia, Slovenia, Spain, Sweden, Switzerland, UK, Ukraine)	MEDIUM	MEDIUM	MEDIUM	LOW	VERY LOW
Aleurodicus dugesii	Giant whitefly	Wattles, bamboo, camel's foot, Citrus, navel orange, papyrus, Eucalyptus, Euphorbia, Ficus, Bourbon cotton, ivy, rosemallows, cottonrose, banana, orchids, Passiflora (passionflower), avocado, frangipani, castor bean, willows, ivy, Solanum (nightshade), ginger, liquidamber, and many other ornamentals, apricot, apple, pear, cinnamon, guava, coconut, **passionfruit**, geranium, boxwood	Leaves	Wind dispersal Infested plant material and machinery, adults capable of flight.	Asia (Indonesia, Pakistan) North America (Belize, Costa Rica, El Salvador, Guatemala, Mexico, Nicaragua, United States) South America (Venezuela) **Canary Islands, Hawaii**	HIGH	HIGH	HIGH	UNKNOWN	UNKNOWN

[84] This species currently occurs from Japan to southern China (Nasu et al. 2004, Zhu and Zhang 2004). It established in areas with a wide range of climatic conditions and therefore has the potential to establish and spread in Australia.

Nematodes										
Aorolaimus helicus		Lychee	Roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Aphelenchus maximus		Lychee, mango	Roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Aphelenchus sparsus		Lychee	Roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Clavilenchus similis		Lychee	Roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Criconema hlagum	Spine nematode	Lychee	Roots		South Africa	LOW	LOW	LOW	LOW	NEGLIGIBLE
Criconemoides complexus	Ring nematode	Lychee, pineapple, mango	Roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Helicotylenchus microcephalus	Spiral nematode	Lychee, Orchidae	Roots		India, South Africa	LOW	LOW	LOW	LOW	NEGLIGIBLE
Hemicriconemoides litchi		Lychee, Mango	roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Hemicycliophora typica	Sheath nematode	Lychee, sugarbeet, carrot, apple, applewood, crabapple, rice, kikuyu grass, potato, wheat	Roots		South Africa, Netherlands	LOW	LOW	LOW	LOW	NEGLIGIBLE
Hoplolaimus pararobustus	Lance nematode	Papaya, banana, oil palm, cotton, citrus, coffee, cowpea, grapevine, guava, mango, rice, plantain, pineapple, roses, sorghum, sugarcane, tea, wheat	Root		Africa (Angola, Burkina Faso, Cameroon, Congo, Democratic Republic of the, Côte d'Ivoire, Egypt, Gambia, Guinea, Kenya, Madagascar, Malawi, Mozambique, Namibia, Niger, Nigeria, Réunion, Rwanda, São Tomé and Príncipe, Senegal, South Africa, Tanzania, Togo, Uganda, Zimbabwe) Asia (China, Pakistan, Sri Lanka) North America (Dominica, Grenada, Saint Lucia, Saint Vincent and the Grenadines)	LOW	HIGH	MEDIUM	MEDIUM	LOW
Longidorus litchii	Needle nematode	Lychee	Roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Meloidogyne enterolobii (Syn. *Meloidogyne mayaguensis*)	Pacara earpod tree root-knot nematode	Papaya, coffee, herbaceous and woody plants. Principal hosts are: coffee, mango, pineapple, cashew, cucurbits, peanut, broccoli, capsicum,	Roots		Africa (Burkina Faso, Côte d'Ivoire, Kenya, Malawi, Niger, Nigeria, Senegal, South Africa, Togo) Asia (China, India, Singapore,	HIGH (Papaya)	HIGH (Papaya)	HIGH (Papaya)	HIGH (Papaya)	HIGH (Papaya)

		papaya, carrot, Eucalyptus, *Gossypium* spp., sweetpotato, lettuce, lantana, bean, coffee, cotton, eggplant, guava, pepper, potato, soybean, tobacco, tomato, ginger, watermelon[14]			Thailand, Vietnam) Europe (Switzerland) North America (Costa Rica, Cuba, Guadeloupe, Guatemala, Martinique, Mexico, Puerto Rico, Trinidad and Tobago, USA) South America (Brazil, Venezuela)					
Ogma decalineatum	Ogma	Lychee	Roots		South Africa	LOW	LOW	LOW	LOW	NEGLIGIBLE
Scutellonema clathricaudatum		Okra, onion, peanut, cabbages, cauliflowers, pigeon pea, papaya, lemon, melon, cucumber, carrot, yam, strawberry, Bourbon cotton, lettuce, cassava, banana, tobacco, rice, pearl millet, pepper, tomato, eggplant, potato, wheat, mung bean, cowpea, grapevine, maize	Leaves, roots		Africa (Benin, Burkina Faso, Cameroon, Central African Republic, Congo, Democratic Republic of the, Congo, Republic of the, Côte d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Malawi, Mali, Mozambique, Niger, Nigeria, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda) Asia (China, India, Thailand) North America (Cuba)	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW
Scutylenchus quadrifer		Lychee	Roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Trichodorus monhystera	Stubby root nematode	Lychee	Roots		China	LOW	LOW	LOW	LOW	NEGLIGIBLE
*Tylenchorhynchus nudus (*Syn. *Tessellus claytoni)*	Stunt nematode	Lychee, kentucky bluegrass, bush honeysuckle, red clover, sorghum, creeping bentgrass, chickpea,	Roots		USA	LOW	LOW	LOW	LOW	NEGLIGIBLE

