Final Report

Review of the biosecurity plan for the berry sector

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Public summary

Australia's biosecurity system works in a dynamic environment with major challenges growing and evolving rapidly. Through this project, Plant Health Australia (PHA), with Horticulture Innovation levy investment, has developed the *Biosecurity Plan for the Australian Berry Sector (V 1.5)*. This Biosecurity Plan (BP) recognises that the operating environments affecting the biosecurity of the berry (blueberry, Rubus and strawberry) sector is vastly different today to that of the past, and that the industry's response capabilities need to keep pace if they are to remain relevant and effective into the future.

The BP lays the foundation for a stronger biosecurity system and more resilient berry producers by identifying and prioritising the growing number of exotic pests and pathogens that could, if introduced, impact on Australian berry production and trade. The BP also analyses the various preparedness resources currently available to manage these risks and provides a program of current and future activities intended to fill any gaps in preparedness and strengthen the sector's biosecurity response capability.

Over the course of the project, two independent exotic pest and disease reviews were undertaken, the first focussed on the Rubus and strawberry industries, and the second on the blueberry industry. Following the second review, a combined BP for the berry sector was developed. These reviews were conducted with valuable input from stakeholders including Berries Australia — representing Australian Blueberry Growers' Association (ABGA), Raspberries and Blackberries Australia Incorporated (RABA) and Strawberries Australia Inc (SAI) — along with biosecurity and crop protection experts from state, territory and Commonwealth governments.

There are three major components to a BP. The first is a review of all known exotic pest and disease species that are known to infect the target crop. This review highlighted over 450 different exotic pest and disease species that, if introduced, could impact the Australian blueberry, Rubus and/or strawberry production and trade. These species' reviews informed the development of risk ratings for each of the identified exotic pests and diseases. The risk ratings consider the potential of each species to enter, establish and spread within Australia and an estimate of their potential economic impact. Of those species reviewed, 34 species were deemed High Priority Pests (HPPs) of the berry sector.

The second component was an analysis of the preparedness resources that are currently available to each HPP, which were compiled to create a Preparedness Table. The resources included contingency plans, fact sheets, diagnostic and surveillance protocols and taxonomic reference specimens.

The third and final component of the BP was the development of a Biosecurity Action Plan that describes the critical activities that, if implemented, will improve the sector's biosecurity preparedness and response capabilities. The Action Plan, was developed and reviewed annually through a Biosecurity Reference Panel (BRP), comprising of industry and government representatives. The Action Plan outlines strategies, communication and engagement activities specific to the berry sector, as well as activities and resources utilised by other industries that share the same exotic pest and disease threats and identifies potential international and domestic collaboration opportunities.

Keywords

Biosecurity Plan, High Priority Pests, Biosecurity Action Plan, pests, diseases, berries, blueberry, Rubus, strawberry.

Introduction

Biosecurity planning provides a mechanism for agricultural industries, government, and other relevant stakeholders to actively determine pests of highest priority and analyse the risks they pose. It also provides a mechanism for industry, governments and other stakeholders to assess current biosecurity practices and future biosecurity needs. The identification, prioritisation and management of key biosecurity risks, through the development and implementation of preparedness resources including a Biosecurity Plan is a critical industry preparedness activity.

Blueberries, Rubus (blackberries and raspberries) and strawberries represented by Berries Australia, is the single biggest fresh produce category in Australian supermarkets with a combined value of over $1 billion[1]. Biosecurity planning is integral to Berries Australia's objectives that include promoting sustainable agricultural production practices that minimise environmental and community impact, while supporting the growth of both domestic and international markets for Australian berries.

Australian berry production occurs year-round and, in most states and territories. The major production areas are located along the eastern seaboard, being Queensland (30%), Victoria (27%) and NSW (23%). As around 90% of domestic berry production is sold as fresh fruit,[2] disruption to the domestic supply chain due to an outbreak of an exotic pest or disease could have devastating short- and long-term impacts on supplier's bottom line and the berry sector more broadly.

Ensuring the berry sector 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 pre-emptive biosecurity planning processes, the sector will be better placed to maintain domestic and international trade and reduce the social and economic costs of pest incursions on both growers and the wider community. The information gathered during these processes provides additional assurance that the berry sector 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.

As a part of Berries Australia, Australian Blueberry Growers' Association (ABGA), Raspberries and Blackberries Australia Incorporated (RABA) and Strawberries Australia Inc (SAI) have highlighted "*Productive management of biosecurity risks*" as an outcome within the Berries Australia Strategic Plan 2022-2025[3]. Biosecurity is also mentioned across several strategies under Outcome 2 "*Industry supply, productivity and sustainability*" in the sector's Strategic Investment Plan (SIP) (2022-2026) developed by Horticulture Innovation[4]. In the previous SIP (2017-2022), investment into biosecurity was limited to specific outputs and targeted pests or diseases[5]. This increased emphasis on biosecurity within the current SIP indicates an acknowledgment by industry of the importance of biosecurity to the berry sector, and a need for continuous investment to improve its biosecurity preparedness.

In collaboration with Berries Australia and Commonwealth, state and territory governments, Plant Health Australia (PHA) has developed Biosecurity Plan (BP) for the berry sector. The BP will provide a framework for improved biosecurity preparedness and practice through increasing industry awareness and risk mitigation relating to exotic pest incursions.

There are three major components to the BP. The first is the review of exotic pest species that are known hosts of the industry or sector. This species' review informs the development of risk ratings for each of the exotic pests identified. These risk ratings focus on the potential of each pest to enter, establish and spread within Australia and an estimate of their potential economic impact. The species that receive high risk ratings are given 'High Priority Pest' (HPP) status.

The second component is an analysis of the available preparedness resources in relation to the HPPs including contingency and continuity plans, fact sheets, diagnostic protocols and reference specimens, creating a Preparedness table.

The third and final component is the development of an Action Plan that describes the critical activities that are designed to improve biosecurity preparedness and response capability. The Action Plan, developed through consultation with industry and government stakeholders, outlines the strategies and activities that are the most important for the exotic pests of greatest concern. The activities outlined in the Action Plan include any required research, development and extension (RD&E) activity, potential international and domestic collaboration opportunities and activities and resources currently utilised by other domestic industries that share some of the same exotic pest threats.

The berry sector historically has had three separate BPs aligned to either the blueberry, Rubus and strawberry industries. Over the course of this project, several iterations of the *Biosecurity Plan for the Australian Berry Sector* were produced, the first focussed on the Rubus and strawberry industries. The project was extended beyond the original December 2023 end date to include the blueberry industry, with the final version incorporating all three crop types. This project aims to improve the biosecurity planning process and optimise future biosecurity investment for the berry sector through the development of a unified *Biosecurity Plan for the Australian Berry Sector (V 1.5).*

Methodology

The development of the *Biosecurity Plan for the Australian Berry Sector (V 1.0)* commenced with an extensive literature review and tabulation of exotic pests and diseases of the plant species produced by the sector. The review utilised a range of resources, including previous Biosecurity Plans (version 1.0 for Rubus and version 2.0 for strawberry), available peer-reviewed scientific literature and other noted sources such as the Centre for Agriculture and Biosciences International (CABI). With the assistance of Berries Australia, a Technical Review Panel (TRP) was then formed to review the literature gathered and to characterise each species based on its risk profile. The risk ratings were based on an assessment for their potential to enter, establish and spread in Australia and their potential economic impact on each berry category. This TRP met in July 2019 (see MS102), was coordinated by PHA and included representatives from Berries Australia and state and territory agriculture agencies and (Table 1).

Table 1. Members of the Technical Review Panel (TRP) and Biosecurity Reference Panel (BRP) for the Rubus and strawberry industries (2019-2023).

NAME	ORGANISATION (HISTORICAL)	MEMBER OF TRP	MEMBER OF BRP
Liz Minchinton	Department of Primary Industries Victoria[1]	✓	✓
Dean Harapas	DEDJTR	✓	✓
Amanda Kobelt	Department of Environment and Primary Industries	✓	
Ruth Huwer	NSW Department of Primary Industries	✓	
Rosalie Daniel	NSW Department of Primary Industries	✓	
Melinda Simpson	NSW Department of Primary Industries	✓	✓
Apollo Gomez	QDAF[2]	✓	
Christine Horlock	QDAF	✓	✓
Angela Atkinson	Victorian Strawberry Industry Development Committee	✓	✓
Amanpreet Singh	RABA	✓	✓
Rachel Mackenzie	Berries Australia	✓	✓
Leandra Fernandes	PHA	✓	✓
Victoria Ludowici	PHA	✓	✓
Penny Measham	Hort Innovation		✓
Bradley Mills	Hort Innovation		✓
Rebekah Pierce	NSW DPI[3]		✓
Pip Cotter	NSW DPI		✓
Chris Pittock	DEDJTR		✓

[1] Department of Primary Industries Victoria, Department of Environment and Primary Industries and DEDJTR now fall under the Department of Energy, Environment and Climate Action (DEECA) and AgVic

[2] QDAF is now Queensland Department of Primary Industries (QDPI)

[3] NSW DPI is now NSW Department of Primary Industries and Regional Development (NSW DPIRD)

Through this process, the information was compiled into several tables of important exotic and endemic pest species. These included:

- **Threat Summary Tables (TST)**. An overview including risk assessments of all known exotic pests and diseases known to impact on the plant species produced by the blueberry, Rubus and strawberry industries.
- **High priority Pest lists (HPP)**. These species based on the risk assessment process have the potential to cause substantial economic impact on the berry sector, either through production losses or market access issues.
- **Other Pests of Biosecurity Significance**. These species are economically important to the berry sector and are considered in the prioritisation of RD&E investment but do not undergo a formal pest risk assessment. They are economically important in least one of the following ways:
    - currently under quarantine arrangements or restricted to regions within Australia,
    - notifiable by law,
    - have market access implications,
    - able to be prevented from entering a farm through good biosecurity practice.

Once compiled, these lists formed the foundation of the Biosecurity Plan. An Action Plan was then developed with the assistance of a Biosecurity Reference Panel (BRP). The BRP (reported on in MS103) was convened by PHA and again comprised of representatives from each industry and the relevant state authorities and met in October 2019 (Table 1).

Action Plans are a critical component of the Biosecurity Plan. The Action Plan highlights current gaps in biosecurity industry preparedness and RD&E that could be ameliorated through future investment. It is developed in accordance with industry priorities and resource availability and aims to improve preparedness and response capability. A number of these priorities are still being addressed by industry.

The activities described within Action Plans are aligned with the five strategic priority areas of the National Biosecurity Strategy and provides industry with a plan with agreed activities and timeframes. The five strategic areas include:

1. Preparedness and Response
2. Capacity and Capability
3. Communications and Engagement
4. Innovation, Research Development and Extension
5. Collaboration and Partnerships

Following these meetings, the Biosecurity Plan was compiled and provided to Berries Australia for endorsement (in September 2020) followed by endorsement by the Plant Health Committee (PHC) which was received in November 2020. PHC is comprised of the Chief Plant Health Managers from each state/territory and a representative from the office of the Australian Chief Plant Protection Officer.

Aspects of the endorsed Biosecurity Plan including the HPP list, Other Pests of Biosecurity Significance and progress towards fulfilment of the Action Plan's activity schedule were then reviewed in February 2021 by the Biosecurity Reference Panel (BRP) (reported on in MS106).

The second BRP meeting was held on 3rd August 2022 (see MS109) and included discussions regarding the incorporation of the blueberry industry into the *Biosecurity Plan for the Australian Berry Sector (V 1.2)*.

The third BRP meeting reported on in MS111, was scheduled to be held in August 2023 however identifying a suitable time for industry representatives resulted in this being delayed. In the interim, the update to the blueberry industry TST commenced with the aim to hold a separate TRP meeting prior to a combined BRP meeting involving all berry sector representatives.

On 2nd May 2024, the TRP to review the blueberry TST was convened consisting of similar membership to previous TRPs and BRPs formed earlier in the project. Additionally on 8th May, the third BRP meeting incorporating all three berry industries met to include activities relevant to ABGA into the Action Plan (Table 2, MS112). The TST developed for the blueberry industry underwent the same process as for the Rubus and strawberry industries and was provided to and endorsed by Berries Australia in October 2024 followed by endorsement by the PHC in March 2025 (see MS113).

Table 2. Members of the blueberry Technical Review Panel (TRP) and Biosecurity Reference Panel (BRP) (2024).

NAME	ORGANISATION (HISTORICAL)	MEMBER OF TRP	MEMBER OF BRP
Stephen Quarrell	PHA		✓
Rebecca Powderly	PHA	✓	✓
Evie Kielnhofer	PHA	✓	✓
Gaius Leong	NSW DPI[4]	✓	
Helen Newman	DPIRD WA	✓	
Shannon Mulholland	DPI NSW	✓	✓
Leonie Martin	DPI NSW	✓	✓
Chris Pittock	AgVic	✓	✓
Melissa Simpson	DPI NSW	✓	
Elisse Nogarotto	AgVic	✓	
Jessica McLeod	DPIRD WA	✓	
Angela Monks	NRE Tasmania	✓	
Christine Wood	DPIRD WA	✓	✓
Angela Atkinson	Berries Australia	✓	✓
Kyla J Finlay	AgVic		✓
Monique Sakalidis	DPIRD WA		✓
Zac Hemmings	DPI NSW		✓

As the *Biosecurity Plan for the Australian Berry Sector (V 1.3)* was endorsed by Berries Australia and PHC, with changes from meetings held in May 2024 incorporated, a fourth BRP meeting reported on in MS113 was held on 25th November 2024 to ensure that all required updates were captured to produce *Biosecurity Plan for the Australian Berry Sector (V 1.4)*.

The fifth and final BRP was held on 20th October 2025 to incorporate final updates to the BP and produce the *Biosecurity Plan for the Australian Berry Sector (V 1.5).* This meeting also included a workshop to capture recommendations for biosecurity activities relevant to the berries sector beyond the scope of the current project. Outcomes from this workshop will be expanded on in the Recommendations section in this report. See Appendix 1 for the *Biosecurity Plan for the Australian Berry Sector (V 1.5)* and Appendix 2 for the minutes from the October 2025 meeting.

[4] NSW DPI is now NSW Department of Primary Industries and Regional Development (NSW DPIRD)

Results and discussion

The revised Biosecurity Plan (BP) has been completed, endorsed by both industry and PHC. It has since undergone several revisions during the annual Biosecurity Reference Panel (BRP) meetings leading to the development of the *Biosecurity Plan for the Australian Berry Sector (V 1.5)*. See Appendix 1 for a copy of the latest version of the BP.

The BP features an analysis of all known exotic pests and diseases of the berry sector. This review highlighted over 450 different exotic pest and disease species that, if introduced, could impact the berry sector. These species' reviews informed the development of risk ratings for each of the identified exotic species. The risk ratings focus on the potential of each species to enter, establish and spread within Australia and an estimate of their potential economic impact. These risk analyses subsequently identified 34 High Priority Pests (HPPs) for the berry sector (see Appendix 1, page 25). The HPPs identified are those deemed to have an elevated likelihood of entry, establishment and spread in Australia and the potential to cause substantial economic impact to the berry sector if introduced through impacts on production or market access.

A further suite of pests and diseases were identified as Other Pests of Biosecurity Significance (Appendix 1, page 37). These pests are economically important to the berry sector and are considered to prioritise RD&E investment but do not undergo a formal pest risk assessment due to their limited distribution in Australia. The pests listed in these tables include species such as Kanzawa spider mite (*Tetranychus kanzawai*), which is restricted to New South Wales and Queensland, and is classified as a Declared Pest, prohibited by Western Australia and Green snail (*Cornu apertus*), which is a notifiable pest for most states and territories.

The Action Plan (see Appendix 1, page 41) was created in consultation with the BRP to provide guidance into future biosecurity related activities that aim to improve industry preparedness and response capability. The Action Plan describes the activities aligned to the strategic priority areas of the National Biosecurity Strategy and provides industry with an overarching plan with agreed activities and timeframes. Many of the activities highlighted within the Action Plan are ongoing and will continue after this project's completion.

Over the course of the project, the Biosecurity Planning team has undertaken a review of the Biosecurity Plan development process and have made several key changes, some of which were able to be incorporated into the *Biosecurity Plan for the Australian Berry Sector* in later versions. Two major changes included an update to the TST development process, which was used to develop the blueberry TST and updates to the Action Plan format, which were included over the course of several BRP meetings.

Further improvements to how Technical Review Panel (TRP) meetings and processes, Action Plan format and the Biosecurity Plan template will be incorporated into the next iteration of the *Biosecurity Plan for the Australian Berry Sector*. These suggested enhancements will be further expanded on in the Recommendations section in this report.

Outputs

Table 3. Output summary

Output	Description	Detail
Threat Summary Table (TST) identifying and prioritising exotic berries pests	Technical review of exotic invertebrate and pathogens that pose a threat to the berry sector.	A foundational part of the Biosecurity Plan comprised of over 450 different exotic pest and disease species that could impact the berry sector. The TST is used to develop the High Priority Pest (HPP) list, species that have a high likelihood of entry, establishment and spread in Australia and the potential to cause substantial economic impact to the berry sector or create market access issues if introduced. See Appendix 1.
HPP Preparedness table and Action plan	A review of available resources for HPPs and development of a table with biosecurity related activities for the berry sector.	The Preparedness table is a gap analysis of resources available to address HPPs of the berry sector. The Action Plan describes critical activities that are designed to improve the berry sector's biosecurity preparedness and response capability. See Appendix 1.
Industry and government endorsed *Biosecurity Plan for the Australian Berry Sector (V 1.5)*	Exotic pest risk analyses, HPP list, Preparedness table, Action Plan with supporting biosecurity-focussed content.	Biosecurity Plans are high level planning documents and have been provided to Berries Australia and Hort Innovation and uploaded onto the Biosecurity Portal. The Portal has access restricted to the relevant peak body(s), RDCs and state and Federal Government agencies. The Biosecurity Plan can be further disseminated further at Berries Australia's discretion. See Appendix 1.
Milestone Reports	Progress reports on Biosecurity Plan's development and the implementation of critical activities that aim to improve the berry sector's biosecurity preparedness and response capability	Milestone reports are submitted to Hort Innovation and disseminated at their discretion.
Final Report	Final report reviewing the outcomes of project MT18004.	Final reports are submitted to Hort Innovation and disseminated on the Hort Innovation website.

Outcomes

Since the original development of the project's Monitoring and Evaluation (M&E) plan, a new Berry Strategic Investment Plan (SIP) has been developed covering the period of 2022-2026[4]. This SIP considers the berry sector (blueberry, Rubus and strawberry) as a whole and is more closely aligned to work undertaken through this project. For this reason, the 2022-2026 SIP has been utilised as the benchmark for determining whether the project has attained the desired industry outcomes.

Table 4. Outcome summary

Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence
Intermediate Outcome Identification and prioritisation of the berry sector's exotic pest and disease threats and other pests and diseases of biosecurity significance	**Outcome 2:** Industry supply, productivity and sustainability **Strategy 6:** Protect the biosecurity status of the Australian berry industry **KPIs:** • Maintenance/tracking of the implementation of an industry biosecurity plan • Resources available to support growers to implement best practice on-farm biosecurity	The identification and prioritisation of pests and diseases for the berry sector is an important step in the development of the Threat Summary Table (TST), High Priority Pest (HPP) list and the Other Pests of Biosecurity Significance table. Members of the Technical Review Panel (TRP) and the Biosecurity Reference Panel (BRP) contributed to the assessment of pests and diseases.	The TST development process involved reviewing the old Biosecurity Plan, TSTs developed for other industries and online resources including CABI, scientific journals and extension material. The TST once developed is reviewed by the TRP and endorsed by Berries Australia and the Plant Health Committee ensuring that the information is accurate and relevant.
Intermediate Outcome Identification and implementation of risk mitigation activities to increase the industry's preparedness for exotic pests and diseases **Intermediate Outcome** Shared responsibility for biosecurity preparedness activities **End-of Project Outcome** Improved preparedness of the berry sector for exotic pests and diseases and a framework to coordinate biosecurity activities and investment for the berry sector over five years	**Outcome 2:** Industry supply, productivity and sustainability **Strategy 6:** Protect the biosecurity status of the Australian berry industry **KPIs:** • Maintenance/tracking of the implementation of an industry biosecurity plan • Resources available to support growers to implement best practice on-farm biosecurity	Following the development of the Biosecurity Plan, a Preparedness table (a stocktake of available resources for HPPs) gives the BRP an understanding of gaps in knowledge to address. The Action plan is reviewed on a regular basis by members of the BRP to confirm that activity updates are captured and new work being undertaken by members of the BRP can be acknowledged. The identification and prioritisation of activities within the Action Plan enables for RD&E funding to be allocated appropriately.	The Preparedness table and the Action Plan are developed in consultation with the BRP to cross reference activities being conducted relevant to the berry sector. Berries Australia and Hort Innovation's involvement also means that the Action Plan can be aligned to the SIP and address the needs of the sector.

Monitoring and evaluation

This project had three key objectives:

1. Support the berry sector in satisfying its biosecurity obligations
2. Ensure that the berry sector and stakeholders have identified exotic pest risks and mitigation actions necessary to managing risks effectively
3. Establish a valid base for decisions on future investment in biosecurity-related RD&E

Table 5. Key Evaluation Questions

Key Evaluation Question	Project performance	Continuous improvement opportunities
1. To what extent has the project achieved its expected outcomes?	This project improved biosecurity preparedness of the berry sector against exotic pests and diseases through the development of a industry and PHC endorsed Biosecurity Plan (Objective 2). The planning process also involved the development of a Biosecurity Action Plan, which provides insight and a gap analysis into the berry sector's biosecurity preparedness and their future RD&E needs (Objectives 2 & 3).	This project provided in sights regarding the biosecurity planning process namely the development of the Biosecurity Plan (BP), Threat Summary Tables (TST) and the Action Plan. This has led to improvements in the format of these key elements, which are currently being implemented in new Hort Innovation funded projects.
2. How relevant was the project to the needs of intended beneficiaries?	The representative of Berries Australia interviewed at the end of the project believed that the project met industry needs in improving their biosecurity preparedness through the generation of a Biosecurity Plan including the development of the TSTs, High Priority Pest (HPP) list, Other Pests of Biosecurity Significance table and Action Plan and therefore improved their biosecurity preparedness. This project also addressed their biosecurity obligations as signatories of the Emergency Plant Pest Response Deed (EPPRD) as outlined in the project's objectives. [5] Overall, the representative stated that the BP review is a good process and showed interest in incorporating improvements made into future projects for the berry sector.	It was noted by the Berries Australia representative that the process to review the TST is time-consuming and created some difficulty in getting industry members to participate in the process. As mentioned in KEQ 1, continuous improvement to the BP development process have been implemented in new projects. These enhancements include: • The TST is now sent out to the TRP ca. 1 month in advance of the meeting • The out-of-session review gives TRP members the flexibility to review the TST and provide feedback when time permits • TRP meetings now typically run for ca. 2-3 hours rather than a full day. This new review process has improved meeting attendance and increased the quality of the risk assessments within as the members have sufficient time to research and consider the draft risk assessments.

[5] Note that the Australian Blueberry Growers' Association (ABGA) are not signatories to the EPPRD.

Key Evaluation Question	Project performance	Continuous improvement opportunities
3. How well have intended beneficiaries been engaged in the project?	As Biosecurity Plans are a high level, peak-body facing documents therefore industry engagement was monitored though attendance of key industry stakeholders at the Technical Review Panel (TRP) and Biosecurity Reference Panel (BRP) meetings.	As stated above, the industry partners were adequately engaged throughout the project through both TRP (year 1 and year 4) and BRP meetings (years 2-6).
4. To what extent were engagement processes appropriate to the target audience/s of the project?	The project's key industry stakeholders (Berries Australia) were engaged throughout the project including during the TRP (twice in year 1 and again in year 4) and during the annual BRP meetings.	As stated above, the industry partners were adequately engaged throughout the project through both TRP (year 1 and year 4) and BRP meetings (years 2-6). It was noted by Berries Australia that the annual BRP review process gave an opportunity to provide time to consider resources that facilitated its continual improvement. It was suggested that international and industry participants would be beneficial to fill further gaps in future projects.
5. What efforts did the project make to improve efficiency?	Efficiencies were largely borne through reducing the PHA salary component and meeting costs via the adoption of online meetings formats, which reduced travel and the drafting of documents (i.e., TST, Action Plan) prior to stakeholder meetings to speed up this the development of the components of the Biosecurity Plan.	These learnings - including improvements in the TST format (see above) - are already being implemented in new Horticulture Innovation-funded projects.

Recommendations

As mentioned in the Methodology and the M&E sections of this report, several improvements have been made over the course of the project and incorporated into the Biosecurity Plan (BP) development process. Some of these changes have only recently been implemented in new projects and were not able to be included in the late stages of MT18004. Recommendations to process improvements include:

- Updating the Rubus and Strawberry TSTs to align with the Blueberry Threat Summary Table (TST). This project did not follow the typical timeline followed to update BPs. In previous berry focussed projects, the three berry industries BPs were revised separately, and industry linkages were not explored. At the beginning of this project the Rubus and strawberry industries were reviewed in one plan with a contract variation to include the blueberry industry made in 2023.

  As previously stated, PHA has made several fundamental changes to the way that TSTs are researched and developed which has bolstered the quality of the BPs overall. These changes are reflected in the recent update to the Blueberry TST but are not reflected in the Rubus and strawberry elements of the BP.

  It is therefore recommended that TSTs for Rubus and strawberry industries are updated to provide a unified data standard across all three industries' TSTs.

- Development of a new Action Plan that considers all industries under Berries Australia, with the new Action Plan template. PHA's new Action Plan template takes the form of a workplan designed to inform strategic investment through the SIAP process.

  Following the inclusion of the blueberry into this project, the Action Plans were retrospectively combined to unify biosecurity related activities across the berry sector. A new Action Plan is recommended to be developed

with all areas of the berry sector considered during its development. This will minimise duplication of effort across industries and ensure that the three berry industries are considered in all relevant activities and their implementation.

The revision of the Action Plan would also provide Berries Australia with an opportunity to address several recommendations highlighted in the workshop held during the final BRP meeting held in October 2025 including:

- The development of a Biosecurity Incident Standard Operating Procedure (BISOP).
- The development of Owner Reimbursement Cost (ORC) frameworks.
- Development of a training framework to ensure Berries Australia staff are appropriately trained for their roles during a Response i.e., not all IDOs have undergone Industry Liaison Officer training.

- Australian Blueberry Growers' Association (ABGA) to consider becoming a signatory to the Emergency Plant Pest Response Deed (EPPRD). It is recommended for the ABGA to consider becoming a signatory to the EPPRD to comprehensively strengthen the berry sector's biosecurity capacity in the event of an incursion.

- Support an annual review of the list of exotic pests and pathogens (Threat Summary Tables) to account for changes in taxonomy, hosts, geographic distribution and/or economic impact which may change the threat posed by each pest. These annual reviews would ensure the Threat Summary Tables remain current and lessen the need for full review each time the Biosecurity Plan is reviewed. As seen within the BRP process within this project, these reviews would be undertaken with the opportunity for continued collaboration with Commonwealth, State and Territory jurisdictions. The development of a new Biosecurity Plan on a five yearly basis could then be undertaken expediently with a focus on an assessment of preparedness and the review and continued refinement and implementation of the Action Plan.

- Analysis of HPPs in preparation for Emergency Plant Pest (EPP) responses. Several plant industries, including Berries Australia, have recently communicated to PHA their concerns regarding the increasing size and frequency of investment requests by jurisdictions to fund EPP incursion Response Plans. The concerns stem from industry's awareness that the debt carried for failed responses limits their preparedness investment for future incursions. Given the biotic attributes of some HPPs and potential delays in detection, the likelihood of eradication success is not always clear. The outcomes of this analysis would be used to understand whether a HPP would be technically feasible to eradicate prior to an incursion and inform industry's decision making regarding whether to invest in a response. If a species' eradication likelihood is deemed low, greater investment would then be directed towards resources that enable a rapid transition to management, minimising the compounding monetary impact of frequent EPP incursions.

- Exotic pest management reviews that provide understanding of how HPPs are managed internationally. These reviews would provide information to industry on how the HPPs are currently managed overseas including the crop scouting, pest identification and cultural, biological and chemical controls. The information within can be easily developed into extension resources during an incursion. These reviews would also generate an information package to enable the rapid generation of APVMA Emergency Permits during an incursion and potentially inform an exotic pest focussed Strategic Agrichemical Review Process (SARP) that focusses on the industries' HPPs. Due to constraints in levy availability, the generation of these pest management reviews species would initially focus on the HPPs deemed less likely to be eradicated in the analysis outlined above.

Additionally, it has also been noted that Berries Australia is in the process of developing a Memorandum of Understanding (MoU) with PHA to direct Biosecurity Activity Component funds to biosecurity activities. PHA will work closely with Berries Australia to ensure cohesion across the Action Plan, Strategic Investment Plan (SIP) and the MoU in prioritising biosecurity activities.

Refereed scientific publications

None to report.

Intellectual property

No project IP or commercialisation to report.

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Plant Heath Australia would like to thank our industry partner, Berries Australia, the Commonwealth and state and territory governments for their valuable support and advice, without which this project would not have been possible.

Appendices

- Appendix 1 – *Biosecurity Plan for the Australian Berry Sector (V 1.5)*
- Appendix 2 - Biosecurity Reference Panel #6 meeting minutes

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References

[1] Berries Australia – About Berries Australia (Accessed 17/11/2025) https://berries.net.au/home/about/berries-australia/

[2] Horticulture Innovation Australia (2025). Australian Horticulture Statistics Handbook 2023/24 (Accessed 17/11/2025) https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/

[3] Berry Strategic Plan (2022-2025) (Accessed 17/11/2025)

[4] Berry Strategic Investment Plan (SIP) (2022-2026) (Accessed 17/11/2025) https://www.horticulture.com.au/globalassets/hort-innovation/levy-fund-financial-and-management-documents/sip-2022-2026-pdfs/hort-innovation-sip-2022-26-berry-r2.pdf

[5] Horticulture Innovation (2016) Raspberry and blackberry - 2017-2021 Strategic Investment Plan

Biosecurity Plan
for the Berry Sector

A shared responsibility between government and industry

Version 1.5 October 2025

Plant Health AUSTRALIA

Australian Blueberry Growers' Association

Hort Innovation BLUEBERRY FUND

STRAWBERRIES AUSTRALIA

Hort Innovation STRAWBERRY FUND

raba Raspberries & Blackberries Australia

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Revision history – Individual plans

Version number	Date	Details
1.0	June 2004	National Strawberry Industry Biosecurity Plan
2.0	April 2009	Industry Biosecurity Plan for the Strawberry Industry
1.0	October 2013	Biosecurity Plan for the Rubus Industry
1.0	April 2016	The Biosecurity Plan for the Blueberry Industry

Revision history – Combined plans

Version number	Date	Details
1.0	June 2020	Detailed review of the Rubus and Strawberry industries to develop the Biosecurity Plan for the Berry Sector + added on the unreviewed Biosecurity Plan for the Blueberry Industry
1.1	April 2021	Review of the Biosecurity Plan for the Berry Sector only
1.2	August 2022	Review of the Biosecurity Plan for the Berry Sector only
1.3	October 2024	Detailed review of the Biosecurity Plan for the Blueberry Industry + review of the Biosecurity Plan for the Australian Berry Sector

Version number	Date	Details
1.4	March 2025	Review of the Biosecurity Plan for the unified Berry Sector
1.5	October 2025	Review of the Biosecurity Plan for the unified Berry Sector

Acknowledgements

The review and development of the *Biosecurity Plan for the Australian Berry Sector* (*Version 1.5)* was coordinated by Plant Health Australia in conjunction with Berries Australia (comprised of Australian Blueberry Growers' Association (ABGA), Strawberries Australia Inc (SAI) and Raspberries and Blackberries Australia Incorporated (RABA)) 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 Australian Berry Sector (Version 1.3)* was formally endorsed by the berry sector (through Berries Australia) in October 2024, and all state and territory governments (through the Plant Health Committee) in March 2025. The Australian Government endorses the document without prejudice for the purposes of industry's planning needs and meeting the Department's obligations under Clause 13 of the Emergency Plant Pest Response Deed (EPPRD). In providing this endorsement the Department notes page 57 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 the Department of Agriculture, Water and Environment 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

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABGA	Australian Blueberry Growers' Association
ACIAR	Australian Centre for International Agricultural Research
ACPPO	Australian Chief Plant Protection Officer
AgVic	Agriculture Victoria
APC	AUSPest*Check*®
APVMA	Australian Pesticides and Veterinary Medicines Authority
AS/NZS	Australian Standard/New Zealand Standard
BICON	Australian Biosecurity Import Conditions Database
BIRA	Biosecurity Import Risk Analysis
BISOP	Biosecurity Incident Standard Operating Procedure
BRP	Biosecurity Reference Panel
BMP	Best Management Practise
BOLT	Biosecurity On-Line Training
BP	Biosecurity Plan
CABI	Centre for Agriculture and Bioscience International
CCEPP	Consultative Committee on Emergency Plant Pests
CPHM	Chief Plant Health Manager
DAFF	Department of Agriculture, Fisheries and Forestry
DAF NT	Department of Agriculture and Fisheries, Northern Territory
DAWE	Department of Agriculture, Water and the Environment (now DAFF)
DEECA	Department of Energy, Environment and Climate Action, Victoria
DPIRD WA	Department of Primary Industries and Regional Development, Western Australia
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
GIA	Greenlife Industry Australia
HACCP	Hazard Analysis Critical Control Point
HPP	High Priority Pest
ICA	Interstate Certification Assurance
IGAB	Intergovernmental Agreement on Biosecurity
ILO	Industry Liaison Officer
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
LCC	Local Control Centres
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
NPBS	National Plant Biosecurity Strategy
NPPP	National Priority Plant Pest
NRE Tas	Department of Natural Resources and Environment, Tasmania
NSP	National Surveillance Protocol
NSW	New South Wales
NSW DPIRD	New South Wales Department of Primary Industries and Regional Development
NT	Northern Territory
ORC	Owner Reimbursement Costs
PaDIL	Pest and Disease Image Library
PBRI	Plant Biosecurity Research Initiative
PHA	Plant Health Australia
PHC	Plant Health Committee
PIC	Property Identification Code
PIRSA	Primary Industries and Regions South Australia
PPIM	Plant Property Identification Model
QA	Quality Assurance
Qld DPI	Queensland Department of Primary Industries
RABA	Raspberries and Blackberries Australia Incorporated
R&D	Research and Development
RDC	Research and Development Corporation
RD&E	Research, Development and Extension
SA	South Australia
SAI	Strawberries Australia Inc
SARDI	South Australian Research and Development Institute
SCC	State Coordination Centres
SDQMA	Subcommittee for Domestic Quarantine and Market Access (now SMART)
SMART	Subcommittee on Market Access, Risk and Trade
SNPHS	Subcommittee for National Plant Health Surveillance
SPHD	Subcommittee on Plant Health Diagnostics
SPS	Sanitary and Phytosanitary
T2M	Transition to Management
TBA	To be announced
TRP	Technical Review Panel
TST	Threat Summary Table
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 56.

EXECUTIVE SUMMARY

To ensure its future viability and sustainability, it is important that the Australian berry sector, represented by Berries Australia (comprised of Australian Blueberry Growers' Association (ABGA), Strawberries Australia Inc (SAI) and Raspberries and Blackberries Australia Incorporated (RABA)), minimises 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 Australia's berry sector. 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 the berry sector. It identifies and prioritises exotic plant pests (not currently present in Australia) and established pests of biosecurity concern and focus on future biosecurity challenges.

The *Biosecurity Plan for the Berry Sector (Version 1.5)* was developed in consultation with the Berry Technical Review Panel (TRP) and Berry Biosecurity Reference Panel (BRP), which consisted of plant health and biosecurity experts and industry representatives. These groups were coordinated by Plant Health Australia (PHA) and included representatives from Berries Australia, relevant state, and territory agriculture agencies and PHA.

Previously the blueberry, Rubus and strawberry industries were covered by separate biosecurity plans. In 2020, a joint *Biosecurity Plan for the Berry Sector* (*Version 1.0),* covering the Rubus and strawberry industries was developed as the industries have several shared pests. A single plan allowed for the reduction in the duplication of biosecurity implementation activities. Information from the *Biosecurity Plan for the Blueberry Industry (Version 1.0)* was integrated into the shared plan, however, it did not go through review prior to being added.

The development of Threat Summary Tables (TST) for the berry sector has undergone several iterations. The *Biosecurity Plan for the Australian Berry Industry (Version 1.0)* included TSTs for the Rubus and strawberry industries covering over 330 exotic pests and diseases.

As the *Biosecurity Plan for the Blueberry Industry (Version 1.0)* has not been formally reviewed since 2016 a detailed review of the TST for blueberries was undertaken and incorporated into the *Biosecurity Plan for the Australian Berry Industry (Version 1.5).* Over 120 exotic pests and diseases were identified as part of the review process for the Blueberry TST in 2024.

	Rubus and Strawberry	Blueberry
Threat Summary Table (TST)	2021	2024

Figure 1. An overview of changes implemented in the plan.

Each pest on the list was given an overall risk rating based on four criteria; entry, establishment, spread potential, and economic impact. In this biosecurity plan, other pests of biosecurity significance for the berry sector were also identified (Table 8) as good biosecurity practice is beneficial for the ongoing management and surveillance for these pests.

The *Biosecurity Plan for the Berry Sector (Version 1.5)* 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 berry sector (Table 10). This enables identification of gaps and prioritises specific actions, as listed in the Berry Biosecurity Action Plan (Table 9). The development of this table will increase the berry sector's biosecurity preparedness and response capability by outlining specific areas of action which could be undertaken through a government and industry partnership.

This biosecurity plan is principally designed for decision makers. It provides the Australian berry sector and government with a mechanism to identify exotic plant pests as well as to address the strengths and weaknesses of the berry sector's current biosecurity position. It is envisaged that regular reviews of the biosecurity plan will be undertaken to assess progress against agreed activities.

The *Biosecurity Plan for the Berry Sector (Version 1.5)* is a document outlining the commitment to the partnership between the berry sector and government to improve biosecurity for the berry sector.

BIOSECURITY PLANNING AND PLAN DEVELOPMENT

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 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 way of life.

Plant pests are 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. For agricultural systems, if exotic 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 because 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 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 continuous improvement from industry and governments to Australia's plant biosecurity system, 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.

Through these themes, a focus on the biosecurity continuum better supports consistent service delivery offshore, at the border, and onshore, and provides an effective biosecurity risk management underpinned by sound evidence and technical justification.

The benefits of the modern biosecurity system are realised by industry, government, and the community, with positive flow on effects to the economy more generally. This occurs through streamlined business processes, productivity improvements and reduced regulatory burden in a seamless and lower cost business environment, by emphasising risk-based decision making and robust partnerships.

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 based in Canberra. PHA's main activities 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 the company.

The company 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 plant industries. Through PHA, current and future needs of the plant biosecurity system can be mutually agreed, issues identified, and solutions to problems found. PHA's independence and impartiality allow the company 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

Biosecurity planning

Biosecurity planning provides a mechanism for the berry sector, government, and other relevant stakeholders to actively determine pests of highest priority, analyse the risks they pose and put in place practices and procedures that would rapidly detect an incursion, minimise the impact if a pest incursion occurs and/or reduce the chance of pests becoming established. Effective industry biosecurity planning relies on all stakeholders, including government agencies, industry, and the public (Figure 2).

Ensuring the berry sector 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 social and economic costs of pest incursions on both growers and the wider community. The information gathered during these processes provides additional assurance that the Australian berry sector 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.