Pathogens

Table 17. Tropical Fruit pathogen threat summary table.

Scientific name	Common name	Primary hosts	Affected plant part	Movement & dispersal	Geographic range	Entry potential	Est. potential	Spread potential	Economic impact	Overall risk
Phytophthora litchii (Syn. Peronophythora litchii)[85]	Brown blight; downy blossom blight of litchi	**Lychee**, Longan	Fruit, flowers, leaves		Asia (China, Taiwan, Thailand, Vietnam) Oceania (Papua New Guinea) Europe (Netherlands)	HIGH	HIGH	HIGH	HIGH	HIGH
Pseudomonas syringae exotic strains[86]	Bacterial canker of stone fruit, bacterial canker of trees	Broad host range over 50 hosts including sweet cherry, sour cherry, onion, capsicum, leek, lucerne, rice, chrysanthemum, citrus, cucumber, pumpkin, garden dahlia, hibiscus, walnut, lettuce, magnolia, mango, **passionfruit**, bean, avocado, stone	Whole plant Leaves, inflorescence, stems, pods, seeds, flowers, fruit	Infected plant material, wind, insect vector, mechanical, plant stress	**global if not splitting endemic and exotic**	HIGH	HIGH	HIGH	HIGH[56]	HIGH

[85] Present based on regional distribution

[86]Infected plant material, wind-driven rain, insects, use of infected budwood or nursery stock, contaminated pruning tools, aerosols in plant debris, sap and water movement when weeds or crops are cut (Moorman unknown). Predisposing stress factors listed were: freeze injury, wounds, nematode damage, coincident infections with plant-pathogenic fungi such as Leucostoma sp. and Nectria sp.
[56]Causes rapid death of trees in nurseries and orchards and have a significant effect on fruit production (CABI, Compendium of Stone Fruit Diseases).

		fruit, roses, tomato, maize, willows, clover, blueberry, grapevine, cowpea								
Passionfruit crinkle virus	Passionfruit crinkle virus	*Passiflora spp.*	Systemic infection		Asia (Taiwan)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Passionfruit ringspot virus	Passionfruit ringspot virus	*Passiflora spp.*	Systemic infection		Africa (Ivory coast)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Passionfruit severe leaf distortion virus	Passionfruit severe leaf distortion virus	*Passiflora spp.*	Systemic infection		South America (Brazil)	HIGH	HIGH	HIGH	HIGH	HIGH
Passionfruit Sri Lankan mottle potyvirus	Passionfruit Sri Lankan mottle potyvirus	*Passiflora spp.*	Systemic infection		Asia (Sri Lanka)	HIGH	HIGH	HIGH	HIGH	HIGH
Passionfruit vein clearing rhabdovirus	Passionfruit vein clearing rhabdovirus	*Passiflora spp.*	Leaves, fruit		South America (Brazil)	LOW	HIGH	HIGH	HIGH	MEDIUM
Passionfruit yellow mosaic virus	Passionfruit yellow mosaic virus	*Passiflora spp.*	Systemic infection		South America (Brazil)	LOW	LOW	LOW	LOW	LOW
Cotton leafcurl virus complex (Begomovirus)	Cotton leaf curl Alabad virus (India/Pakistan), cotton leaf curl Bangalore virus, Cotton leaf curl Gezira virus (Africa), Cotton leaf curl Kokhran virus (India/Pakistan). Cotton leaf curl Multan virus (India/Pakistan/China), Cotton leaf curl Rajasthan virus (India), Cotton leaf curl Shahdapur virus, Papaya leaf curl virus (India/Pakistan), Tomato leaf curl	Cotton. Additional hosts include Hibiscus, Okra, tobacco, radish, tomato, French bean, chilli, **papaya** and many weeds	Leaves symptomatic , whole plant affected		Asia (Oman)	MEDIUM	HIGH	HIGH	HIGH	HIGH