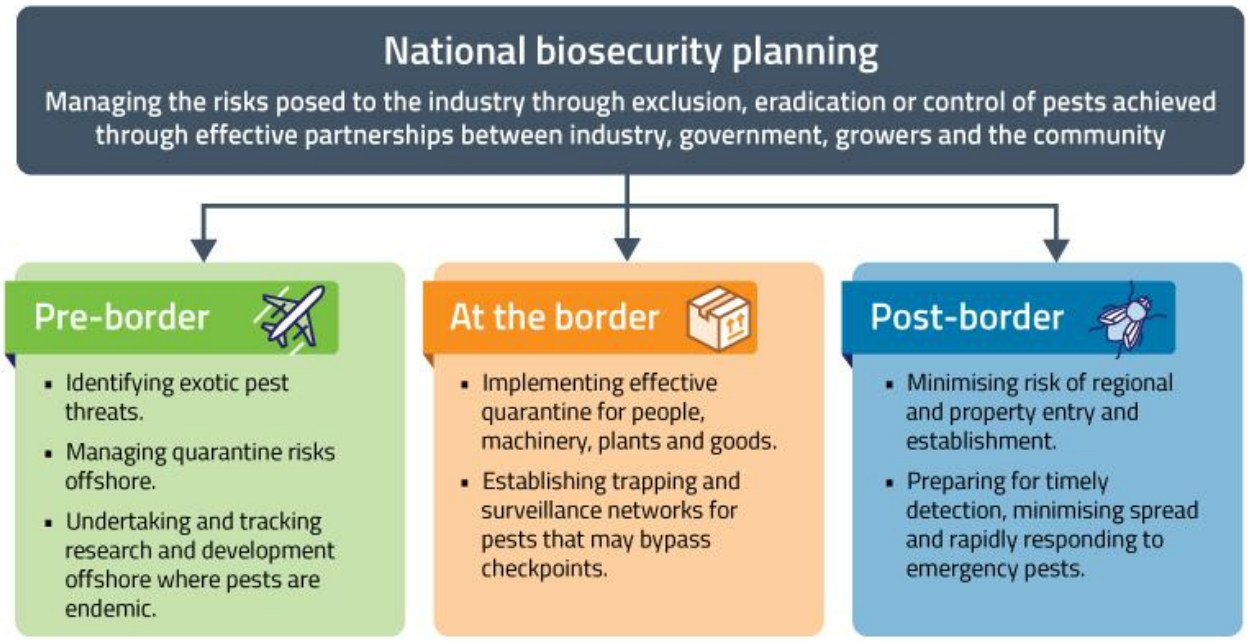

Figure 2. Industry biosecurity: a shared responsibility.

AUSTRALIAN BERRY SECTOR PROFILE

Peak industry bodies

The Australian Blueberry Growers' Association (ABGA), Strawberries Australia Inc (SAI) and Raspberries and Blackberries Australia Incorporated (RABA) are the peak industry bodies for Australia's blueberry, Rubus and strawberry industries respectively. RABA and SAI are signatories to the EPPRD and are the key industry contact points if a suspect emergency plant pest affecting the berry sector is detected. The ABGA are not signatories to the EPPRD. Berries Australia is a joint venture between the three berry peak industry bodies and is also not a signatory to the EPPRD.

For further information about RABA and SAI in relation to response procedures following the identification of a suspect exotic pest, refer to page 71.

For background information on the Australian berry sector, refer to page 20.

Berries Australia

Berries Australia[1] was formed in 2019 as a joint venture between the Australian Blueberry Growers' Association (ABGA), Strawberries Australia Inc (SAI) and Raspberries and Blackberries Australia Incorporated (RABA). It represents berry growers across Australia at a national level, including multi-site agribusinesses and major horticultural enterprises. It represents the single largest line of fresh berry produce in Australian supermarkets with an overall value exceeding $1 billion. Their aim is to foster sustainable farming practices which would have a minimal impact on the environment and surrounding communities, as well as expansion of the domestic and global markets for Australian berries. The company is governed by a board of directors agreed upon by ABGA, SAI and RABA (Berries Australia, N.D.).

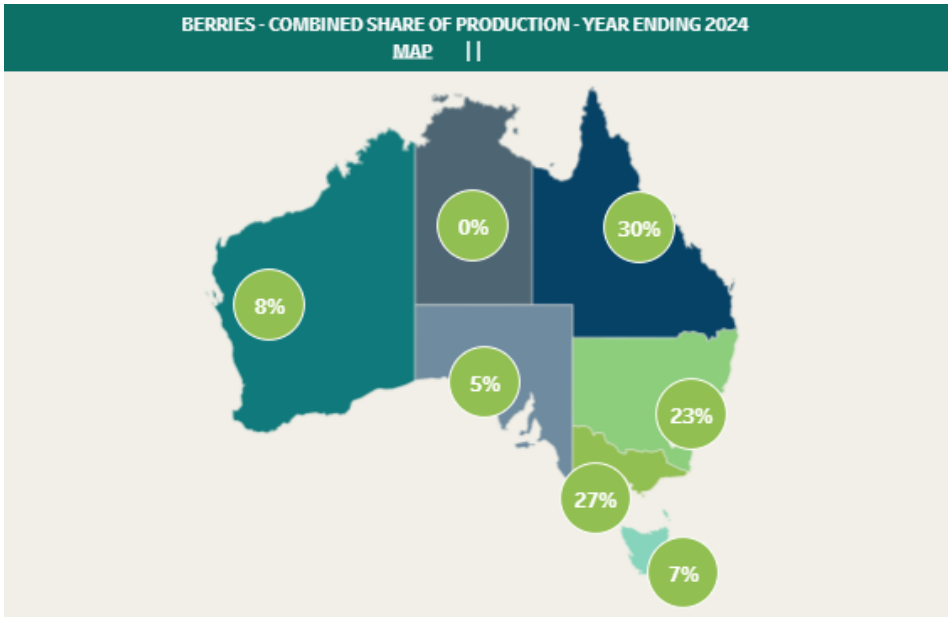

Figure 3. Australian berry sector production values (Hort Innovation, 2025).

[1] https://berries.net.au/home/about/berries-australia/

Australian Blueberry Growers' Association

Formed in the mid-1970s, the Australian Blueberry Growers' Association[2] (ABGA) is the representative association of Australian blueberry growers. As of 2024, the ABGA is made up of over 230 grower members from six states and territories, with 95% of Australia's blueberry production is estimated to have come from members of the association (Figure 4). One of the main goals of the association is to ensure that the Australian blueberry industry is profitable, environmentally sustainable and produces quality fruit (Berries Australia, N.D.).

The ABGA is a member of Plant Health Australia but is not a signatory to the Emergency Plant Pest Response Deed (EPPRD). A voluntary levy provides funds to achieve the objectives of the industry such as research, development, and marketing. In 2023/24, Australia produced 27,540 tonnes of fresh blueberries valued at $505 million (Hort Innovation, 2025).

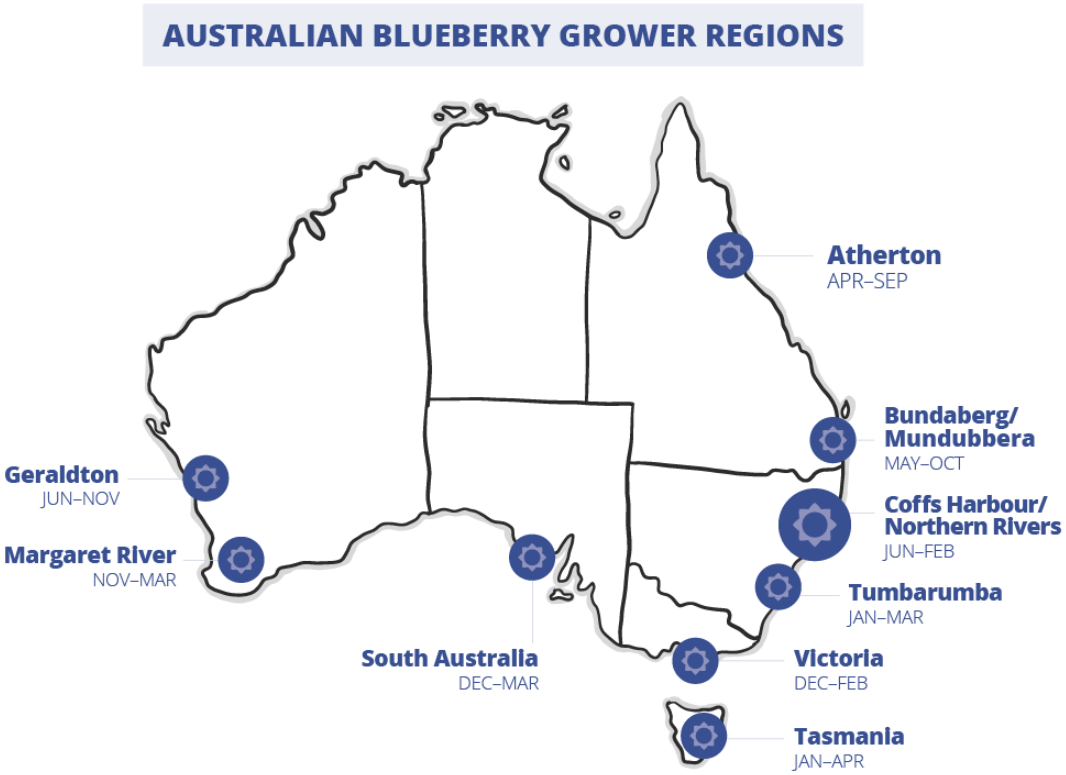

Figure 4. Blueberry growing regions in Australia (Berries Australia, N.D.).

[2] https://berries.net.au/home/about/blueberries/abga/

Raspberries and Blackberries Australia

Raspberries and Blackberries Australia Inc.[3] (RABA); previously known as the Australian Rubus Growers Association, was established in Victoria in 1983. In 1999, RABA was incorporated as the representative for Raspberry and Blackberry growers nationally. In 2006, the industry introduced a compulsory levy that has funded research and development activities which have enabled the industry to grow significantly. In recent years, the Raspberry (Rubus) industry has emerged as one of the fastest growing fresh fruit industries within Australia; with over 100 Rubus growers currently recorded in nearly all states and territories within Australia (Berries Australia, N.D.).

The Rubus levy and charge was first introduced 1 July 2006. Rubus produced in Australia that is sold by a producer or exported, will attract a levy or charge (Figure 5). In 2023/24, Australia produced 13,386 tonnes of fresh Rubus valued at $290 million (Hort Innovation, 2025).

Product	Levy/charge rate
Rubus	4 cents per kilogram

Figure 5. The current levy rates for Rubus production (DAFF, 2025).

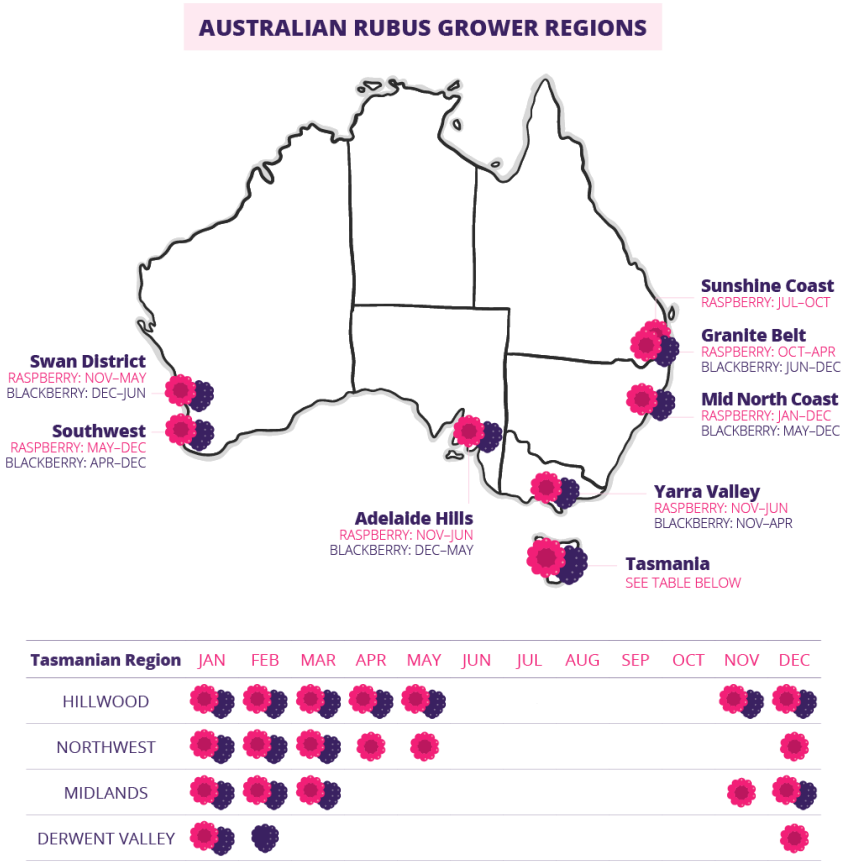

Figure 6. Rubus growing regions in Australia (Berries Australia, N.D.).

[3] https://berries.net.au/home/about/rubus/raba/

Strawberries Australia Inc.

Strawberries Australia Inc.[4] (SAI) is the peak industry body that represents all strawberry growers within Australia. The purpose and aim of SAI is to develop a professional, innovative and world-leading industry for the benefit of Australian strawberry growers and the wider community (Berries Australia, N.D.).

The strawberry industry first developed a national R&D plan in 1993, funded by the Australian Berryfruit Growers' Federation and the former Horticultural Research & Development Corporation (HRDC).

The strawberries levy was first introduced 1 April 1997. Strawberries produced in Australia and sold by the producer or used by the producer in the production of other goods, will attract a levy. In 2023/24, Australia produced 80,741 tonnes of fresh strawberries valued at $508 million (Hort Innovation, 2025).

Strawberries levy component	Levy rate
EPPR	$0.00
PHA	13 cents per 1000 runners
R&D	$7.87 per 1000 runners
TOTAL	**$8.00 per 1000 runners**

Figure 7. The current levy rates for strawberry production (DAFF, 2025).

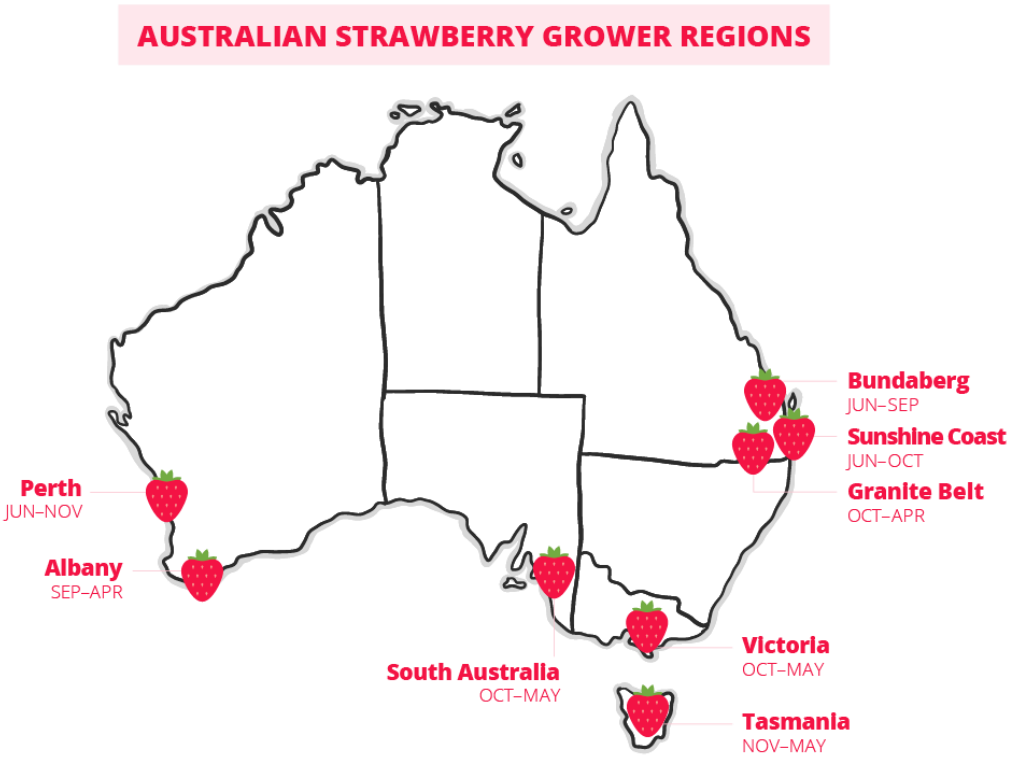

Figure 8. Strawberry growing regions in Australia (Berries Australia, N.D.).

[4] https://berries.net.au/home/about/strawberries/sai/

Industry profiles

Blueberry

Blueberries were first introduced into Australia in the early 1970s. By 1978, it was recognised that Southern Highbush and Rabbiteye varieties, which are suited to a warmer climate and were originally grown in the southern states of America, would grow on the North Coast of New South Wales and produce high value, early season fruit. These varieties are harvested from June to February.

Blueberry production in Australia is centred around Coffs Harbour which; when combined with other production areas in WA, SA, Queensland, Victoria and Tasmania, provides an almost year-round availability of blueberries (Berries Australia, N.D.).

Table 1. Cultivated blueberry species.

SPECIES NAME	COMMON NAME	NOTES
Vaccinium corymbosum	Northern highbush blueberry or highbush blueberry	Cultivated in southern NSW, Victoria, and Tasmania. Have a high chilling requirement to satisfy dormancy.
V. corymbosum x V. darrowii	Southern highbush blueberry	Cultivated in northern NSW and southern Queensland. Heat tolerant and low winter chilling requirement.
V. angustifolium, *V. myrtilloides* and hybrids of these species	Lowbush blueberry	Not cultivated in Australia and have a very high chilling requirement.
V. ashei	Rabbiteye blueberry	Cultivated in northern NSW and southern Queensland. Low chill, late season variety.

In 2023/24, 85.6% of fresh blueberry production came from NSW. Around 4% of Australia's fresh blueberry production was exported with the remaining 96% being used domestically. In previous years, Australia typically imported between 1000-1700 tonnes of fresh blueberries annually, in the year 2023/24 Australia imported 1309 tonnes (Hort Innovation, 2025).

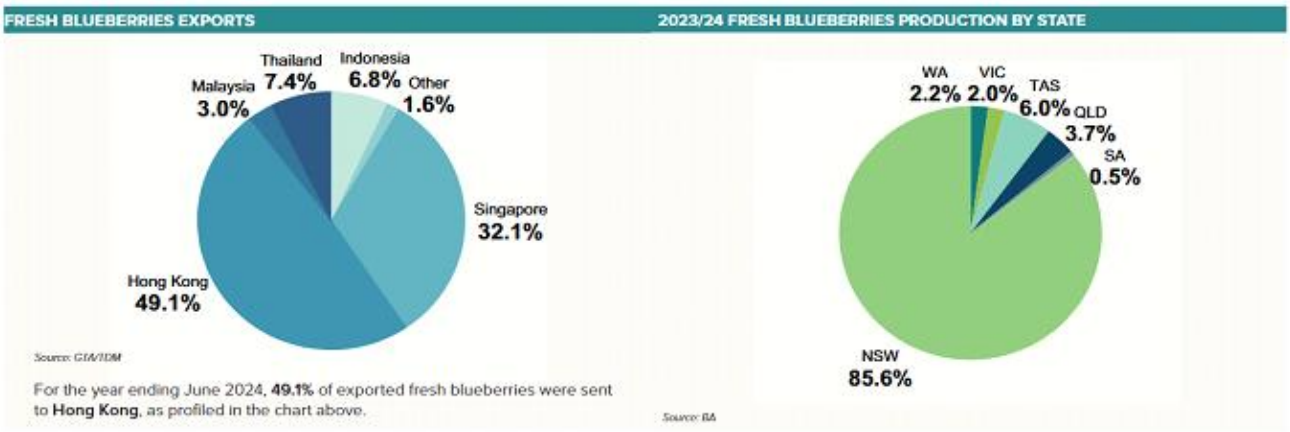

Figure 9. Blueberry production statistics (Hort Innovation, 2025).

Rubus

The Australian Rubus industry comprises of blackberries and raspberries; both of which are species of the Rubus genus, and the latter considered to dominate production. In 2023/24, raspberries accounted for 68% of fresh production, blackberries accounted for 31% of fresh production and other varieties, including boysenberries and silvanberries, accounted for <1% of fresh production (Hort Innovation, 2025).

Raspberries are bright red aggregate fruit with a hollow core are traditionally grown in climates with cold winters that provide the required chill. Raspberries crop most abundantly from early November until May. More recently, warmer climate plantings have allowed fresh Australian raspberries to become available almost all year round.

In 2023/24, 28.7% of fresh Rubus berry production came from Tasmania. <1% of Australia's fresh Rubus berry production was exported with the remaining 99% being used domestically. As fresh raspberries and blackberries are perishable, this limits the ability to import and export widely. 54.9% of fresh Rubus fruit was exported to Hong Kong (Hort Innovation, 2025).

Table 2. Cultivated Rubus species.

SPECIES NAME	COMMON NAME	NOTES
Rubus idaeus	Raspberry	There are a range of varieties of raspberries grown in Australia with varying colour and tastes.
Rubus fruticosus aggregate	Blackberry	A range of berries from dark-coloured round fruit, to elongated berries are grown in southern regions of Australia. Each variety of blackberry has a unique flavour, aroma, acidity and strength of flavour.
Rubus × hybrids	Rubus hybrids (eg. loganberry, boysenberry, marionberry and tayberry)	Hybrids in the *Rubus* genus are common, growth of hybrid species is seen in Australia, and contribute to <1% of berry sales.