	Bangalore virus (India/Pakistan), Okra enation leaf curl virus (Pakistan)									
ES	East Asian Passiflora virus	*Passiflora* spp. (including *P. edulis, P. edulis* x *P. edulis* f. *Claviceps* and *P. edulis* f. *Claviceps*).	Systemic infection		Asia (Japan)	HIGH	HIGH	HIGH	HIGH	HIGH
Enterobacter cloacae (Jordan)	Internal yellowing	Papaya	Fruit	Fruit flies, other insects	North America (USA-Hawaii)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Rickettsia spp.	Papaya bunchy top	Papaya	Leaves, stems		Africa (Sudan, Tanzania) Asia (India, Sri Lanka) North America (Antigua and Barbuda, Barbados, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Montserrat, Netherlands Antilles, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, USA) South America (Guyana, Suriname)	LOW	MEDIUM	LOW	MEDIUM	LOW
Papaya lethal yellowing virus	Papaya lethal yellowing disease	Papaya	Leaves, fruit		South America (Brazil)	LOW	MEDIUM	MEDIUM	LOW-MEDIUM	LOW
Phytophthora tropicalis[87]		Cherimoya, breadfruit, **papaya**, carnation, macadamia nut, black pepper, apricot, rosemary, sesame, eggplant, cocoa, vanilla, periwinkle, rubber, Leucoedema, cyclamen, verbena, camellia, rhododendron	Foliage, Leaves, stems, whole plant (wilting)		Asia (Taiwan, Vietnam) Europe (Germany, Italy, Netherlands, Poland, Spain) North America (Mexico, USA) Oceania (French Polynesia) South America (Brazil)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Euphorbia mosaic virus		Passionfruit, Euphorbia (wild poinsettia)	Systemic infection		North America (Costa Rica, Cuba, Mexico, Nicaragua, Puerto Rico, U.S. Virgin Islands, United States)South America (Argentina, Brazil, Venezuela)	LOW	LOW	MEDIUM	LOW	LOW

[87] This is likely to have a similar impact on the 4 other species of Phytophthora in Australia that affect carnation.

Papaya droopy necrosis virus (PDNV); Papaya apical necrosis virus (PANV)[37]		**Papaya**	Leaves		North America (USA) South America (Venezuela)	LOW	LOW	LOW	LOW	LOW
Papaya lethal yellowing virus	Papaya lethal yellowing disease	**Papaya**	Leaves, fruit		South America (Brazil)	LOW	MEDIUM	MEDIUM	LOW-MEDIUM	LOW
Passionfruit crinkle virus	Passionfruit crinkle virus	***Passiflora spp***.	Systemic infection		Asia (Taiwan)	LOW	MEDIUM	MEDIUM	LOW-MEDIUM	LOW
Passionfruit ringspot virus	Passionfruit ringspot virus	***Passiflora spp.***	Systemic infection		Africa (Ivory coast)	LOW	MEDIUM	MEDIUM	LOW-MEDIUM	LOW
Passionfruit yellow mosaic virus	Passionfruit yellow mosaic virus	***Passiflora spp***.	Systemic infection		South America (Brazil)	LOW	LOW	LOW	LOW	LOW
Moroccan watermelon mosaic virus		**Papaya**, marrow	Leaves		Africa (Democratic Republic of Congo, Nigeria, South Africa, Tunisia) Asia (Iran) Europe (France, Greece, Italy)	LOW	LOW	MEDIUM	LOW	LOW
Papaya leaf medium distortion mosaic virus (Potyvirus)	Papaya leaf medium distortion mosaic virus[38]	**Papaya**, oriental pickling melon, cucumber, spiked/horned melon	Leaves, fruit		North America (Mexico)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM
Papaya leaf medium distortion mosaic virus (Potyvirus)	Papaya leaf medium distortion mosaic virus	**Papaya**, oriental pickling melon, cucumber, spiked/horned melon	Leaves, fruit		North America (Mexico)	LOW	MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM
Aecidium Passifloraceae[88] *(exotic strains) (anamorph of Puccinia scleirae)*	Passionfruit rust	***Passiflora* spp**. (*P. edulis, P. glandulosa, P. cyanea, P. rubra, P. serrato-digitata, P. suberosa, P. tricuspis, P. tuberosa*)	Leaves and stems		Asia (China, Indonesia, Japan, Malaysia, Philippines, Taiwan) South America (Brazil) Central America (Panama) Oceania (Papua New Guinea)	HIGH	HIGH	HIGH	MEDIUM	MEDIUM
Candidatus Phytoplasma asteris 16SrI	Yellow disease phytoplasmas	Onion, garlic, celery, asparagus, oats, beetroot, Bougainvillea, canola, cabbages, cauliflowers, broccoli, turnip, pigeon pea, bell pepper, **papaya**, safflower, *Citrus*	Fruit, growing point, inflorescence leaves, roots,	Latent infection of propagation material - cuttings	Africa (Mozambique, South Africa, Zambia) Asia (China, India, Indonesia, Iran, Israel, Japan, Lebanon, Malaysia, Myanmar, South	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM

[88] Perhaps the strain that affects passionfruit is different from the one affecting other plants. Minor disease.

		spp., coconut, coriander, pumpkin, marrow, carrot, loquat, Eucalyptus, Euphorbia round kumquat, strawberry, soyabean, cotton, china-rose, barley, hop, lettuce, larches, lily, loofah, lupins, macadamia nut, apple, mallow, mango, cassava, lucerne, bitter gourd, Japanese mulberry, wild banana, myrtle, watercress, basil, European olive, prickly pear, common poppy, **passionfruit,** pearl millet, parsley, common bean, date-palm, black pepper, poplars, primrose, apricot, cherries, peach, nectarine, Japanese plum, European pear, common oak, radish, blackcurrant, red currant, roses, blackberry, raspberry, willows, sesame, tomato, eggplant, potato, spinach, lilac, marigold, pyrethrum, dandelion, clovers, wheat, blueberries, grapevine, maize, zinnia	stems		Korea, Taiwan, Thailand, Turkey, Pakistan) Europe (Belarus, Belgium, Czechia, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Poland, Portugal, Russia, Spain, Ukraine, United Kingdom) North America (Bermuda, Canada, Cuba, Guatemala, Mexico, Saint Vincent and the Grenadines, United States) South America (Argentina, Brazil, Colombia, Peru) Oceania (Futuna islands)					
Candidatus Phytoplasma solani 16SrXII-A	Stolbur phytoplasma	Kiwifruit, celery, beetroot, cabbages, cauliflowers, bell pepper, **papaya**, chicory, carrot, common fig, strawberry, apple, lucerne, Peppermint, tobacco, parsnip, avocado, parsley, common bean, pea, broad-leaved plantain, stone fruit, American plum, sweet cherry, plum, European pear, radish, blackberry, tomato, eggplant, black nightshade, potato, Johnson grass, dandelion, thyme, red clover, lavender, maize	Fruit, inflorescence, leaves, stems, vegetative organs, whole plant	Parasitic plants and latently infected vegetative propagation material	Africa (Niger) Asia (Armenia, Azerbaijan, China, Georgia, India, Iran, Israel, Jordan, Kyrgyzstan, Lebanon, Saudi Arabia, South Korea, Syria, Tajikistan, Turkey, Uzbekistan) Europe (Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, France, Germany, Greece, Hungary, Italy, Moldova, Montenegro, North Macedonia, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Ukraine, United Kingdom) South America (Chile)	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Erwinia papayae	Bacterial crown rot (aka papaya bacterial canker)	**Papaya**, known to survive on the leaves of cowpea, tomato and rockmelon for at least 14 days.	Leaves, fruit, stems		DAWE lists as: Anguilla; Antigua and Barbuda; Barbados; Dominica; Grenada; Guadeloupe; Indonesia; Japan; Malaysia; Martinique; Montserrat; Northern Mariana	LOW	HIGH	HIGH	HIGH	MEDIUM

					Islands; Philippines; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Tonga; Trinidad and Tobago; Venezuela, Bolivarian Republic of; and Virgin Islands, United States of America.					
Erwinia mallotivora	papaya dieback	**Papaya**, Mallotus japonicus Alternate hosts weeds; *Amaranthus viridius, Amaranthus spinosus, Syndrella nodiflora Achelpha indica and Commelina benghalensis*	Leaves, stem and flowers, whole plant	Vegetative propagative material	DAWE lists as: Anguilla; Antigua and Barbuda; Barbados; Dominica; Grenada; Guadeloupe; Indonesia; Japan; Malaysia; Martinique; Montserrat; Northern Mariana Islands; Philippines; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Tonga; Trinidad and Tobago; Venezuela, Bolivarian Republic of; and Virgin Islands, United States of America.	LOW	HIGH	HIGH	HIGH	MEDIUM
Xanthomonas axonopodis pv. passiflorae	Bacterial blight	*Passiflora spp.*	Seedlings and adult plants Local and Systemic infection	Seed and latently infected seedlings/plants	South America (Brazil, Colombia)	LOW	HIGH	MEDIUM	HIGH	MEDIUM
Candidatus Phytoplasma sudamericanum 16SrIII-V	witches'-broom	**Passionfruit**, closely related to clover ash strain	stem		Rio Pernambuco, Brazil,	LOW	MEDIUM	MEDIUM	HIGH	MEDIUM
Papaya leaf curl virus (several Reoviruses can cause this disease)	Papaya leaf curl virus	Papaya	Leaves		Asia (India)	LOW	MEDIUM	MEDIUM-HIGH	MEDIUM-HIGH	MEDIUM
Croton yellow vein mosaic Begomoviral	Croton yellow vein mosaic virus	Solanaceae, beetroot, **papaya**, peas and beans	Leaves		Asia (India)	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Papaya leaf curl Guangdong virus		**Papaya, passionfruit**, bell pepper, tobacco	Systemic infection		Asia (South Korea, Taiwan)	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM