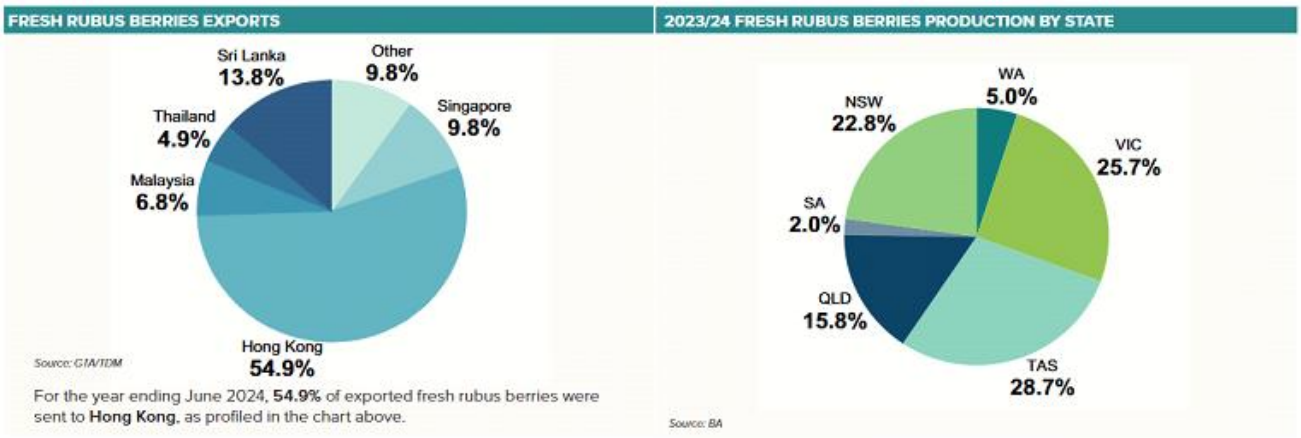

Figure 10. Rubus production statistics (Hort Innovation, 2024).

Strawberry

Strawberries were first commercially grown in Victoria's Yarra Valley during the 1950's. Varieties grown in Australia are mostly introduced and are predominantly sourced from the US (University of California), but also from Israel and Japan. Most Australian strawberries are currently grown in open fields, with only a small proportion grown in glasshouses or hydroponically. The most common form of protected is strawberries grown under clear plastic tunnels (Berries Australia, N.D.).

In 2023/24, 42% of fresh strawberry production came from Queensland. Around 4% of Australia's fresh strawberry production was exported with the remaining 96% being used domestically. Australia rarely imports strawberries and in 2023/24 Australia exported 3082 tonnes of fresh strawberries, with 29% being exported to Thailand (Hort Innovation, 2025).

The Australian Strawberry Breeding Program (ASBP) is funded by Hort Innovation using the strawberry research and development levy, with co-contributions from the Queensland Government through its Department of Agriculture and Fisheries and funds from the Australian Government. Another breeding program, Consorzio Italiano Vivaisti (CIV), has introduced new varieties to the Australian market (APG, N.D.).

Table 3. Cultivated ASBP strawberry varieties[5]

GROWING REGION	VARIETY NAME	NOTES
Sub-tropical	• Stella • Red Rhapsody • Sundrench • Scarlet Rose • Susie	The sub-tropical growing regions in Australia are the Wide Bay area, the coastal areas of Southeast Queensland, and the coastal areas of mid-coast NSW. Varieties suited to sub-tropical growing regions can also be grown in the Wanneroo area north of Perth in WA Strawberries are grown here during the southern hemisphere winter season with planting taking place in March-April and fruit production generally spanning from May to October
Temperate	• Tahli • Tamara	The temperate growing regions in Australia are Tasmania, Victoria, South Australia, the Granite Belt region of Queensland and Southwest WA Strawberries are grown here during the southern hemisphere summer season with fruit production generally spanning from October to April
Mediterranean	• Stella • Red Rhapsody • Sundrench • Scarlet Rose	The Mediterranean growing region in Australia is north of Perth in the Wanneroo area of WA. Strawberries are grown here during the southern hemisphere winter season with fruit production generally spanning from May to December

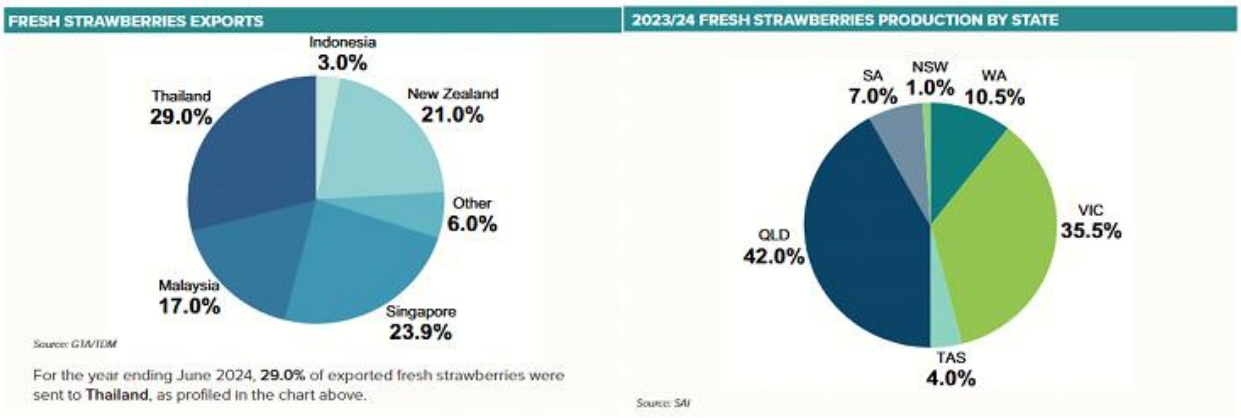

Figure 11. Strawberry production statistics (Hort Innovation, 2024).

[5] All varieties of strawberry are Fragaria × ananassa (APG, N.D.).

DOCUMENT OVERVIEW

Biosecurity for the Australian berry sector focuses on five key areas outlined below and identifies the components to be implemented over the life of the biosecurity plan 2019-2025.

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 (HPP) and established pests of biosecurity significance for the Australian berry sector (Page 25). This section includes:

- exotic HPPs; being the most significant potential exotic pest threats affecting the berry sector as identified through a prioritisation process,
- established pests of biosecurity significance identified in consultation with the Australian berry sector.

The identification of HPPs and important established pests will allow industry and government to better prioritise and implement preparedness activities (page 52). For example, the development and implementation of:

- effective grower and community awareness campaigns,
- targeted biosecurity education and training programs for growers,
- development of surveillance programs and diagnostic protocols,
- pest-specific mitigation activities can enhance biosecurity preparedness.

Implementing biosecurity for the Australian berry sector 2019-2025

This section (Page 40) includes the Berry Biosecurity Action Plan and a gap analysis of the current level of preparedness for HPPs of the Australian berry sector. The Berry Biosecurity Reference Panel (BRP), comprised of both industry and government representatives, developed the Berry Biosecurity Action Plan (Table 9) that sets out shared biosecurity goals and objectives over the next five years. It is intended that the Action Plan is revisited by the BRP regularly over the next five years to maintain its relevance.

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 berry biosecurity pest threats considered in the biosecurity plan are detailed in the Threat Summary Table (TST). From the prioritisation process undertaken in the TST, pests with an overall high rating were identified as a HPP (page 25). Other pests of biosecurity significance, as determined by the criteria on page 36, are also listed.

Risk mitigation and preparedness

This section provides a summary of activities to mitigate the impact of pest threats on the Australian berry sector, 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.

Response management

This section provides a summary of the processes in place to respond to emergency plant pest (EPP)[6] incursions that would affect the Australian berry sector. 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

One of the primary goals of the biosecurity plan is to identify the high priority exotic pests, exotic pests to monitor and other pests of biosecurity significance to the Australian berry sector. These pest lists are outlined in this section and were developed in consultation with industry, government, and stakeholders. Pests of biosecurity significance assist in the prioritisation of resources for risk mitigation and pest management activities.

The exotic pests identified as High Priority Pests (HPPs) are included on page 25. Further details on each pest along with the basis for the likelihood ratings are provided in 'Threat identification and pest risk assessments' (page 55) and the Threat Summary Table (page 83). Assessments may change due to increased understanding of pest biology, changes to pest/host interactions, or production methods. The HPP list may be reviewed on a regular basis through the Biosecurity Reference Panel (BRP).

[6] Refer to the PHA website for details https://www.planthealthaustralia.com.au/response-arrangements/emergency-plant-pest-response-deed-epprd/

Berry sector exotic High Priority Pests

Pests and diseases captured in this table have been identified and rated as High Priority Pests (HPPs) for all crop commodities assessed across the Berry sector. Pests and diseases affecting specific crop commodities have been separated into individual tables allocated to their specific berry host.

Table 4. Shared High Priority Pests (Blueberry, Rubus and Strawberry).

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Crop commodity	Entry potential	Est.[7] potential	Spread potential	Economic impact	Overall risk
Invertebrates											
Coleoptera (Beetles and weevils)											
Popillia japonica	Japanese beetle	Highly polyphagous and reported to feed on over 300 hosts.[1]	Whole plant[2]	Infested plant material and machinery and adults are capable of flight.	Native range: Japan, Russia. Introduced range: Canada, United States of America, Italy (restricted distribution), Portugal (Azores), Switzerland (restricted distribution) (EPPO, 2020).	Blueberry Rubus Strawberry	MEDIUM[3]	HIGH[4]	HIGH[5]	HIGH[6]	**HIGH**
Diptera (flies and midges)											
Drosophila suzukii	Spotted winged drosophila	*D. suzukii* is reported to have a wide host range which has been extensively researched.[7,8]	Fruit[9]	Adults capable of flight. Can spread via infested plant material[10].	Africa, Asia, Middle East, the Americas, Europe, Oceania.[11]	Blueberry Rubus Strawberry	HIGH[12]	HIGH[13]	HIGH[14]	EXTREME[15]	**EXTREME**
Hemiptera (stink bugs, aphids, mealybugs, scale, whiteflies and hoppers)											
Halyomorpha halys	Brown marmorated stink bug	BMSB is highly polyphagous on over 300 hosts.[16]	Leaves and fruit[17]	Infested plant material, conveyances and cargo. Adults capable of flight for localised spread.	Africa, Asia, Europe, the Americas.[18]	Blueberry	HIGH	HIGH	HIGH	HIGH[19]	**HIGH**
						Rubus Strawberry	HIGH[20]	HIGH	HIGH	EXTREME[21]	**EXTREME**
Thysanoptera											
Scirtothrips dorsalis complex (exotic	Chilli thrips	Highly polyphagous.[22]	Shoots, leaves, young fruit,		Africa, the Americas, the Caribbean, Asia,	Blueberry	HIGH[25]	HIGH[26]	MEDIUM[27]	HIGH[28]	**HIGH**

[7] Establishment potential.

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Crop commodity	Entry potential	Est.[7] potential	Spread potential	Economic impact	Overall risk
species)			and flowers.[23]		Europe, Oceania.[24]	Rubus Strawberry					
Fungi											
***Monilinia fructigena* (syn. *Oospora fructigena*, *Sclerotinia fructigena*)**	Brown rot	Apple, Apricot, Blueberry, Cherry, Fig, Peach, Pear, Persimmon, Plum, Quince and Strawberry (Plant Biosecurity and Product Integrity, 2017).	Fruit, blossoms, stems and leaves[29]	Localised spread by fungal spores carried by wind or rain splash and insect vectors (e.g. wasps, beetles and butterflies). Longer distance spread is most likely through the movement of infected plant material(s) or fruit.	Africa, Asia, Middle East, Europe.[30]	Blueberry Rubus Strawberry	HIGH[31]	HIGH[32]	HIGH[33]	HIGH	**HIGH**

Table 5. High Priority Pests (Blueberry industry).

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Entry potential	Est.[8] potential	Spread potential	Economic impact	Overall risk
Invertebrates										
Coleoptera (Beetles and weevils)										
Popillia japonica	Japanese beetle	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Diptera (flies and midges)										
Drosophila suzukii	Spotted winged drosophila	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Hemiptera (stink bugs, aphids, mealybugs, scale, whiteflies and hoppers)										
***Ericaphis fimbriata*[34] (with *Blueberry scorch virus* (Carlavirus))**	Blueberry aphid	Blueberry[35,36]	Shoots, flowers and leaves[37]	Infested plant material and adults are capable of flight and wind dispersal.	United States of America, Canada, The Netherlands, Italy, United Kingdom (Plant Biosecurity and Product Integrity, 2017). Also found in Sweden (Dransfield & Brightwell, 2021) and Poland (Netherlands Food and Consumer Product Safety Authority, 2012).	MEDIUM [38]	MEDIUM	MEDIUM [39]	EXTREME [40]	**HIGH**
Halyomorpha halys	Brown marmorated stink bug	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
***Homalodisca vitripennis* (rating with *Xylella fastidiosa*)**	Glassy winged sharp-shooter, GWSS	Broad host range[41,42]	Leaves and stems	Infested plant material, clothing and machinery and adults capable of flight for localised spread.	Mexico, USA, Chile, Pacific Islands, Cook Islands, French Polynesia	HIGH	HIGH	HIGH	EXTREME [43]	**EXTREME**
Scaphytopius acutus (factoring blueberry stunt disease)	Sharpnosed leafhopper	Wide host range including *Fragaria virginiana* (Virginia strawberry, wild strawberry, common strawberry, or mountain strawberry) and *Rubus allegheniensis* (blackberry) (McClure, 1980) and blueberries.[44]	Leaves[45].	Can jump short distances between hosts but typically do not move far.	United States of America.	LOW	MEDIUM[46]	HIGH	EXTREME [47]	**HIGH**
Lepidoptera (butterflies and moths)										
Argyrotaenia velutinana	Red banded leafroller	Wide host range including *Vaccinium* spp.	Leaves.	Adults capable of flight but do not fly far. Often	Canada, United States of America.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**

[8] Establishment potential.

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution		Entry potential	Est.[8] potential	Spread potential	Economic impact	Overall risk
		(blueberry)[48].		found in fresh produce and stored products.							
Croesia curvalana	Blueberry leaftier, rough skinned cutworm	Blueberry	Stems, flowers and leaves	Infested plant material and adults are capable of flight.	North America.		HIGH	HIGH	MEDIUM	HIGH	**HIGH**
Lymantria dispar (L. d. dispar, L. d. asiatica, L. d. japonica)	Spongy moth complex	All *L. dispar* species are highly polyphagous, however *L. dispar asiatica* and *L. dispar japonica* have a wider host range (Boukouvala et al., 2022). Generally, *L. dispar* is reported to feed on over 500 tree species. [49]	Leaves	Spread over long distances through conveyances and cargo. Adults are capable of flight.[50]	Asia, Middle East, the Americas, Europe.[51]	*L. d. asiatica*	HIGH	HIGH[52]	HIGH[53]	HIGH[54]	**HIGH**
						L. d. dispar	MEDIUM[55]	HIGH[52]	MEDIUM	HIGH[54]	**MEDIUM**
						L. d. japonica	MEDIUM[55]	HIGH[52]	HIGH[53]	HIGH[54]	**HIGH**
						Species complexes are considered to be a High Priority Pest if one or more members are assessed with an overall risk rating of HIGH or above. In the case of the spongy moth complex, whilst *Lymantria dispar dispar* has an overall risk rating of MEDIUM, both *Lymantria dispar asiatica* and *Lymantria dispar japonica* have an overall risk rating of HIGH.					
Lymantria monacha	Nun moth	Wide host range including *Rubus idaeus* (raspberry) and *Vaccinium myrtillus* (blueberry).[56]	Leaves[57]	Adult moths capable of flight; noting males are more active than females; the latter who usually sit on stems of host plants and may fly more actively after depositing most of her eggs. First- and second instars are capable of wind-dispersal over considerable distances. Note however, that adult moths do not feed and live for less than a week (Plant Biosecurity and Product Integrity, 2016).	Native range: Austria, Bulgaria, China, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Japan, Kazakhstan, Latvia, Lithuania, Netherlands, North Korea, North Macedonia, Norway, Poland, Portugal, Romania, South Korea, Spain, Sweden, Switzerland, Vietnam, Ukraine. Introduced range: Armenia, Azerbaijan, Georgia, Turkey, Belgium, Bosnia and Herzegovina, Hungary, Russia, Slovenia, United Kingdom.		HIGH[58]	MEDIUM	HIGH	HIGH[59]	**HIGH**
***Choristoneura rosaceana* (syn. *Loxotaenia rosaceana*)**	Oblique banded leafroller	Wide host range including *Rubus* spp. (blackberry, raspberry), *Rubus flagellaris* (northern dewberry), *Rubus idaeus*	Leaves.	Larvae are external feeders, so are unlikely to spread with fruit. Potentially spread with nursery plants.	Canada, Mexico, United States of America.		MEDIUM	HIGH[61]	HIGH	HIGH[62]	**HIGH**

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Entry potential	Est.[8] potential	Spread potential	Economic impact	Overall risk
		(raspberry, American red raspberry), *Vaccinium* spp. (blueberry) and *Vaccinium corymbosum* (highbush blueberry)[60].								
Thysanoptera										
Scirtothrips citri (syn. Euthrips citri)	California citrus thrips	Wide host range including *Vaccinium corymbosum* and Vaccinium hybrids (EPPO, 2022).[63]	Leaves, fruit[64].		Israel, United States of America (southern states), Mexico (EPPO, 2022).	HIGH[65]	HIGH[66]	MEDIUM[67]	HIGH[68]	**HIGH**
Scirtothrips dorsalis complex (exotic species)	Chilli thrips	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Pathogens										
Bacteria (including phytoplasmas)										
Xylella fastidiosa spp.[9]	Blueberry leaf scorch (BLS)	*Vaccinium* spp. (*V. corymbosum*, *V. ashei, V. virgatum, V. darrowii, V. angustifolium*) (Delbianco et al., 2022)[69].	Leaves, stems, fruit, roots[70].	Primarily spread by infected plant material(s) and insect vectors (mainly leafhoppers-sharpshooters, cicadas and spittlebugs)[71, 72]	United States of America (Alabama, Georgia, Louisiana)[73].	MEDIUM[74]	HIGH[75]	HIGH[76]	EXTREME[77]	**EXTREME**
Fungi										
***Botryosphaeria corticis* (syn. *Physalospora corticis*)**	Blueberry cane canker, Blueberry stem canker, Dieback of Blueberry	*Vaccinium* spp. (Hilario et. al, 2019).	Stem (natural openings in bark, pruning cuts or wounds).	Spores may be spread through wind-dispersal, contaminated pruning tools or feeding insects with introduction into new plantings possible when vegetative hardwood or softwood cuttings are taken from infected plants (Blueberry BP 2016). Spores can enter host plants through natural openings in bark,	United States of America (Hilario et. al, 2019).	MEDIUM[78]	HIGH	HIGH	HIGH	**HIGH**

[9] Includes subspecies of *Xylella fastidiosa*: *Xf subsp. multiplex*; *Xf subsp. fastidiosa*; *Xf subsp. unknown* (Delbianco et al., 2022).