Papaya leaf curl virus (several Begomoviruses can cause this disease)	Papaya leaf curl virus	Papaya	Leaves		Asia (India)	LOW	MEDIUM	MEDIUM-HIGH	MEDIUM-HIGH	MEDIUM
Tomato leaf curl Albatinah virus		**Papaya**, tomato	Systemic infection		Asia (Oman)	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Pseudomonas syringae pv. syringae (exotic races)	Bacterial canker	**Passionfruit**, onion, leek, capsicum, chrysanthemum, citrus, cucumber, pumpkin, garden dahlia, hibiscus, walnut, lettuce, magnolia, mango, lucerne, rice, avocado, bean, poplar, stonefruit, azalea, roses, tomato, willows, clover, blueberries, grapevine and maize. Attacks plants from the seedling stage through to maturity.	Leaves, inflorescence, stems, pods, seeds, flowers, fruit	Seed and vegetative propagating material	global if not splitting endemic and exotic	HIGH	HIGH	HIGH	MEDIUM - HIGH	MEDIUM - HIGH
Uredo nephelii	Rust	Lychee	Leaves		Asia	MEDIUM - HIGH	HIGH	HIGH	MEDIUM	MEDIUM - HIGH
Tobacco leaf curl virus (syn. Tobacco leaf curl bigeminivirus, Tobacco cabbaging virus, Tobacco curly leaf virus, Tobacco frenching virus, Tobacco leaf curl begomovirus, Tobacco leaf curl bigeminivirus, Tobacco leaf curl geminivirus, Tobacco leaf curl virus 1, Tomato yellow dwarf virus)	Tobacco leaf curl virus (TLCV)	Tomato, capsicum, **papaya,** tobacco, spinach and *Zinnia elegans*	Leaves, stem, fruit, flowers, whole plant (dwarfing)		Africa (Burkina Faso, Cameroon, Comoros, Democratic Republic of the Congo, Egypt, Ghana, Madagascar, Malawi, Mauritius, Morocco, Mozambique, Nigeria, Sierra Leone, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe) Asia (Cambodia, China, Georgia, India, Indonesia, Iraq, Japan, Malaysia, Myanmar, Pakistan, Philippines, South Korea, Sri Lanka, Taiwan, Thailand, Yemen) Europe (Denmark, Romania, Spain, Switzerland) North America (Cuba, Jamaica, Panama, Puerto Rico, United States) Oceania (Papua New Guinea, South America, Colombia, Venezuela)	LOW Papaya	MEDIUM Papaya	MEDIUM Papaya	LOW Papaya	VERY LOW Papaya

Ovulariopsis papayae	Papaya powdery mildew	Papaya	Leaves		South Africa	LOW	LOW	LOW	LOW	NEGLIGIBLE
Pestalotiopsis pauciseta	Leaf blight	**Lychee**, *Canarium* spp., *Guioa* spp., sycamore, mango, *Neophelium litchi*, Macarthur Palm, *Uvaria* spp., upriva orange mangrove, longan, rubber fig, triangle palm, guava	Leaves, Stems		Asia (China, Philippines, India)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Phaeosaccardinula javanica (Syn. *Chaetothyrium javanicum)*]	Sooty mould	**Lychee,** grape, sapodilla, mango, Aleurites, shell ginger (dwarf cardamom), bamboo, tea, *Citrus* spp., Cinchona, coffee, persimmon, *Eugenia* spp. (longan), *Ficus* spp., *Gardenia* spp.	Leaves		Asia (China, Taiwan) North America (Caribbean)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Phomopsis longanae	Fruit blotch and leaf blight	Lychee, Longan tree	Fruit, leaves		Asia (China) Europe (Italy)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Phyllosticta caricae-papayae	Target spot	Papaya	Leaves		Asia (India)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Pseudomonas carica papayae - reclassified as Pseudomonas syringae phylogroup 6	Leaf spot	Papaya	Leaves		South America (Brazil)	NEGLIGIBLE	LOW	MEDIUM	LOW	NEGLIGIBLE
Rickettsia spp. (Syn. *Papaya bunchy top phytoplasma; papaya bunchy top virus*)	Papaya bunchy top Pawpaw bunch top	Papaya	Leaves, stems, fruit		Africa (Sudan, Tanzania) Asia (India, Sri Lanka) North America (Antigua and Barbuda, Barbados, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Montserrat, Netherlands Antilles, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States) South America (Guyana, Suriname)	MEDIUM	MEDIUM	LOW	LOW	NEGLIGIBLE
Papaya mosaic virus (Potexvirus)	Papaya mosaic virus	Papaya	Leaves, whole plant (dwarfing)		Africa (Tanzania) Asia (India, Philippines) North America (Dominica, Mexico, Saint Vincent and the	LOW	LOW	LOW	LOW	NEGLIGIBLE