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Entry potential	Est.[8] potential	Spread potential	Economic impact	Overall risk
				pruning cuts or wounds (Davey, N.D.).						
Botrytis pseudocinerea[79]	Grey mould	*Brassica napus, Brassica napus* var. *oleifera, Solanum lycopersicum* (Tomato), *Vaccinium* spp., *Vitis vinifera* (Grape). Also found on blackberry (Walker et. al, 2011) and strawberry (Plesken et. al, 2015).	Flowers and fruit (Madeiras & Schloemann , 2020)	Spores may be spread through wind-dispersal, contaminated pruning tools or feeding insects (Davey, N.D.).	China, France, Spain, United States of America (California).	MEDIUM	HIGH	HIGH	HIGH	**HIGH**
***Godronia cassandrae* (syn. *Fusicoccum putrefaciens*, *Sphaeronaema radula*)**[80]	Canker of Blueberry, Fusicoccum canker, Godromia canker	*Vaccinium* spp., *Vaccinium corymbosum* (Blueberry), *Vaccinium macrocarpon* (Cranberry).	Stem (branches)[81]	Rain dispersal is reported to be of greater importance for dispersal than wind (Parker & Ramsdell, 1977).	Russia, Canda (Nova Scotia, Quebec), United States of America (Michigan). Also found in Norway (Zhao et. al, 2019).	MEDIUM	HIGH	HIGH	HIGH[82]	**HIGH**
***Monilinia fructigena* (syn. *Oospora fructigena*, *Sclerotinia fructigena*)**	Brown rot	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
***Monilinia vaccinii-corymbosi* (syn. *Sclerotinia vaccinii-corymbosi*)**	Mummy berry, Cottonball disease	*Vaccinium* spp. (including *V. corymbosum*, *V. angustifolium*)	Fruit and blossoms[83]	Infected plant material spores, rain and insect pollinators	Austria, Canada, Chile, Europe, Slovenia, United States of America (Alvarez Osorio et. al, 2022; Munda, 2011; Plant Biosecurity and Product Integrity, 2018).	MEDIUM[84]	HIGH[85]	HIGH[86]	HIGH[87]	**HIGH**
Oomycetes										
***Phytophthora kernoviae* (syn. *P. kernovii*)**	Phytophthora blight	Wide host range including *Vaccinium* spp. (blueberries) and *Vaccinium myrtillus*[88].	Leaves, Shoots[89]	Moves by rain or mist events, wind-blown mists or wind-driven rain-splash, has the potential to move in watercourses and irrigation and it can survive in water. Transportation by humans (for example on shoes or on car tyres) is also possible, as is movement	Ireland, United Kingdom, Argentina, Chile, New Zealand (EPPO, 2022).	HIGH[90]	HIGH[91]	HIGH	HIGH[92]	**HIGH**

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Entry potential	Est.[8] potential	Spread potential	Economic impact	Overall risk
				by animals (EPPO, 2022).						
Phytophthora ramorum	Sudden oak death	Broad host range including oak trees, *Arbutus* spp., *Lithocarpus* spp., fir, maple, plants Ericaceae family (incl. blueberry), *Eucalyptus gunnii*, beech, bay laurel, yew, magnolia[93]	Stems, branches and leaves	Transmitted by infected plant material, pruning with contaminated tools and through airborne and soilborne spores.	Belgium, Croatia, Denmark, Finland (transient), France, Germany, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, United Kingdom, Japan, Vietnam, Canada (transient), United States of America, Argentina (EPPO, 2020).	HIGH[94]	HIGH[95]	HIGH[96]	EXTREME[97]	**EXTREME**
Viruses and viroids										
Tobacco ringspot virus (Nepovirus nicotianae) (exotic blueberry infecting strains)[98]	Tobacco ringspot virus, TRSV	Wide host range including *Vaccinium* spp. (blueberries) and *Vaccinium corymbosum* (blueberry)[99].	Leaves, Stem, Whole plant[100]	Vectored by nematodes in soil and roots.	Congo (DRC), Egypt, Malawi, Morocco, Nigeria, Togo, Zambia, China, India, Indonesia, Iran, Japan, Kyrgyzstan, Nepal, North Korea, Sri Lanka, Taiwan, Jordan, Lebanon, Oman, Saudi Arabia, Turkey, Belarus, Croatia, Georgia, Hungary, Italy, Lithuania, Netherlands, Poland, Russia, Ukraine, United Kingdom, Canada, Cuba, Dominican Republic, Mexico, United States of America, Australia (some strains), New Zealand, Papua New Guinea, Brazil, Chile, Uruguay, Venezuela (EPPO, 2002)[101].	MEDIUM[102]	HIGH	HIGH[103]	HIGH[104]	**HIGH**
Tomato ringspot Nepovirus (Nepovirus lycopersici) (subgroup C)	Tomato ringspot virus	Wide host range spanning over multiple families. Hosts include blueberry, blackberry, raspberry, gooseberry, apple, stonefruit, currants, grapevine, strawberry, *Pelargonium* spp. and various weed species.	Whole plant	Vectored by nematodes in soil and roots.	China, India, Iran, Japan, Jordan, Korea, Republic of, Oman, Pakistan, Turkey, Egypt, Togo, Canada, Mexico, USA, Puerto Rico, Brazil, Chile, Colombia, Peru, Venezuela, Belarus, Croatia, France, Italy, Lithuania, Poland, Russian Federation, Serbia, Slovakia, Slovenia, Yugoslavia (Serbia and Montenegro), Fiji, New Zealand.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**

Table 6. High Priority Pests (Rubus industry).

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Entry potential	Est.[10] potential	Spread potential	Economic impact	Overall risk
Invertebrates										
Acari (mites)										
Tetranychus turkestani	Strawberry spider mite	Apple, okra, pear, citrus, clover, fig, cherry, peach, cotton, almond, strawberry, *Rubus* spp., banana, carrot, stone fruit, rose, soybean, maize, beans, quince, lucerne, lettuce, blackcurrant, parsley, grapevine	Leaves	Can spread over long distances on infested plant material, wind dispersal, clothing and machinery. Localised spread, from plant to plant by walking.	Europe, North and South America, New Zealand, Africa and Asia (including the Middle East).	MEDIUM[105]	HIGH	HIGH	HIGH[106]	**HIGH**
Coleoptera (Beetles and weevils)										
Popillia japonica	Japanese beetle	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Diptera (flies and midges)										
Drosophila suzukii	Spotted winged drosophila	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Hemiptera (stink bugs, aphids, mealybugs, scale, whiteflies and hoppers)										
Euschistus conspersus	Consperse stinkbug	Polyphagous including tomato blackberry, pear, almond, cotton, vegetable.	Fruit	Infested plant material and adults are capable of flight.	North America.	MEDIUM[107]	HIGH	HIGH	HIGH[108]	**HIGH**
Halyomorpha halys	Brown marmorated stink bug	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
***Homalodisca vitripennis* (rating with *Xylella fastidiosa*)**	Glassy winged sharp-shooter, GWSS	*Refer to High Priority Pests (Blueberry industry).*								
Lygus lineolaris	Tarnished plant bug	Wide host range[109] including apple, European pear, carrot, cotton, cherry, beans, lucerne, soybean, peach, strawberry, *Rubus* spp., clover, tomato, conifers.	Above ground plant parts	Infested plant material and adults are capable of flight for localised dispersal.	Georgia, Bermuda, Canada, Mexico, USA, El Salvador, Guatemala, Honduras.	HIGH	HIGH[110]	HIGH	HIGH[111]	**HIGH**

[10] Establishment potential.

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Entry potential	Est.[10] potential	Spread potential	Economic impact	Overall risk
Lepidoptera (butterflies and moths)										
Lymantria dispar (L. d. dispar, L. d. asiatica, L. d. japonica)	Spongy moth complex	*Refer to High Priority Pests (Blueberry industry).*								
Thysanoptera (thrips)										
Thrips fuscipennis	Rose thrips	Roses, strawberry, blackberry, apple, cucumber	Flowers	Infested plant material and adults are capable of flight.	North America, China and Europe.	HIGH	HIGH	HIGH	HIGH	**HIGH**
Scirtothrips dorsalis complex (exotic species)	Chilli thrips	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Pathogens										
Bacteria (including phytoplasmas)										
Xylella fastidiosa **(with vector)**	Leaf scorch	Wide host range including plum, sycamore, oak, blackberry, raspberry, *Citrus* spp., peach, ryegrass, Oleander, pecan, almond, maple, grape, blueberry.	Leaves, stems, fruit, roots	Primarily spread by infected plant material(s) and insect vectors (mainly leafhoppers-sharpshooters, cicadas and spittlebugs).[112, 113]	Iran, Taiwan, Canada, Mexico, United States of America, Europe.	HIGH[114]	HIGH	HIGH[115]	EXTREME	**EXTREME**
Fungi										
Arthuriomyces peckianus	Orange rust (long cycled)	Black raspberry, purple raspberry, blackberry, dewberry.	Whole plant	Airborne and rain splash borne spores	USA, Japan, China, Turkey, Russia, Mexico, Canada, Finland, Norway, Sweden.	HIGH	HIGH[116]	HIGH[117]	HIGH	**HIGH**
Monilinia fructigena **(syn. *Oospora fructigena*, *Sclerotinia fructigena*)**	Brown rot	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								

Table 7. High Priority Pests (Strawberry industry).

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Entry potential	Est.[11] potential	Spread potential	Economic impact	Overall risk
Invertebrates										
Acari (mites)										
Oligonychus ilicis	Southern red mite	Wide host range.[118]	Foliage	Infested plant material and soil.	East Asia, North and South America, Europe, Japan, Korea.	HIGH[119]	HIGH	HIGH	HIGH	**HIGH**
Tetranychus turkestani	Strawberry spider mite	*Refer to High Priority Pests (Rubus industry).*								
Lygus lineolaris	Tarnished plant bug	*Refer to High Priority Pests (Rubus industry).*								
Lygus rugulipennis	Bishop bug, European tarnished plant bug	More than 400 hosts including alfalfa, clover, lettuce, lucerne, potato, sugarbeet, winter cereals, eggplant, strawberry.[120]	Above ground plant parts	Infested plant material and adults are capable of flight.	Japan, Turkey, Finland, Canada, Bulgaria, Italy, Hungary, Lithuania, Poland, UK, Sweden, Serbia, Russia, Montenegro.	HIGH	HIGH[121]	HIGH	HIGH	**HIGH**
Coleoptera (Beetles and weevils)										
Popillia japonica	Japanese beetle	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Diptera (flies and midges)										
Drosophila suzukii	Spotted winged drosophila	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Hemiptera (stink bugs, aphids, mealybugs, scale, whiteflies and hoppers)										
Halyomorpha halys	Brown marmorated stink bug	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Thysanoptera (thrips)										
Frankliniella intonsa	Flower thrips	Wide host range.[122]	Fruit and Inflorescence	Infested planting material over long distances	Asia, Middle East, the Americas, Europe.[123]	HIGH[124]	HIGH[125]	HIGH	HIGH[126]	**HIGH**
Scirtothrips dorsalis complex (exotic species)	Chilli thrips	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								
Thrips fuscipennis	Rose thrips	*Refer to High Priority Pests (Rubus industry).*				HIGH[127]	HIGH	HIGH	HIGH	**HIGH**

[11] Establishment potential.

Scientific name	Common name	Host(s)	Affected plant part	Dispersal	Distribution	Entry potential	Est.[11] potential	Spread potential	Economic impact	Overall risk
Pathogens										
Bacteria (including phytoplasmas)										
Xanthomonas fragariae	Angular leaf spot	Strawberry	Leaves, growth points	Windblown rain, infected plant material, contaminated soil	Asia, Middle East, the Americas, Europe.[128]	HIGH[129]	HIGH	HIGH[130]	HIGH	**HIGH**
Oomycetes										
Phytophthora fragariae[131]	Strawberry red stele root rot	Strawberry.	Bulbs, roots and stem.	Infected plant material and equipment, soilborne and waterborne spores.[132]	Asia, Middle East, the Americas, Europe.[133]	MEDIUM [134]	HIGH	HIGH[135]	EXTREME [136]	**EXTREME**
Fungi										
Monilinia fructigena **(syn. *Oospora fructigena*, *Sclerotinia fructigena*)**	Brown rot	*Refer to Shared High Priority Pests (Blueberry, Rubus and Strawberry).*								

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. Pollination services of the European honey bee is provided by beekeepers to growers of pollinator-reliant crops.

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

Both established and exotic pests of honey bees (bee pests) and bee species that compete with honey bees (pest bees) can have a major impact on crop pollination services. Bee pests and pest bees can also impact unmanaged colonies which provide "free" pollination.

Blueberry, Rubus and strawberry are regarded as pollination-reliant industries and honey bee pests and pest bees can impact the berry sector, through reduced pollination and therefore yield. A list of the high priority bee pests and pest bees which could impact the berry sector can be located on the PHA website[12] and the BeeAware website[13].

Other pests of biosecurity significance

Introduction

This section identifies other pests of biosecurity significance for the Australian berry sector. By identifying pests which are either currently under quarantine arrangements or which berry producers already 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 industry.

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

Threat identification

In order to be considered as a pest of biosecurity significance, the pests included in Table 8 should be economically important to the berry sector and at least one of the following:

- currently under quarantine arrangements or 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.

[12] https://www.planthealthaustralia.com.au/resource/resource-centre/
[13] https://beeaware.org.au/pollination/pollinator-reliant-crops/berries/

Table 8. Other pests of biosecurity significance.

Affected berry industry	Common name (Scientific name)	Hosts	Affected plant part	Distribution in Australia	State movement controls or markets impact by pests	Factsheets	Comments
Invertebrates							
Acari (Mites)							
Strawberry	**Kanzawa spider mite** (*Tetranychus kanzawai*)	Wide host range including beans, persimmon, strawberry, apple, cherry, peach, pear, eggplant, papaya, soybean, *Citrus* spp., grape.	Leaves, stems	NSW, Qld	Movement control of fruit and nursery stock into WA.[137]	None	
Rubus	**Red berry mite** (*Acalitus essigi*)	*Rubus* spp. particularly blackberry, loganberry, cedars, *Citrus*, cherry, coffee, cotton, grapevine, peanut.	Fruit, leaves	SA, Tas, Vic, WA	No formal movement restrictions	Tasmanian Institute of Agriculture/Hort Innovation[138]	
Coleoptera (Beetles and weevils)							
Blueberry, Rubus and Strawberry	**Strawberry rough weevil** (*Otiorhynchus rugosostriatus*)	Several plant species including *Corylus*, strawberry, oaks, *Azalea* spp., *Rubus* spp., yew, blueberry, cranberry, grapevine and *Thuja* spp.	Above ground parts	ACT, NSW, Tas, Vic	Movement control of nursery stock into WA.[139]	None	Adult weevils are flightless. Larvae and adults are transported through the roots of planting material.
Diptera (Flies and midges)							
Blueberry, Rubus and Strawberry	**Queensland fruit fly** (*Bactrocera tryoni*)	Wide host range[140]	Fruit	NSW, NT (Darwin), Qld, Vic	Movement controls of fruit into WA, SA and Tas.[141]	NSW DPIRD[142], PHA[143], Qld DPI[144], AgVic[145], DPIRD WA[146], PIRSA[147]	SA experiences intermittent outbreaks of Medfly and Qfly with outbreak specific restrictions regularly updated.[148]
Blueberry and Rubus	**Mediterranean fruit fly** (*Ceratitis capitata*)	Wide host range including strawberry, *Rubus* spp., kiwi, *Capsicum* spp., papaya, Citrus and mango.	Fruit	WA (except Ord river irrigation area)	Movement controls of fruit for all states.	PHA[149], NSW DPIRD[150], DAF NT[151], Qld DPI[152], DPIRD WA[153], AgVic[154], PIRSA[147]	SA experiences intermittent outbreaks of Medfly and Qfly with outbreak specific restrictions regularly updated.[148]
Gastropoda (Slugs and snails)							
Strawberry	**Green snail** (*Cornu apertus*)	Wide host range including broadacre and horticultural crops eg. cereals, canola, lucerne, pasture grasses, lupins, cultivated flowers, vegetables, nursery stock and citrus.	Fruit, flowers, leaves	WA (Perth metropolitan area), Vic (near Cobram)	Notifiable pest for WA, Vic, NT, Tas, SA and NSW. Host plant material (including strawberries and strawberry plants) are restricted if originating from where green snails are known to occur.	DPIRD WA[155], AgVIc[156], PIRSA[157]	One detection of green snails was made in Vic in 2011 and hasn't been reported since.[156]

Affected berry industry	Common name (Scientific name)	Hosts	Affected plant part	Distribution in Australia	State movement controls or markets impact by pests	Factsheets	Comments
Hymenoptera (Sawflies, wasps, bees and ants)							
Blueberry, Rubus and Strawberry	**Red imported fire ant (RIFA)** (*Solenopsis invicta*)	More than 50 agricultural and horticultural crops, as well as turf and nursery species, can be affected by fire ants.	Impact on harvest and movement of produce. May have some impact on production.	Southeast Queensland and Northern NSW[158]	FACT: Fire Ant Compliance Tool[159], Biosecurity Regulation 2016[160] (Qld), Biosecurity (Invasive Ant Carriers) Control Order [161] (NSW)	PHA[162], Qld DPI[163], NSW DPIRD[164], ISC[165], Lucid Central[166], DAFF/ NSW DPIRD[167], AgVic[168]	Fire ants pose a serious threat to the environment and have significant environmental, economic, social and health impacts. The National Fire Ant Eradication Program has been operating since 2001 and is led by teams in Queensland (Biosecurity Queensland and Queensland Government's Fire Ant Suppression Taskforce (FAST)) and is coordinated by the National Management Group (NMG)[169]
Thysanoptera (Thrips)							
Blueberry and Strawberry	**Western flower thrips** (*Frankliniella occidentalis*)	Highly polyphagous including onion, peanut, beetroot, cabbage, melon, *Capsicum* spp., grapefruit, Chrysanthemum, Azalea, blueberries, potato, eggplant, fig, strawberry.	Fruit, flowers, leaves	NSW, Qld, SA, Tas, Vic, WA	NT[170].	NSW DPIRD[171], PHA[172], Hort Innovation[173], ACIAR[174]	Pest feeds on plant tissue causing scarring of leaves, malformed flowers and deformed fruit. Pest of concern for Taiwan.
Blueberry, Rubus, Strawberry	**Chilli thrip** (*Scirtothrips dorsalis*) (endemic)	Wide host range including *Fragaria* spp. (strawberry), *Rubus* spp. (blackberry, raspberry) and *Vaccinium* spp. (blueberry).	Shoots, leaves, flowers and young fruits.	NSW, NT, Qld, WA	No formal movement restrictions.	GIA[175], DPIRD WA[176]	Following BRP #4, 2024. It was decided by the BRP that Chilli thrips will be split into endemic and exotic species noting new research into the species complex.
Pathogens							
Fungi and Oomycetes							
Blueberry	**Blueberry rust** (*Thekopsora minima*)	*Vaccinium* spp., *Tsuga* spp., *Rhododendron* spp. and *Gaylussacia* spp.	Fruit and foliage.	NSW, Qld, Tas, WA and Vic.	State movement controls of host plant material into SA.[177]	NSW DPIRD[178], NRE Tas[179], AgVic[180], DPIRD WA[181], PIRSA[182]	Blueberry rust primarily affects the foliage of blueberry plants and can cause extensive defoliation of susceptible cultivars during periods of warm weather and heavy rainfall and dew. Symptoms of infection include reddish spots on upper leaf surfaces and yellow pustule formation on fruit and leaves.

Affected berry industry	Common name (Scientific name)	Hosts	Affected plant part	Distribution in Australia	State movement controls or markets impact by pests	Factsheets	Comments
Strawberry	**Charcoal rot** (*Macrophomina phaseolina*)	Broad host range including strawberry, okra, onion, garlic, pea, tomato, potato, maize, eggplant, vanilla and radish.	Roots.	NSW, Qld, SA, Vic, WA	No formal movement restrictions. Growers implement movement restrictions to minimise local spread in Victoria.	Qld DPI[14], Victorian Strawberry Industry Certification Authority (VSICA)[15],[16]	The disease has recently emerged in strawberry fruit crops in Victoria, Queensland and Western Australia, following cessation of the practice of soil fumigation with methyl bromide. Adequate disease control is difficult to achieve with existing management practices.

[14] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/diseases/horticultural/charcoal-rot
[15] https://berries.net.au/wp-content/uploads/2020/07/Summer-2019-BS15005.pdf
[16] https://berries.net.au/wp-content/uploads/2025/02/Integrated-Control-of-Charcoal-Rot-August-2023.pdf

Implementing biosecurity for the Australian berry sector 2019-2025

As part of the biosecurity planning process, prioritisation and gap analysis was undertaken by the Berry Biosecurity Reference Panel (BRP). Following this, an Action Plan (Table 9). was developed by industry and government to set out shared biosecurity goals and objectives. This section contains the Berry Biosecurity Action Plan, which was developed to act as a guide for biosecurity activities for the Australian berry sector, governments, and other stakeholders from 2019-2025. It is intended that the plan be monitored and reviewed annually by the BRP.

Berry Biosecurity Action Plan (2019-2025)

The Berry Biosecurity Action Plan documents the priorities of the berry sector in relation to biosecurity. The action plan outlines the strategies and activities that may be implemented over the life of the Biosecurity Plan through the efforts of the Berry sector, Berries Australia, the Australian Blueberry Growers' Association (ABGA), Strawberries Australia Inc (SAI) and Raspberries and Blackberries Australia Incorporated (RABA), Hort Innovation, Plant Health Australia (PHA), government and other stakeholders.

The key priority areas of the Berry Biosecurity Action Plan align with the key priority areas of the National Biosecurity Strategy 2022-2032.[17]

The action plan highlights activities currently underway as well as those that may be addressed in the future in accordance with industry priorities and resource availability. A number of these priorities are currently being addressed by the industry.