					Grenadines, Trinidad and Tobago, USA) Oceania (Guam) South America (Brazil, Venezuela)					
Raboviruses	Papaya droopy necrosis and apical necrosis	Papaya	Leaves		North America (USA)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Rickettsia spp. (Syn. *Papaya bunchy top phytoplasma; papaya bunchy top virus*)	Papaya bunchy top Pawpaw bunch top	Papaya	Leaves, stems, fruit		Africa (Sudan, Tanzania) Asia (India, Sri Lanka) North America (Antigua and Barbuda, Barbados, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Montserrat, Netherlands Antilles, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States) South America (Guyana, Suriname)	LOW	MEDIUM	LOW	LOW	NEGLIGIBLE
Papaya apical necrosis rhabdovirus	Papaya apical necrosis rhabdovirus	Papaya, Red amaranth	Leaves		North America (USA)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Papaya mosaic virus (Potexvirus)	Papaya mosaic virus	Papaya	Leaves, whole plant (dwarfing)		Africa (Tanzania) Asia (India, Philippines) North America (Dominica, Mexico, Saint Vincent and the Grenadines, Trinidad and Tobago, USA) Oceania (Guam) South America (Brazil, Venezuela)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Raboviruses	Papaya droopy necrosis and apical necrosis	Papaya	Leaves		North America (USA)	LOW	LOW	LOW	LOW	NEGLIGIBLE
Armillaria tabescens, A. mellea, A. socialis[89]	Armillaria root rot Wood rot (Summerfruit) Clitocye root rot (Tea	**Papaya, lychee**, Aleurites, Carya (hickories), Casuarina (beefwood), *Casuarina equisetifolia* (casuarina), mandarin lime, navel orange,	Leaves, fruit, Whole plant Roots and collar region	Infected Plant	Asia (China, India, Japan, Republic of Korea, Malaysia, Nepal, Turkey) Africa (Madagascar, Malawi,	LOW Lychee, Papaya	MEDIUM Lychee, Papaya	MEDIUM Lychee, Papaya	LOW Lychee, UNKNOWN Papaya	NEGLIGIBLE Lychee UNKNOWN Papaya

[89] Widespread. Similar impact to other Armillaria spp. in Australia. Established Armillaria spp. are not economically significant in tea tree plantations. Unlikely to be a problem on mulch from tea tree as it is

	Tree, Truffles)	*Eucalyptus*, lychee, *Melaleuca quinquenervia* (paperbark tree), oleander, pines, almond, peach, Japanese plum, guava, *Vitis spp. (grape)*, oak, *Acacia* spp., blueberry, common Jujube, banana, plantain, coffee, macadamia, pear, apple, apricot, plum, summerfruit, persimmon, loquat, hickories, range of Australian native trees including Rosaceous species, Ornamental trees, shrubs and fruit crops.	(Truffles)		Mauritius, Tanzania, Zimbabwe) North America (Mexico, USA) Central America and Caribbean (Panama, Trinidad and Tobago) South America (Brazil) Europe (Albania, Czech Republic, France, Germany, Greece, Italy, Montenegro, Netherlands, Portugal, Serbia, Slovakia, Slovenia, Spain, UK) Oceania (Fiji)					
Asterina megalospora	Black mildew	*Passiflora spp.*	Leaf		Asia (Japan) North America (Cuba, Dominican Republic, Puerto Rico, Trinidad and Tobago) South America (Brazil, Colombia, Ecuador, Peru, Venezuela)[59]	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Colletotrichum magna		Papaya	Fruit		South America (Brazil)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Guignardia spp.	Guignardia spot	Papaya	Leaves		Hawaii	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Haematonectria ipomoeae		Passionfruit	Stem, whole plant (wilting)		Asia (China, Japan) Europe (Germany)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Oidium caricae-papayae	Powdery mildew: Papaya	Papaya	Leaves		Asia (India, Taiwan) North America (Canada)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Pestalotiopsis mangiferae	Brown spot: mango	Lychee, Eucalyptus, mango, lacebark elm, grapevine, hickory	Leaves		Asia (China, India, Saudi Arabia) North America (USA) Oceania (American Samoa)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

heated for oil extraction prior to use.

Polygala phyllody phytoplasma (16SrII)	Polygalla phyllody phytoplasma	papaya, Beach naupaka (Scaevola taccada) .	stems		Cuba	LOW	MEDIUM	LOW	UNKNOWN	UNKNOWN
Candidatus Phytoplasma caricae (16SrXVII)		papaya	stems		Cuba	LOW	MEDIUM	LOW	UNKNOWN	UNKNOWN
Candidatus Liberibacter crescens		papaya	stems		Puerto Rico	LOW	MEDIUM	LOW	UNKNOWN	UNKNOWN
Candidatus phytoplasma brasiliense	Papaya bunchy top disease	red hibiscus (*Hibiscus rosa-sinensis* L.), sunn hemp (Croalaria juncea L.), Cuban jute (Sida rhmobifolia L.), cauliflower (Brassica oleraceae), bastard cedar trees (Guazuma ulmifolia Lam.), grapevine	stem		Peru, Brazil, Costa Rica	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Pantoea cypripedii (aka Erwinia cypripedii)[90]	black rot of papaya	papaya				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Polygala phyllody phytoplasma (16SrII)	Polygalla phyllody phytoplasma	papaya, Beach naupaka (Scaevola taccada)	stems		Cuba	LOW	MEDIUM	LOW	UNKNOWN	UNKNOWN
Candidatus Phytoplasma caricae (16SrXVII)		papaya	stems		Cuba	LOW	MEDIUM	LOW	UNKNOWN	UNKNOWN
Candidatus Liberibacter crescens		papaya	stems		Puerto Rico	LOW	MEDIUM	LOW	UNKNOWN	UNKNOWN
Candidatus phytoplamsa brasiliense	Papaya bunchy top disease	red hibiscus (*Hibiscus rosa-sinensis* L.), sunn hemp (Croalaria juncea L.), Cuban jute (Sida rhmobifolia L.), cauliflower (Brassica oleraceae), bastardcedar trees (Guazuma ulmifolia Lam.), grapevine	stem		Peru, Brazil, Costa Rica	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

[90] https://gd.eppo.int/taxon/ERWICY, https://www.cabi.org/ISC/abstract/19811376771

Erwinia herbicola (exotic strains)	Purple stain fruit rot	Papaya, pineapple, golden-fruited palm; the species affects a very wide host range and survives well in the environment	Fruit		North America (USA-Hawaii), South America (Brazil): the species is globally distributed	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Papaya droopy necrosis virus (PDNV); Papaya apical necrosis virus (PANV)		Papaya	Leaves		North America (USA) South America (Venezuela)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Papaya leaf curl Guandong virus		Papaya, passionfruit, bell pepper, tobacco	Systemic infection		Asia (South Korea, Taiwan)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Longan witches' broom-associated virus	*Longan witches' broom-associated virus*	Longan	Leaves, branches, shoots	Spread by grafting and by the Litchi stink bug	Asia (Cambodia, China, Taiwan, Vietnam)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Maracuja mosaic Tobamovirus	Maracuja mosaic virus	Passionfruit, tomato, tobacco, cucumber, quinoa	Systemic infection		North America (United States) South America (Brazil, Peru)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Cercospora papayae	Black spot disease of papaya	Papaya	Leaves, fruit		Hawaii, Caribbean region, Central America, South America	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Pseudoidium neolycopersici	Tomato powdery mildew	Papaya, ornamental croton, tomato	Leaves, stems		Africa (South Africa, Tanzania)Asia (Bhutan, China, Hong Kong, India, Iran, Japan, Malaysia, Nepal, South Korea, Thailand, Turkey)Europe (Bulgaria, Croatia, Czechia, Denmark, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Serbia, Spain, Switzerland, United Kingdom)North America (Canada, Guadeloupe, Jamaica, Mexico, United States)South America (Argentina, Colombia, Venezuela)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Xylella fastidiosa			leaf, stem, fruit and whole plant			LOW	HIGH	UNKNOWN	HIGH	UNKNOWN

Tomato leaf curl Albatinah virus		Papaya, tomato	Systemic infection		Asia (Oman)					
Chickpea chlorotic dwarf virus		Beetroot, bell pepper, papaya, chickpea, watermelon, cucumber, cotton, lentil, common bean, pea, tomato, spinach, faba bean	Leaves, whole plant (stunting)		Africa (Egypt, Ethiopia, Nigeria, Sudan) Asia (India, Iran, Iraq, Oman, Pakistan, Syria, Yemen)	MEDIUM	MEDIUM	MEDIUM	LOW	
Okra enation leaf curl virus		**Papaya,** okra,	Systemic infection		Asia (India, Pakistan)	LOW-MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM	