The action plan has been developed in recognition that biosecurity is a shared responsibility between industry, government, and other stakeholders. For this reason, the action plan has been produced to help coordinate actions and resources across the biosecurity system, with the intention of creating effective and productive biosecurity partnerships.

Implementing the specific actions listed in the Berry Biosecurity Action Plan will not only strengthen the berry sector, but also the broader national plant biosecurity system. Future versions of this Biosecurity Plan will contain information on the progress of implementation.

In previous versions of the Biosecurity Plan, activities related to blueberry were included as a separate table. This table had not been updated following its development in 2016. To better align activities being undertaken by the blueberry industry to those of the broader Berry sector, all three crop commodities have been included in a single action plan (Table 9).

[17] https://www.biosecurity.gov.au/sites/default/files/2022-08/National%20Biosecurity%20Strategy%28final%29.pdf

Table 9. Biosecurity Action Plan for the Berry Sector (2019-2025).

Biosecurity plan strategy	Action	Output	Outcome	Potential partners	Current activities	Timeframe	Berry industry strategic investment plan[18]	Priority rank[19]
1. Preparedness and Response	1.1 Develop/maintain Biosecurity Incident Standard Operating Procedures (BISOP) which is designed to guide industry and government in the event of an exotic pest/pathogen incursion.	BISOP which identifies and documents corporate knowledge, organisational procedures, and roles/responsibilities for responding to a biosecurity incident/incursion.	BISOP developed for industry.	Berries Australia (BA), Plant Health Australia (PHA), Strawberries Australia (SAI), Raspberries & Blackberries Australia (RABA).	Angela working with Carolyn from PHA on strawberries to start, then Rubus to follow.	2025-26	Proactive management of biosecurity risks: Strategy - Uphold obligations under the Plant Health Deed where relevant	High
	1.2 Continue to encourage the certification and adoption of best biosecurity practice principles.	Adoption of Freshcare, Harmonised Australian Retailer Produce Scheme (HARPS) and other relevant certification.	Growers continue to adopt latest certifications and ensure compliance and high-quality fruit production.	BA, Australian Blueberry Growers Association (ABGA), SAI, RABA.	Part of ongoing work, most berry growers will have these certifications. Food Standards Australia New Zealand (FSANZ) were updated Feb 2025 and implemented in Victoria (statewide) and WA (local council level).	Ongoing	Proactive management of biosecurity risks: Strategy - Promote on-farm biosecurity	High
	1.3 Understand current surveillance programs and develop an industry surveillance strategy that links industry and government surveillance efforts.[20]	Surveillance analysis and a Berry industry surveillance program.	Early detection of key exotic pests and an improved knowledge of geographic spread of established pests.	BA, ABGA, SAI, RABA, PHA, Subcommittee on National Plant Health Surveillance (SNPHS), Commonwealth, State and territory governments.	National surveillance ongoing as per normal. Vic – Spotted Winged Drosophila (SWD) surveillance activity ongoing in Melbourne and Geelong covering 30 community gardens in high-risk areas.[21]	Ongoing	Proactive management of biosecurity risks: Strategy - Engage with PHA, DAFF and State biosecurity departments and maintain strong networks	High
	1.4 Undertake a study which evaluates the limitations of current and potential surveillance programs and identifies tools or methods that may address identified limitations.	A report that identifies surveillance limitations as well as tools and methods to address them.	Increased ability for the detection of exotic pests.	BA, ABGA, SAI, RABA, PHA, SNPHS, Commonwealth, State and territory governments.	Berries Australia is aware of current gaps, no plans to address at present. CESAR produced a report on SWD impacts and current limitations in 2019.[22]	TBD	Proactive management of biosecurity risks: Strategy -Investment in proactive biosecurity R&D	Medium

[18] https://berries.net.au/wp-content/uploads/2022/08/Strategic-Plan-22-25-FINAL.pdf
[19] Low; Medium; High.
[20] Determine the status of data sharing - industry and governments.
[21] The SWD surveillance activities are an outcome of the Boosting Diagnostic Capacity for Plan Production Industries project which ran from April 2019 – June 2023. https://grdc.com.au/__data/assets/pdf_file/0027/606546/GRDC-Boosting-Diagnostics-FINAL-report-for-publishing-Updated-06Aug2024.pdf
[22] https://www.horticulture.com.au/globalassets/laserfiche/assets/project-reports/mt18010/mt18010-final-report-complete---cesar-australia.pdf

Biosecurity plan strategy	Action	Output	Outcome	Potential partners	Current activities	Timeframe	Berry industry strategic investment plan[18]	Priority rank[19]
	1.5 Participate in future simulation exercises that test the preparedness and response of the biosecurity system to exotic pest and/or pathogen incursions.	Simulation exercises.	Participating industries and governments are better prepared to respond to a pest incursion.	BA, ABGA, SAI, RABA, PHA.	Exercise Aggregate with AgVIc and PHA in August 2023 (Angela). Xylella workshop in Mildura held September 2025 (Angela). Suggested: encourage other Industry Development Officers (IDOs) to participate in future simulation	As they occur	Proactive management of biosecurity risks: Strategy - Engage with PHA, DAFF and State biosecurity departments and maintain strong networks	High
	1.6 Review the availability of crop protection products to manage exotic pests and pathogens and identify gaps in control options.	A list of important pests and control options are available with gaps identified.	A prioritised list of pests and control options with strategies developed to gain access.	BA, ABGA, SAI, RABA, PHA, Commonwealth, State and territory governments, NSW DPIRD (Farm Chemicals Team).	A review has been considered pending funding which may involve a gap analysis based on the HPPs of berries.	TBD	Proactive management of biosecurity risks: Strategy - Investment in proactive biosecurity R&D	High
	1.7 Implement a system for monitoring pesticide resistance in important established pests and maintain awareness of pesticide resistance in important exotic pests.	Regular reports on the status of pests with regards to resistance within Australia and internationally.	Increased awareness of pesticide resistance in important established pests and important exotic pests.	BA, ABGA, SAI, RABA, Commonwealth, State and territory governments.	Berries Australia are looking at projects in the future around fungicide resistance pending funding and additionally contribute to research as needed. Curtin University (WA) has ongoing research on botrytis fungicide resistance.	As they occur/TBD	Proactive management of biosecurity risks: Strategy - Investment in proactive biosecurity R&D	Medium
	1.8 Encourage the implementation of surveillance for pests and pathogens for both presence and absence of key pests.	Surveillance data.	Surveillance data to demonstrated pest freedom and assist with trade.	BA, ABGA, SAI, RABA, Commonwealth, State and territory governments.	Multiple states and regions undertake surveillance activity for both Q-fly and Med-Fly where applicable. Victoria and New South Wales undertake trapping programs for fruit fly in addition to surveillance. Hort Frontiers project on area-wide management of Q-fly.	Ongoing	Proactive management fo biosecurity risks: Strategy - Educate growers on the need to report and provide support Promote on-farm biosecurity	High
	1.9 Review availability of diagnostics for the high priority pests and assess the capability to perform diagnostics (normal capacity and surge capacity).	Diagnostic tools and methods that provide accurate and timely identification of pests and pathogens.	Increased accuracy and rapid diagnosis of pests/pathogens will provide greater opportunity for eradication and/ or management.	BA, ABGA, SAI, RABA, Commonwealth, State and territory governments, Subcommittee on Plant Health Diagnostics (SPHD), Hort Innovation.	Berries Australia has no current activities in this space. SPHD are reviewing the capacity to apply NDPs in an emergency response and the application of non-Australian NDP equivalents.	Ongoing	Proactive management of biosecurity risks: Strategy - Investment in proactive biosecurity R&D	High
	1.10 Maintain an understanding of	Regular legislation and regulation update.	Any specific state/ territory or discordant requirements	BA, ABGA, SAI, RABA, Commonwealth, State	Business as usual.	Ongoing	Proactive management of biosecurity risks:	Medium

Biosecurity plan strategy	Action	Output	Outcome	Potential partners	Current activities	Timeframe	Berry industry strategic investment plan[18]	Priority rank[19]
	relevant biosecurity legislation and regulations in all states/territories.		identified. Increase industry awareness of legislation and regulations impacting their businesses.	and territory governments.			Strategy - Engage with PHA, DAFF and State biosecurity departments and maintain strong networks	
	1.11 Ensure the Owner Reimbursement Costs (ORC) Framework and cost calculations are current and appropriate for key berries categories.	Current ORC framework and cost structure.	ORC framework and costs structures remain relevant to key industry sectors.	BA, PHA, SAI, RABA.	Varroa mite incursion triggered development of an ORC framework for Rubus (in development). Aim to develop an ORC framework for strawberry in the future. NSW acknowledges the complexity of ORCs but supports preparedness in this space.	2025-2026	Proactive management of biosecurity risks: Strategy - Uphold obligations under the Plant Health Deed where relevant	High
2. Capacity & Capability	2.1 Ensure Berries Australia Board Directors and staff receive appropriate biosecurity training (e.g., EPPRD, BOLT).	Training industry members and staff.	Improve understanding of biosecurity activities and preparedness for all levels of decision making.	BA, ABGA, SAI, RABA, PHA, State and territory governments.	Board members may not have done training, IDOs have done ILO training. Would be good to improve their understanding. New IDOs will be undertaking ILO training. Suggested: have a high-level training package for executive decision makers. (Just in time training, used by NSW DPIRD).	2025-2026	Proactive management of biosecurity risks: Strategy - Uphold obligations under the Plant Health Deed where relevant Educate growers on the need to report and provide support	High
	2.2 Undertake an analysis of research and development capacity within the Berry industry and develop a strategy to address gaps.	Research and development capacity analysis.	The Australian Berry industry understands current R&D capacity and has a strategy to address future needs.	BA, ABGA, SAI, RABA, PHA, Commonwealth, State and territory governments, Hort Innovation.	Hort Innovation undertake a gap analysis of ongoing projects. The R&D and Biosecurity Manager will be overseeing biosecurity in the Berry space. Ongoing Hort Innovation projects: Integrated pest management approaches to address pest challenges in raspberry and blackberry (RB21000) has funded 3 PHD students.[23]Improving management of chilli thrips in blueberry and Rubus (MT24009).[24]	2024-Ongoing	Proactive management of biosecurity risks: Strategy - Investment in proactive biosecurity R&D	High

[23] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/rb21000/
[24] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt240092/

Biosecurity plan strategy	Action	Output	Outcome	Potential partners	Current activities	Timeframe	Berry industry strategic investment plan[18]	Priority rank[19]
					Hort Frontiers project with QDPI on the use of UV-C to control powdery mildew.			
	2.3 Develop and implement a biosecurity training framework for the Berry industry including but not limited to: surveillance and diagnostics technologies, BOLT courses, ILO training etc.	Biosecurity training framework.	Growers, staff, and associated businesses have access to high quality industry endorsed training which will increase the adoption of sound biosecurity practices.	BA, ABGA, SAI, RABA, PHA, Commonwealth, State and territory governments, Hort Innovation.	No formal training framework, however training undertaken by IDOs is disseminated to growers as business as usual. NSW DPIRD is hosting 2 Xylella focussed workshops in December 2025. Suggested: NSW DPIRD has developed viticulture biosecurity response training which could be tailored for berries. Funded by AgSkilled through Tocal.	Ongoing/As they occur	Proactive management of biosecurity risks: Strategy - Uphold obligations under the Plant Health Deed where relevant Educate growers on the need to report and provide support	High
3. Communication and Engagement	3.1 Berries Australia maintains an industry database which holds current contact information for Berry managers and key industry stakeholders.	Current and maintained database.	Current database of all berry growers and industry stakeholders	BA, ABGA, SAI, RABA	Database actively managed and updated as part of BAU	Ongoing	Berries Australia communicates effectively with our members across all of the PIBs	High
	3.2 Berries Australia delivers an effective industry communications program with multiple delivery methods which has the capacity to deliver biosecurity relevant information.	Communications program (including newsletters, articles, social media, journal).	Berry industry is well informed on the range of issues impacting on industry and business.	BA, ABGA, SAI, RABA, PHA, Commonwealth, State and territory governments, Hort Innovation.	Business as usual. Hort Innovation project: Facilitating the development of the Australian berry industries (MT22010).[25] Multiple NSW DPIRD articles produced on HPPs of Berry industry. Additionally, the Berry plant protection guide 2025-26 has been published.[26]	Ongoing	Berries Australia communicates effectively with our members across all of the PIBs	High
	3.3 Ensure industry (in particular new entrants) are aware of the Emergency Plant Pest Response Deed (EPPRD), the ORC Framework and	Training industry members and staff.	Improve understanding of biosecurity activities and preparedness for industry members and staff.	BA, PHA, SAI, RABA.	Business as usual. New entrants are engaged via newsletters, articles on the Berries Australia website and other outputs from the Berries Australia marketing and communications team.	Ongoing	Proactive management of biosecurity risks: Strategy - Educate growers on the need to report and provide support	High

[25] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt22010/
[26] https://berries.net.au/wp-content/uploads/2025/05/Berry-plant-protection-guide-2025-web.pdf

Biosecurity plan strategy	Action	Output	Outcome	Potential partners	Current activities	Timeframe	Berry industry strategic investment plan[18]	Priority rank[19]
	the implications for the industry and business.						Promote on-farm biosecurity	
4. Innovation, Research, Development and Extension	4.1 Review and prioritise Berry biosecurity RD&E annually and identify opportunities for collaboration and cross-sectoral investment.	Berry biosecurity RD&E plan.	A Berry innovation and RD&E program that addresses key issues challenging the Berry industry.	Ba, ABGA, SAI, RABA, PHA, Commonwealth, State and territory governments, Hort Innovation.	Business as usual. Hort Innovation project: Berry advisory mechanism (MT23003) has replaced the SIAP to encourage collaborative project proposals for Berries Australia members.[27]	Ongoing	Proactive management of biosecurity risks: Strategy - Investment in proactive biosecurity R&D	High
	4.2 Investigate innovative technologies including: rapid in-field diagnosis of key pests and pathogens, resistance breeding, and climate change.	Rapid field diagnostic tools, Disease resistant varieties, improved understanding of new and emerging technology.	More rapid diagnosis of pathogens will assist growers to implement the most suitable eradication or management program.	BA, ABGA, SAI, RABA, PHA, SPHD, Commonwealth, State and territory governments, Hort Innovation.	Business as usual. Hort Innovation project: Fresh and Secure Trade Alliance (FASTA) (AM22000) has in-field diagnostics as an outcome.[28]	Ongoing	Proactive management of biosecurity risks: Strategy - Investment in proactive biosecurity R&D	High
5. Collaboration and partnerships	5.1 Build and maintain strong networks among both researchers and regulators in Commonwealth and State/Territory governments.	A robust and collaborative research and regulatory network.	Greater input into future decisions making that may impact industry.	BA, RABA, PHA, Commonwealth, State and territory governments, Hort Innovation.	Annual Biosecurity Reference Panel Meetings to review Biosecurity Plans.	2024-ongoing	Proactive management of biosecurity risks: Strategy - Engage with PHA, DAFF and State biosecurity departments and maintain strong networks	High
	5.2 Support gaps in biosecurity preparedness to be addressed through collaboration with other industries, governments, universities and other research and education providers.	Collaborative and shared biosecurity.	Ensure the berry industry maintains access to innovative solutions and products.	BA, ABGA, SAI, RABA, PHA, Commonwealth, State and territory governments, Hort Innovation.	Business as usual, activities include MT24009[29], MT23003[30], MT18004[31].	Ongoing.	Proactive management of biosecurity risks: Strategy - Engage with PHA, DAWE and State biosecurity departments and maintain strong networks Investment in proactive biosecurity R&D	High
	5.3 Facilitate and maintain an international	Berry pest and disease network.	Improved capability and capacity to manage both	BA, ABGA, SAI, RABA	The berry industry has a strong international network of technical	Ongoing	Proactive management of biosecurity risks:	Medium

[27] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt23003/
[28] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/am22000/
[29] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt240092/
[30] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt23003/
[31] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt18004/

Biosecurity plan strategy	Action	Output	Outcome	Potential partners	Current activities	Timeframe	Berry industry strategic investment plan[18]	Priority rank[19]
	network of Berry technical specialists who can contribute to growth of knowledge and skills within the Australian Berry industry.		established and exotic pests.		specialists particularly through our members who work across multiple international sites eg. Costa, Driscolls, Mountain Blue. Berry Quest also attracts attendance from international delegates and speakers, particularly from New Zealand.		Strategy - Engage with PHA, DAWE and State biosecurity departments and maintain strong networks	
	5.4 Engage in initiatives to improve preparedness and response to cross sectoral pests and or diseases.	Improved preparedness for pests and diseases.	Shared investment into RD&E.	BA, ABGA, SAI, RABA, PHA, Commonwealth, State and territory governments, Hort Innovation.	Hort Innovation ongoing projects include: National bee pest surveillance program (MT21008)[32], (Xyllela insect vectors (ST19018)[33], National Fruit Fly Council (FF20000)[34], FASTA (AM22000).	Ongoing	Proactive management of biosecurity risks: Strategy - Investment in proactive biosecurity R&D Engage with PHA, DAWE and State biosecurity departments and maintain strong networks	High

[32] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt21008/
[33] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/st19018/
[34] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/ff20000/

Australian berry sector – Biosecurity preparedness

The following table has been populated with the High Priority Pests (HPP) of the berry sector. The aim of these tables 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 HPP and align future activities as listed in the Berry Biosecurity Action Plan (Table 9).

Table 10. Documents and activities currently available for High Priority Pests of the Berry sector.

Affected Berry Industry	Common name (Scientific name)	National Diagnostic Protocol[35]	Surveillance programs[36]	Fact sheets	Contingency plan	EPPRD category[37]	National Priority Plant Pest[38]	Potential collaborators[39]
Invertebrates								
Acari (Mites)								
Strawberry	**Southern red mite** (*Oligonychus ilicis*)	Not developed	Not covered by a specific surveillance program	GIA/Qld DPI[183]	GIA/Qld DPI (2019)[184]	Not categorised	Not categorised	Coffee, Production Nursery
Rubus and strawberry	**Strawberry spider mite** (*Tetranychus turkestani*)	Not developed	Not covered by a specific surveillance program	PHA[185]DPIRD WA[186]	Not developed	Not categorised	Not categorised	-
Coleoptera (Beetles and weevils)								
Blueberry, Rubus and strawberry	**Japanese beetle** (*Popillia japonica*)	Not developed	Vic - is using a lure for Japanese beetle for surveillance of bumblebees.	PHA[187]	Not developed	Not categorised	Not categorised	Apple and Pear, Cherry, Cutflower, Grains, Nursey and Garden, Nut, Tomato, Summerfruit, Vegetable, Viticulture
Diptera (Flies and midges)								
Blueberry, Rubus and strawberry	**Spotted wing drosophila** (*Drosophila suzukii*)	Draft in review stage	National Plant Health Surveillance Program (Tas) Multiple states participate in the Multiple Pest Surveillance Program. Surveillance is uploaded to AUSPestCheck. Multiple states participate in the National Plant Health Surveillance Program.	PHA[188], NSW DPIRD[189]	Not developed	Not categorised	NPPP - 3	Apple and Pear, Cherry, Summerfruit, Viticulture

[35] Copies of these documents are available from https://www.plantbiosecuritydiagnostics.net.au/
[36] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/2020-National-Plant-Biosecurity-Status-Report.pdf
[37] https://www.planthealthaustralia.com.au/response-arrangements/emergency-plant-pest-response-deed-epprd/
[38] https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/plant/national-priority-plant-pests
[39] Industries listed in this column identify these pests within their biosecurity plans.