Scientific name	Common name	Primary hosts	Affected plant part	Movement & dispersal	Geographic range	Entry potential	Est. potential	Spread potential	Economic impact	Overall risk
Meloidogyne enterolobii (Syn. *Meloidogyne mayaguensis*)	Pacara earpod tree root-knot nematode	**Papaya**, coffee, herbaceous and woody plants. Principal hosts are: coffee, mango, pineapple, cashew, cucurbits, peanut, broccoli, capsicum, carrot, Eucalyptus, *Gossypium* spp., sweetpotato, lettuce, lantana, bean, eggplant, guava, pepper, potato, soybean, tobacco, tomato, ginger, watermelon	Roots	Infested plant material, soil and machinery, water	Africa (Burkina Faso, Côte d'Ivoire, Kenya, Malawi, Niger, Nigeria, Senegal, South Africa, Togo) Asia (China, India, Singapore, Thailand, Vietnam) Europe (Switzerland) North America (Costa Rica, Cuba, Guadeloupe, Guatemala, Martinique, Mexico, Puerto Rico, Trinidad and Tobago, USA) South America (Brazil, Venezuela)	HIGH (Papaya)	HIGH (Papaya)	HIGH (Papaya)	HIGH (Papaya)	HIGH (Papaya)
Hoplolaimus pararobustus[91]	Lance nematode	**Papaya**, banana, oil palm, cotton, citrus, coffee, cowpea, grapevine, guava, mango, rice, plantain, pineapple, roses, sorghum, sugarcane, tea, wheat	Root	Transmitted by infested plant material, soil, water and machinery	Africa (Angola, Burkina Faso, Cameroon, Congo, Democratic Republic of the, Côte d'Ivoire, Egypt, Gambia, Guinea, Kenya, Madagascar, Malawi, Mozambique, Namibia, Niger, Nigeria, Réunion, Rwanda, São Tomé and Príncipe, Senegal, South Africa, Tanzania, Togo, Uganda, Zimbabwe) Asia (China, Pakistan, Sri Lanka) North America (Dominica, Grenada, Saint Lucia, Saint Vincent and the Grenadines)	LOW	HIGH	MEDIUM	MEDIUM	LOW
Scutellonema clathricaudatum		Okra, onion, peanut, cabbages, cauliflowers, pigeon pea, **papaya**, lemon, melon, cucumber, carrot, yam, strawberry, Bourbon cotton, lettuce, cassava, banana, tobacco, rice, pearl millet, pepper, tomato, eggplant, potato, wheat, mung bean, cowpea, grapevine, maize	Leaves, roots		Africa (Benin, Burkina Faso, Cameroon, Central African Republic, Congo, Democratic Republic of the, Congo, Republic of the, Côte d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Malawi, Mali, Mozambique, Niger, Nigeria, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda) Asia (China, India, Thailand) North America (Cuba)	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW
Aorolaimus helicus		**Lychee**	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE

[91] There is a Hoplolaimus species present in Australia, but the taxonomy of this species has not been resolved.

Aphelenchus maximus		**Lychee**, mango	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Aphelenchus sparsus		**Lychee**	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Clavilenchus similis		**Lychee**	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Criconema hlagum	Spine nematode	**Lychee**	Roots		South Africa	LOW	LOW	LOW	LOW	NEGLIGIBLE
Criconemoides complexus	Ring nematode	**Lychee**, pineapple, mango	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Helicotylenchus microcephalus	Spiral nematode	**Lychee**, Orchidae	Roots		India, South Africa	LOW	LOW	LOW	LOW	NEGLIGIBLE

Hemicriconemoides litchi		**Lychee**, Mango	roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Hemicycliophora typica	Sheath nematode	**Lychee**, sugarbeet, carrot, apple, applewood, crabapple, rice, kikuyu grass, potato, wheat	Roots		South Africa, Netherlands	LOW	LOW	LOW	LOW	NEGLIGIBLE
Longidorus litchii	Needle nematode	**Lychee**	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Ogma decalineatum	Ogma	**Lychee**	Roots		South Africa	LOW	LOW	LOW	LOW	NEGLIGIBLE
Scutylenchus quadrifer		**Lychee**	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE
Trichodorus monhystera	Stubby root nematode	**Lychee**	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	China	LOW	LOW	LOW	LOW	NEGLIGIBLE

*Tylenchorhynchus nudus (*Syn. *Tessellus claytoni)*	Stunt nematode	**Lychee**, kentucky bluegrass, bush honeysuckle, red clover, sorghum, creeping bentgrass, chickpea,	Roots	Transmitted by infested plant material, contaminated soil tools and machinery, water and hitchhiking.	USA	LOW	LOW	LOW	LOW	NEGLIGIBLE

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