Affected Berry Industry	Common name (Scientific name)	National Diagnostic Protocol[35]	Surveillance programs[36]	Fact sheets	Contingency plan	EPPRD category[37]	National Priority Plant Pest[38]	Potential collaborators[39]
Hemiptera (stink bugs, aphids, mealybugs, scale, whiteflies and hoppers)								
Blueberry	**Blueberry aphid** (*Ericaphis fimbriata*) (with *Blueberry scorch Carlavirus*)	Not developed	Not covered by a pest specific surveillance program	NSW DPIRD[190]	Not developed	Not categorised	Not categorised	-
Blueberry, Rubus and strawberry	**Brown marmorated stink bug** (*Halyomorpha halys*)	Not developed	Brown marmorated stink bug (NSW, SA, WA), National Plant Health Surveillance Program (NSW, Tas, Vic), Greater Sydney Local Land Services Periurban Surveillance Program (NSW), Multiple Pest Surveillance Program (NSW, Vic)	PHA[191], DPIRD WA[192], NRE Tas[193], NSW DPIRD[194], AgVic[195], Qld DPI[196]	PHA (2017)[197]	Category 2	NPPP – 8	Apple and Pear, Cherry, Cotton, Cutflower, Grains, Nut, Summerfruit, Tomato, Truffle, Vegetable, Viticulture
Rubus	**Consperse stink bug** (*Euschistus conspersus*)	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not categorised	Cotton, Tomato, Vegetable
Strawberry	**European tarnished plant bug** (*Lygus rugulipennis*)	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not categorised	Viticulture
Blueberry and Rubus	**Glassy winged sharpshooter** (*Homalodisca vitripennis*) (with *Xylella fastidiosa*)	NDP-23[198]	Greater Sydney Local Land Services Periurban Surveillance Program (NSW), National Plant Health Surveillance Program (NSW, NT, Qld, SA, Tas, Vic, WA)	PHA[199], DPIRD WA[200], PIRSA[201], NSW DPIRD[202], Qld DPI[203], GIA/Qld DPI[204]	GIA/Qld DPI (2017)[205]	Not categorised (Xylella fastidiosa is categorised individually as Category 2)	NPPP – 1	Cherry, Citrus, Nursery and Garden, Summerfruit, Viticulture
Rubus and strawberry	**Tarnished plant bug** (*Lygus lineolaris*)	Not developed	Not covered by a pest specific surveillance program	PHA[206]	GIA/Qld DPI (2011)[207]	Not categorised	Not categorised	Apple and Pear, Cherry, Cotton, Cutflower, Grains, Potato, Production Nursey, Summerfruit, Tomato, Vegetable
Blueberry	**Sharpnosed leafhopper** (*Scaphytopius acutus)*	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not categorised	Cherry, Citrus and Summerfruit
Lepidoptera (Butterflies and moths)								
Blueberry	**Red banded leafroller** *Argyrotaenia velutinana*	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not categorised	Apple and Pear, Summerfruit, Viticulture
Blueberry	**Oblique banded leafroller**	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not categorised	Apple and Pear, Cherry, Cutflower, Production Nursery, Summerfruit, Tree Nut (Almond, Hazelnut,

Affected Berry Industry	Common name (Scientific name)	National Diagnostic Protocol[35]	Surveillance programs[36]	Fact sheets	Contingency plan	EPPRD category[37]	National Priority Plant Pest[38]	Potential collaborators[39]
	*Choristoneura rosaceana (*syn. *Loxotaenia rosaceana)*							Pistachio), Truffle
Blueberry and Rubus	**Spongy moth complex** (*Lymantria dispar (L. d. dispar, L. d. asiatica, L. d. japonica*))	NDP-42[208]	Spongy moth surveillance program (NSW, Qld, SA, Tas, Vic, WA), National Plant Health Surveillance Program (Vic), Port of Entry (WA)	PHA[209], NSW DPIRD[210], AgVic[211], DPIRD WA[212]	PHA/GIA (2009)[213]	Not categorised	NPPP - 7	Apple and Pear, Blueberry, Cherry, Grains, Lychee, Nut, Plantation forestry, Production Nursey, Rubus, Summerfruit, Truffle
Blueberry	**Nun moth** (*Lymantria monacha*)	NDP-42[208]	Not covered by a pest specific surveillance program	PHA[214], NSW DPIRD[215]	Not developed	Not categorised	NPPP - 7	Apple and Pear, Nut, Plantation forestry, Summerfruit, Truffle
Blueberry	**Blueberry leaftier** (*Croesia curvalana*)	Not developed	Not covered by a pest specific surveillance program	NSW DPIRD[216]	Not developed	Not categorised	Not categorised	-
Thysanoptera (Thrips)								
Strawberry	**Flower thrips** (*Frankliniella intonsa*)	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not categorised	Cutflower and Tomato
Blueberry	**California citrus thrips** *Scirtothrips citri (syn. Euthrips citri)*	Not developed	Not covered by a pest specific surveillance program	PHA[217]	Not developed	Not categorised	Not categorised	Citrus, Mango, Viticulture
Blueberry, Rubus and strawberry	***Scirtothrips dorsalis complex*** *(exotic species)*	Not developed	Not covered by a pest specific surveillance program	GIA[218], DPIRD WA[219]	Not developed	Not categorised	Not categorised	Citrus, Mango, Viticulture, Cherry, Grains, Production Nursey, Vegetable.
Rubus and strawberry	**Rose thrips** (*Thrips fuscipennis*)	Not developed	Not covered by a pest specific surveillance program	Not developed	Not developed	Not categorised	Not categorised	-
Pathogen								
Bacteria								
Strawberry	**Angular leaf spot** (*Xanthomonas fragariae*)	Draft in review stage	Validated molecular testing in Post Entry Quarantine (PEQ).	PHA[220], Qld DPI[221]	Not developed	Category 3	Not categorised	-
Blueberry and Rubus	**Leaf scorch** *Xylella fastidiosa* spp. *(Xf subsp. multiplex; Xf subsp. fastidiosa; Xf subsp. unknown) (Delbianco et al., 2022).*	NDP-6[222]	Xylella Surveillance Program (NSW, NT, Qld), National Plant Health Surveillance Program (NSW, NT, Qld, Tas, Vic, WA) Validated molecular testing in Post Entry Quarantine (PEQ).	PHA[223], AgVic[224], PIRSA[225], NSW DPIRD[226], DAFF[227]	GIA/Qld DPI (2016)[228] Cross industry CP-in draft	Category 2	NPPP – 1	Apple and Pear, Avocado, Cherry, Citrus, Coffee, Cutflower, Nut, Olive, Production Nursey, Summerfruit, Tree Nut (Almond, Macadamia, Pecan), Vegetable, Viticulture

Affected Berry Industry	Common name (Scientific name)	National Diagnostic Protocol[35]	Surveillance programs[36]	Fact sheets	Contingency plan	EPPRD category[37]	National Priority Plant Pest[38]	Potential collaborators[39]
Fungi								
Blueberry	**Blueberry cane canker, Blueberry stem canker, Dieback of Blueberry** (*Botryosphaeria corticis (syn. Physalospora corticis)*)	Not developed	Validated molecular testing in Post Entry Quarantine (PEQ).	Not developed	Not developed	Not categorised	Not categorised	-
Blueberry	**Grey mould** (*Botrytis pseudocinerea*)	Not developed	Not covered by a pest specific surveillance program	Qld DPI[229]	Not developed	Not categorised	Not categorised	-
Blueberry	**Canker of Blueberry, Fusicoccum canker, Godromia canker** *Godronia cassandrae* (syn. *Fusicoccum putrefaciens*, *Sphaeronaema radula*)	Not developed	Not covered by a pest specific surveillance program	Not developed	Not categorised	Not categorised	Not categorised	-
Blueberry, Rubus and strawberry	**Brown rot** (*Monilinia fructigena* syn. *Oospora fructigena*)	NDP-1[230]	Not covered by a pest specific surveillance program	PHA[231], NSW DPIRD[232]	Not developed	Category 3	Not categorised	Apple and Pear, Cherry, Production Nursery (Nursery and Garden), Tomato, Truffle, Summerfruit, Viticulture
Blueberry	**Mummy berry and cottonball disease** (*Monilinia-vaccinii-corymbosi (syn. Sclerotinia vaccinii-corymbosi*))	Not developed	Validated molecular testing in Post Entry Quarantine (PEQ).	PHA[233], NSW DPIRD[234]	Not developed	Not categorised	Not categorised	-
Rubus	**Orange rust** (*Arthuriomyces peckianus*)	Not developed	Not covered by a pest specific surveillance program	PHA[235]	Not developed	Not categorised	Not categorised	-
Oomycetes								
Strawberry	**Strawberry red stele root rot** (*Phytophthora fragariae*)	Not developed	Validated molecular testing in Post Entry Quarantine (PEQ).	PHA[236], GIA/Qld DPI[237]	Not developed	Category 3	Not categorised	Production Nursery
Blueberry	**Phytophthora blight** (*Phytophthora kernoviae*	Not developed	Validated molecular testing in Post Entry Quarantine (PEQ).	GIA/Qld DPI[237]	Not developed	Not categorised	NPPP	Plantation forest

Affected Berry Industry	Common name (Scientific name)	National Diagnostic Protocol[35]	Surveillance programs[36]	Fact sheets	Contingency plan	EPPRD category[37]	National Priority Plant Pest[38]	Potential collaborators[39]
	(syn. P. kernovii))							
Blueberry	**Sudden oak death** (*Phytophthora ramorum*)	NDP-5[238]	Grow Help Australia diagnostic service project (Qld). Validated molecular testing in Post Entry Quarantine (PEQ).	PHA[239], GIA/Qld DPI[237],[240], NSW DPIRD[241]	GIA/Qld DPI (2019)[242]	Category 1	NPPP	Avocado, Cutflower, Nursery and Garden, Nut, Truffle, Plantation forestry
Viruses and Viroids								
Blueberry	**Tobacco ringspot virus, TRSV** *Tobacco ringspot virus (Nepovirus nicotianae) (exotic blueberry infecting strains)*	Not developed		Not developed	Not developed	Not categorised	Not categorised	Potato
Blueberry	**Tomato ringspot virus** *Tomato ringspot Nepovirus (Nepovirus lycopersici)(subgroup C)*	Not developed	Validated molecular testing in Post Entry Quarantine (PEQ).	PHA[243]	Not developed	Not categorised	Not categorised	Apple and Pear, Cherry, Cutflower, Melon, Production Nursery (Nursery and Garden), Tomato, Tree Nut (Almond), Summerfruit, Viticulture

Biosecurity Plan development

With the assistance of Berries Australia, the Australian Blueberry Growers' Association (ABGA), Strawberries Australia Inc (SAI) and Raspberries and Blackberries Australia Incorporated (RABA), a Technical Review Panel (TRP) and a Biosecurity Reference Panel (BRP) were formed to work on the review of the *Biosecurity Plan for the Australian Berry Sector (Version 1.2)* and conduct a complete review of the *Biosecurity Plan for the Blueberry Industry (Version 1.0)*. Following the update of the Blueberry Threat Summary Table (TST), this information was incorporated into the *Biosecurity Plan for the Australian Berry Sector (Version 1.3)*. These groups were coordinated by Plant Health Australia (PHA) and included representatives from Berries Australia, ABGA, SAI, RABA, relevant state and territory agriculture agencies and PHA.

Key roles of the Technical Expert Group for the biosecurity plan development included:

- Identifying and documenting key threats to the Australian berry sector,
- consider the potential entry, establishment, spread and economic impact of each exotic pest,
- confirming an agreed High Priority Pest (HPP) list.

Key roles of the Biosecurity Implementation Group for the biosecurity plan included:

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

Following the decision to review contents of the *Biosecurity Plan for the Blueberry Industry (Version 1.0),* a hybrid group which involved members of both previous Biosecurity Plans was formed (Table 11).

Table 11. Members of the Technical Review Panel (TRP) and/or the Biosecurity Reference Panel (BRP) formed in 2023.

Name	Organisation	Member of Berry TRP	Member of Berry BRP
Angela Atkinson	Berries Australia/SAI	✓	✓
Kyla Finlay	AgVic/DEECA		✓
Elisse Nogarotto	AgVic/DEECA	✓	
Chris Pittock	AgVic/DEECA	✓	✓
Jessica McLeod	DPIRD WA	✓	
Monique Sakalidis	DPIRD WA		✓
Christine Wood	DPIRD WA	✓	✓
Zac Hemmings	NSW DPIRD		✓
Gaius Leong	NSW DPIRD	✓	
Leonie Martin	NSW DPIRD	✓	✓
Shannon Mulholand	NSW DPIRD	✓	✓
Melinda Simpson	NSW DPIRD	✓	
Angela Monks	NRE Tas	✓	
Evie Kielnhofer	PHA	✓	✓
Rebecca Powderly	PHA	✓	✓

Table 12. Members of the Technical Review Panel (TRP) and/or the Biosecurity Reference Panel (BRP) formed in 2019.

Name	Organisation	Area of expertise	Member of Berry TRP	Member of Berry BRP
Angela Atkinson	Victoria Strawberry Industry Development Committee	Industry	✓	✓
Melinda Simpson	NSW DPIRD	Industry	✓	✓
Rachel Mackenzie	Berries Australia Limited	Industry		✓
Penny Measham	Hort Innovation	Industry		✓
Christine Horlock	Qld DPI	Pathologist	✓	
Amanpreet Singh	Raspberries and Blackberries Australia	Grower	✓	
Rebekah Pierce	NSW DPIRD	Industry		✓
Dean Harapas	AgVic/DEECA	Pathologist	✓	✓
Liz Minchinton	AgVic/DEECA	Pathologist	✓	✓
Chris Pittock	AgVic/DEECA	Industry		✓
Rosalie Daniel	Former NSW DPIRD	Pathologist		✓
Victoria Ludowici	Plant Health Australia	Biosecurity	✓	✓
Leandra Fernandes	Plant Health Australia	Biosecurity	✓	✓
Aileen Reid	Strawberry Growers Association WA	Industry	✓	
Ruth Huwer	NSW DPIRD	Entomologist	✓	
Amanda Kobelt	DJPR	Entomologist	✓	
Pip Cotter	NSW DPIRD	Industry	✓	

The *Biosecurity Plan for the Blueberry Industry Version 1.0* was developed in 2016 in partnership with the Blueberry Industry Biosecurity Group (IBG).

Table 13. Members of the Blueberry IBG formed in 2016.

Name	Organisation	Area of expertise
Rosalie Daniel	NSW DPIRD	Plant Pathology
Malcolm Deveson	Moonblue Berries	Industry
David van Dommele	Mountain Blue Farms	Industry
Jacky Edwards	AgVic/DEECA	Plant Pathology
Rebekah Niall	NSW DPIRD	Industry
Jonathan Shaw	Australian Blueberry Growers' Association	Industry
Melinda Simpson	NSW DPIRD	Industry
Phillip Wilk	NSW DPIRD	Industry
Gary Wright	Costas	Industry
Victoria Ludowici	Plant Health Australia	Biosecurity
Alison Saunders	Plant Health Australia	Biosecurity
Fiona Constable	AgVic/DEECA	Virology
Bill Cline	North Carolina State University (USA)	Plant Pathology
Ruth Huwer	NSW DPIRD	Entomology

Review Processes

With the support of the relevant industry bodies and PHA this plan should be reviewed on a regular 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 references to available resources are accurate.

In addition to the formal review process above, the document should be reviewed/revisited annually by the BRP comprised of industry, government and PHA representatives and scientific experts 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 RD&E 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 all stakeholders. This flexibility will increase the plan's currency and relevance.

THREAT IDENTIFICATION AND PEST RISK ASSESSMENTS

Introduction

This section identifies high risk exotic pest threats to the Australian berry sector, 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 berry sector.

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 if pest incursions occur. One such mechanism is the Emergency Plant Pest Response Deed (EPPRD) that has been negotiated between Plant Health Australia's (PHA) government and industry members. The EPPRD ensures reliable and agreed funding arrangements are in place in advance of Emergency Plant Pest (EPP) incursions, and assists in the response to EPP incursions, particularly those identified as key threats.

Identification of exotic High Priority Pests (HPPs) 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.

Other pests of biosecurity significance have also been considered in this plan. It is well understood that good biosecurity practice is beneficial for the ongoing management of established pests, as well as for surveillance and early detection of exotic pests. Non-exotic pests cause ongoing hardships for growers and 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 pests for the berry sector.

Exotic pests of the Australian berry sector

Threat identification

Information on exotic pest threats to the Australian berry sector described in this document came from a combination of:

- Past records,
- existing industry protection plans,
- industry practice and experience,
- relevant published literature,
- local industry and overseas research,
- specialist and expert judgment.

At this time, only invertebrate pests (insects, mites and molluscs), nematodes and pathogens (disease causing organisms) have been identified for risk assessment, as these pests are covered 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 biosecurity plan was developed in accordance with the International Standards for Phytosanitary Measures (ISPM) No. 2[40] and 11 [Food and Agriculture Organization of the United Nations.[41] A summary of the pest risk analysis protocol followed in this biosecurity plan is shown in Table 14.

While there are similarities in the ranking system used in this document and the Biosecurity Import Risk Analysis (BIRA)[42] process followed by the Department of Agriculture, Fisheries and Forestry (DAFF), 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.

Modifications of the DAWR[43] (Department of Agriculture and Water Resources, 2016) protocol have been made to suit the analysis required in the biosecurity plan development process, including, but not limited to:

- Entry potential: The determination of entry potential in this biosecurity plan considers 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 in the BIRA process, which only considers legal importation of plants or plant commodities.
- Potential economic impact of pest establishment in this document only considers the impacts on the Australian berry sector. The BIRA process has a wider scope, including the impacts on all of Australia's plant industries, trade, the environment, social amenity, and public health.
- Risk potential and impacts: The categories used in this biosecurity plan for describing the entry, establishment, spread, and potential economic impacts differs in comparison to that used in the BIRA process.

Table 14. Summary of 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 an overall 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 biosecurity plan.

The objective of risk assessment is to clearly identify and classify biosecurity risks and to provide data to assist in the evaluation and mitigation 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.

[40] FAO (2007).
[41] FAO (2004).
[42] https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/bira-guidelines-2016.pdf
[43] Now the Department of Agriculture, Fisheries and Forestry (DAFF).

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 increases 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, 2018].

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 Threat Summary Tables (TST) present a list of potential plant pest threats to the Australian berry sector 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 detailed in the HPP list.

> 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 BIRA conducted by the Department of Agriculture, Fisheries and Forestry, which focuses only on specific regulated import pathways.

When a pest that threatens multiple industries is assessed, the entry, establishment and spread potentials consider 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 berry sector), and therefore this rating may differ between biosecurity plans.

Description of terms used in pest risk tables

Table 15. Description of terms used in pest risk tables.

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 pest has limited potential to survive and become established within Australia given the combination of all known factors.
Low	The pest has the potential to survive and become established in approximately one-third or less of the range of hosts. The pest could have a low probability of contact with susceptible hosts.
Medium	The pest has the potential to survive and become established in between approximately one-third and two-thirds of the range of hosts.
High	The pest has potential to survive and become established throughout most or all of the range of hosts. Distribution is not limited by environmental conditions that prevail in Australia. Based upon its current world distribution, and known conditions of survival, it is likely to survive in Australia wherever major hosts are grown.
Unknown	The establishment potential of the pest 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.

RISK MITIGATION AND PREPAREDNESS

Introduction

There are a number of strategies that can be adopted to help protect and minimise the risks of Emergency Plant Pests under International Plant Protection Convention (IPPC) standards[44] and Commonwealth and state/territory legislation.

Many pre-emptive practices can be adopted to reduce the risk of exotic pest movement for the berry sector (Figure 12). Such risk mitigation and preparedness practises are the responsibility of governments, industry, and the community.

Several key risk mitigation areas are outlined in this guide, along with summaries of the roles and responsibilities of the Australian Government, state/territory governments, and 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 situation.

Figure 12. Examples of biosecurity risk mitigation activities[45]

[44] https://www.ippc.int/en/core-activities/standards-setting/ispms/

[45] BMP refers to Best Management Practise.

Barrier quarantine

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

National level – Importation restrictions

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

- Establishment of scientifically 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,
- collaboration with portfolio industries and exporters.

DAFF is responsible for developing biosecurity (i.e. SPS) risk management policy and reviewing existing quarantine measures for the importation of live animals and plants, and animal and plant products. DAFF undertakes import risk analyses to determine which products may enter Australia, and under what quarantine conditions. DAFF 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, DAFF 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 DAFF under the Australian Government *Biosecurity Act 2015*. Quarantine policies are developed through the Biosecurity Import Risk Analysis (BIRA) process. This process is outlined in the BIRA Guidelines 2016 (Department of Agriculture and Water Resources, 2016). DAFF maintains barrier quarantine services at all Australian international sea and airports, 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 DAFF.

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. BICON can be accessed at agriculture.gov.au/import/bicon. For export conditions see the Manual of Importing Country Requirements (MICoR) database at https://micor.agriculture.gov.au/Pages/default.aspx.

The Australian Government 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 DAFF on 1800 900 090, or visit the website at awe.gov.au/biosecurity-trade/import/online-services/bicon.

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.

SURVEILLANCE

Surveillance enhances prospects for early detection, minimising costs of eradication and are necessary to meet the treaty obligations of the WTO SPS Agreement[46] with respect to the area freedom status of Australia's states, territories and regions.

The SPS Agreement gives WTO members the right to impose SPS measures to protect human, animal and plant 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, 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 6[47] 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 and the costs of eradication.

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 for establishing whether particular pests are present in each state or region, and if so, where these occur.

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, Fisheries and Forestry (DAFF) maintains barrier quarantine services at all international ports and in the Torres Strait region. DAFF also surveys the northern coast of Australia, offshore islands and neighbouring countries for exotic 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 Australia Quarantine Strategy (NAQS).[48] NAQS surveillance programs relevant to the berry sector are listed in Table 16.

State surveillance programs

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

[46] https://www.wto.org/english/tratop_e/sps_e/spsund_e.htm
[47] FAO (2018).
[48] https://www.agriculture.gov.au/biosecurity-trade/policy/australia/naqs

- biosecurity training,
- reporting services to all interested parties (DAFF, national bodies, trading partners and industry).

Various pest surveillance programs are managed by the DAFF and the state/territory agriculture departments. Many state/territory agriculture departments run general surveillance programs whereby suspect samples can be forwarded and diagnosed for the presence of exotic pests free of charge. Official surveillance programs that target pests of the berry sector (exotic or those under official control in a region or state/territory) are shown in Table 16.

Table 16. Official surveillance programs that target pest of the berry sector (Plant Health Australia, 2020).

Surveillance program	Pests targeted	Hosts targeted
New South Wales		
Brown marmorated stink bug	*Halyomorpha halys*	Multiple hosts
Greater Sydney Local Land Services Periurban Surveillance Program	*Halyomorpha halys, Homalodisca vitripennis*	Multiple plant hosts in periurban landscape, including community gardens
National Plant Health Surveillance Program – multi pest surveillance	*Halyomorpha halys, Homalodisca vitripennis, Erwinia amylovora*	Multiple plant hosts around Ports of Sydney, Newcastle and Wollongong
Multiple Pest Survey- Trapping/Visual inspection	*Halyomorpha halys, Erwinia amylovora*	Multiple
Spongy moth Survey-Trapping	*Lymantria dispar, Lymantria monacha*	Multiple
National Plant Health Surveillance Program-Spongy moth	*Lymantria* spp.	Various tree hosts around Port of Sydney, Newcastle, Wollongong and Eden
Xylella Survey-Visual Inspection/Sampling	*Xylella fastidiosa*	Multiple
Northern Territory		
National Plant Health Surveillance Program	*Homalodisca vitripennis, Xylella fastidiosa*	Multiple
Xylella Survey-Visual Inspection/Sampling	*Xylella fastidiosa*	Multiple
Queensland		
National Plant Health Surveillance Program	*Homalodisca vitripennis, Xylella fastidiosa, Lymantria* spp.	Multiple
Exotic spongy moth surveillance-Trapping	*Lymantria dispar, Lymantria monacha*	Multiple
Grow Help Australia diagnostic service project	*Phytophthora* spp. and *Erwinia* spp.	Fruit, vegetables and ornamental hosts
Xylella Survey-Visual Inspection/Sampling	*Xylella fastidiosa*	Multiple
South Australia		
Brown marmorated stink bug	*Halyomorpha halys*	Multiple
National Plant Health Surveillance Program	*Homalodisca vitripennis*	*Vitus vinifera*
Spongy moth Survey-Trapping	*Lymantria dispar, Lymantria monacha*	Multiple
Post of Entry Trapping Program	*Lymantria* spp.	*Eucalyptus* spp., ornamental trees
Multiple pest Surveillance Program	*Xylella fastidiosa, Homalodisca*	Potato, citrus, grapevine, Solanaceous

Surveillance program	Pests targeted	Hosts targeted
	vitripennis	species, insect traps
Tasmania		
National Plant Health Surveillance Program- spotted winged drosophila	*Drosophila suzukii*, *Homalodisca vitripennis*, *Lymantria dispar*, *Xylella fastidiosa*	Multiple, including forest and amenity trees, various hosts at nurseries and on urban pathways
National Plant Health Surveillance Program – fire blight	*Erwinia amylovora*	Commercial orchards
Multiple Pest Survey-Trapping	*Drosophila suzukii, Erwinia amylovora*	Multiple
National Pest Surveillance Program – brown marmorated stink bug	*Halyomorpha halys*	Various hosts near cargo, freight, ports and in parks and gardens
Gypsy moth Survey-Trapping	*Lymantria dispar*	Multiple
Blueberry Rust Surveillance program	*Thekopsora minima*	Blueberry
Victoria		
Crop safe program	*Agrotis segetum*	In-field grains
National Plant Health Surveillance Program	*Halyomorpha halys, Lymantria dispar*	Plant and weed hosts around Melbourne ports
Spongy moth Survey-Trapping	*Lymantria dispar, Lymantria monacha*	Multiple
Multiple Pest Survey- Trapping/Visual inspection	*Halyomorpha halys*	Multiple
National Plant Health Surveillance Program	*Homalodisca vitripennis, Xylella fastidiosa*	Grapes
Western Australia		
Brown marmorated stink bug	*Halyomorpha halys*	General surveillance all hosts, urban areas
National Plant Health Surveillance Program	*Erwinia amylovora, Homalodisca vitripennis, Xylella fastidiosa*	Pome and citrus crops
Port of Entry – Asian spongy moth trapping	*Lymantria dispar*	More than 600 forest, orchard, ornamental and native species
Spongy moth Survey-Trapping	*Lymantria dispar, Lymantria monacha*	Multiple
Multiple Pest Survey-Trapping	*Erwinia amylovora*	Multiple

Farm level pest monitoring

Farm level monitoring involves the participation and interaction of growers, agribusiness and industry representative groups. Examples of the surveillance activities that can be carried out by each of these groups are outlined in Figure 13. Conducting regular surveys of farms and nurseries provides the best chance of spotting new pests early and implementing eradication or management responses.

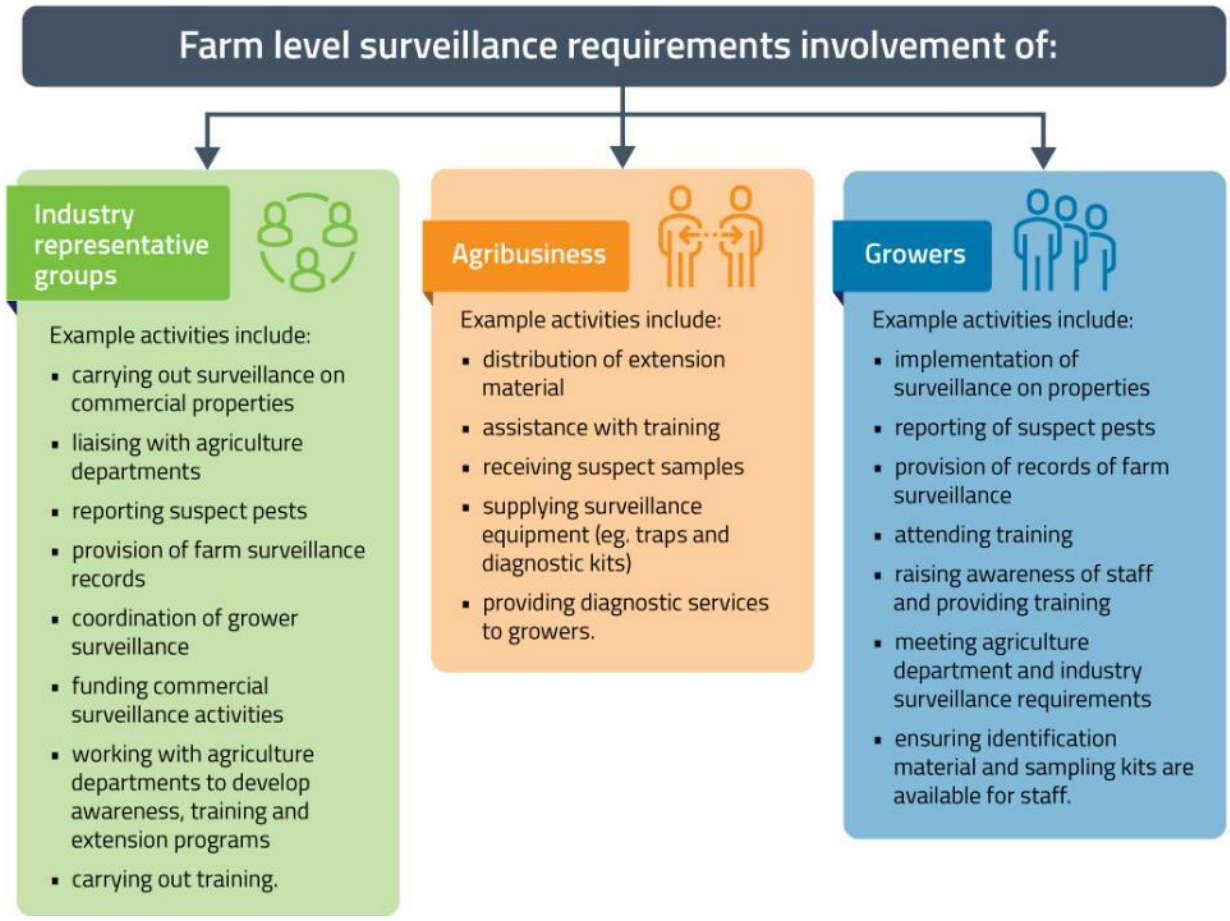

Figure 13. Examples of farm level surveillance activities.

TRAINING AND AWARENESS

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.

Training

National Emergency Plant Pest Training Program

PHA supports members in training personnel through the delivery of the National Emergency Plant Pest (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 Emergency Plant Pest Response Deed (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 Centres (SCC) or Local Control Centres (LCC).

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 https://www.planthealthaustralia.com.au/training/biosecurity-online-training-bolt/.

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

Biosecurity Incident Standard Operating Procedures

The industry Biosecurity Incident Standard Operating Procedure (BISOP) is focussed on documenting the critical processes, functions, contact and authorisations information regarding how a specific organisation fulfils its roles and responsibilities during biosecurity incidents managed under the EPPRD. The completion of an organisation(s) BISOP involves:

- A detailed look at key decision points in a response put into the context of basic incursion scenarios and documentation of how the industry body will determine their view on those decision points (e.g. technical feasibility, approval to fund a Response Plan, input into communications).
- Documentation of the peak industry body record keeping processes and other internal processes to meet responsibilities under the EPPRD.

Awareness

Early reporting enhances the chance of effective control and eradication. Awareness activities raise the profile of biosecurity and exotic pest threats to the Australian berry sector, 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).

Further information on High Priority Pests

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

Table 17. Sources of information on High Priority Pests for the Australian berry sector.

Source	Website
Berries Australia	https://berries.net.au/
CABI – Crop Protection Compendium	cabi.org/cpc/
Department of Agriculture, Fisheries and Forestry (DAFF)	agriculture.gov.au
Department of Energy, Environment and Climate Action (DEECA)	https://agriculture.vic.gov.au/biosecurity
Department of Agriculture and Fisheries, Northern Territory (DAF NT)	https://nt.gov.au/industry/agriculture/food-crops-plants-and-quarantine
Department of Natural Resources and Environment Tasmania (NRE Tas)	https://nre.tas.gov.au/biosecurity-tasmania/plant-biosecurity/pests-and-diseases
Department of Primary Industries and Regions SA (PIRSA)	https://www.pir.sa.gov.au/biosecurity
Department of Primary Industries and Regional Development Western Australia (DPIRD WA)	https://www.agric.wa.gov.au/biosecurity-quarantine/biosecurity/plant-biosecurity
European and Mediterranean Plant Protection Organization (EPPO)	eppo.int/DATABASES/pqr/pqr.htm
Global Biodiversity Information Facility (GBIF)	https://www.gbif.org/
New South Wales Department of Primary Industries and Regional Development (NSW DPIRD)	https://www.dpi.nsw.gov.au/biosecurity/plant https://www.dpi.nsw.gov.au/agriculture/horticulture/berries/growing-guides/berry-plant-protection-guide
Plant Health Australia (PHA)	planthealthaustralia.com.au/
Pest and Disease Image Library (PaDIL)	padil.gov.au/
Queensland Department of Primary Industries (Qld DPI).	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/priority-pest-disease
University of California Statewide Integrated Pest Management (IPM) Program	ipm.ucdavis.edu/EXOTIC/exoticpestsmenu.html

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 berries that Australia does not have.

Farm biosecurity measures can be used to minimise the spread of such pests before their presence is known or after they are identified and therefore can greatly increase the likelihood that they could be eradicated. This section of the document outlines farm biosecurity and hygiene measures to help reduce the impact of pests on the industry.

The biosecurity and hygiene measures outlined here can be considered as options for each farm's risk management. Many of these measures can be adopted in a way that suits a given farm so that each can have an appropriate level of biosecurity.

Farm biosecurity reporting procedures and hygiene strategies to reduce threats covered in this document are:

- Selection and preparation of appropriate planting material,
- chemical control measures,
- control of vectors,
- control of alternative hosts,
- neglected farms and volunteer plants,
- post-harvest handling and produce transport procedures,
- use of warning and information signs,
- managing the movement of vehicles and equipment,
- managing the movement of people,
- visiting overseas nurseries/farms/orchards – what to watch out for when you return,
- including biosecurity in industry best management practice and quality assurance schemes,
- biosecurity checklist.

Development of a farm biosecurity plan tailored to the needs of an individual operation is a good way to integrate best practice biosecurity with day-to-day operations (farmbiosecurity.com.au/planner/). Further information on farm biosecurity can be found at farmbiosecurity.com.au or by contacting Berries 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 to which the report relates. 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 20. 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, followed up and treated confidentially.

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 jurisdiction.

Some berry 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 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 is provided in Table 10. Over time, as more resources are produced for individual pests of the berry sector they will be included in this document and made available through the PHA website[49]. 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 High Priority Pests (HPPs). These documents and programs should be developed over time for all medium to high-risk pests that are listed in the Threat Summary Tables (TST) (page 83).

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 Table 10 for a list of current fact sheets available for berry 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. The 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[50] and be endorsed by the National Management Group[51] prior to implementation.

As a part of contingency planning, biological and chemical control options are considered, as are options for breeding for pest resistance. Through the planning process, it may be discovered that there are gaps in knowledge. Such gaps should be identified and consequently be considered as RD&E needs to be met within the Berry Biosecurity Action Plan (Table 9). For a list of current contingency plans relevant to berry HPP's see Table 10.

[49] https://www.planthealthaustralia.com.au/resource/
[50] https://www.planthealthaustralia.com.au/biosecurity/incursion-management/plantplan/
[51] https://www.directory.gov.au/portfolios/agriculture-water-and-environment/department-agriculture-water-and-environment/national-management-group

National Diagnostic Protocols

Diagnostic protocols are documents that contain information about a specific plant pest, or related group of pests, relevant to its diagnosis. National Diagnostic Protocols (NDPs)[52] are diagnostic protocols for the unambiguous taxonomic identification of a pest in a manner consistent with ISPM No. 27 – Diagnostic Protocols for Regulated Pests.[53] NDPs include diagnostic procedures and data on the pest, its hosts, taxonomic information, detection and identification.

Australia has a coherent and effective system for the development of NDPs for plant pests managed by the Subcommittee on Plant Health Diagnostics (SPHD).[54] NDPs are peer reviewed and verified before being endorsed by Plant Health Committee (PHC).[55]

Endorsed NDPs are available on the National Plant Biosecurity Diagnostic Network (NPBDN)[56] website together with additional information regarding their development and endorsement.

For diagnostic information on fruit flies, refer to the Australian Handbook for the Identification of Fruit Flies[57].

National Surveillance Protocols

National surveillance protocols (NSPs)[58] are the first point of reference for developing surveillance plans. A surveillance protocol is a technical reference guide for conducting surveillance on a specific plant pest or group of plant pests. It includes information on surveillance methodology, pest biology, taxonomy, identification, and sample processing.

NSPs will be used for all national surveillance programs, and their use is also encouraged for all other relevant surveillance activities conducted by governments and industry in Australia. NSPs are reviewed by the National Surveillance Protocol working group (NSPWG) and endorsed by the Subcommittee on National Plant Health Surveillance (SNPHS)[59].

Research, Development and Extension – Linking Biosecurity Outcomes to Priorities

Through the biosecurity planning process, gaps in knowledge or extension of knowledge have been identified and documented in the Berry Biosecurity Action Plan (Table 9). 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 (i.e. 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 throughout the life of the biosecurity plan.

[52] https://www.plantbiosecuritydiagnostics.net.au/initiatives/national-diagnostic-protocols/
[53] FAO (2006).
[54] https://www.plantbiosecuritydiagnostics.net.au/work/subcommittee-on-plant-health-diagnostics/
[55] https://www.agriculture.gov.au/agriculture-land/plant/health/committees/phc
[56] https://www.plantbiosecuritydiagnostics.net.au/
[57] https://www.fruitflyidentification.org.au/identify/handbook/
[58] https://plantsurveillancenetwork.net.au/resources/reference-standards-for-development-and-approval-of-national-surveillance-protocols-for-plant-pests/
[59] https://www.agriculture.gov.au/agriculture-land/plant/health/committees/snphs

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 emergency 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 an Emergency Plant Pest (EPP).

The following section includes key contact details and communication procedures that should be used in the event of an incursion relevant to the Australian berry sector. Additionally, a listing of pest-specific emergency response and information documents are provided that may support a response. Over time, as more of these documents are produced for pests of the berry sector they will be included in the list 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[60], which is an agreement between the Australian government, the state/territory governments, 38 plant industries (including Raspberries and Blackberries Australia, and Strawberries Australia Inc.) and PHA (collectively known as the signatories), that allows the rapid and efficient response to EPPs. Australian Blueberry Growers' Association and Berries Australia are not signatories to the EPPRD. 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 to deliver eradication responses to EPPs detected 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 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 an EPP Response Plan.
- Rapid responses to EPPs (excluding weeds).
- A framework for 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.
- Cost sharing of eligible costs.
- 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 https://www.planthealthaustralia.com.au/resource/.

[60] https://www.planthealthaustralia.com.au/response-arrangements/emergency-plant-pest-response-deed-epprd/

Raspberries and Blackberries Australia, and Strawberries Australia Inc. Biosecurity Statements

All EPPRD Parties are required under Clause 13 of the EPPRD to produce a Biosecurity Statement, the purpose of which is to provide acknowledgement of, and commitment to, risk mitigation measures and preparedness activities related to plant biosecurity. The Biosecurity Statement will inform all Parties of activities being undertaken by the Industry Party to meet this commitment. Parties are required to report to PHA each year any material changes to the content of, or the Party's commitment to, the Party's Biosecurity statement. Biosecurity Statements are included in Schedule 15 of the EPPRD, which can be found on the PHA website.[61]

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 a number of 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.[62]

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.[61]

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 18). 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 the likelihood of eradication or the overall importance of the pest 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 18. Response funding allocation between Government and Industry for an EPP.

EPP category	Government funding	Industry funding
Category 1	100%	0%
Category 2	80%	20%
Category 3	50%	50%
Category 4	20%	80%

[61] https://www.planthealthaustralia.com.au/response-arrangements/emergency-plant-pest-response-deed-epprd/

[62] https://www.planthealthaustralia.com.au/response-arrangements/plantplan/

Pest categorisation

The list of categorised EPPs can be found in Schedule 13 of the EPPRD. In the event that 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.

Berry EPPs categorised to date

EPPs relevant to the Australian berry sector that are categorised and listed within Schedule 13 of the EPPRD are listed in Table 19.

Table 19. Formal categories for pests of the Australian berry sector listed in the EPPRD (as of February 2025[63]).

Formal category	Scientific name	Common name
1	*Phytophthora ramorum*	Sudden oak death
2	*Adoxophyes orana*	Summer fruit tortrix
2	*Conotrachelus nenuphar*	Plum weevil
2	*Erwinia amylovora*	Fire blight
2	*Halyomorpha halys*	Brown marmorated stink bug (BMSB)
2	*Phymatotrichopsis omnivora* (syn. *Phymatotrichum omnivorum*)	Texas root rot
2	*Varroa destructor*	Varroa mite
2	*Xylella fastidiosa* (multiple subspecies) (with vector)	Cherry leaf scorch, Pierce's disease, blueberry leaf scorch, olive leaf scorch, almond leaf scorch
3	*Anthomonas bisignatus*	Strawberry bud weevil
3	*Monilinia fructigena*	Brown rot
3	*Phytophthora fragariae* (syn. *Phytophthora fragariae* var. *fragariae*)	Phytophthora root rot
3	*Xanthomonas fragariae*	Angular leaf spot
4	*Acleris comariana*	Strawberry tortrix
4	*Lygus hesperus*	Western plant bug
4	*Peridroma saucia*	Variegated cutworm

[63] https://www.planthealthaustralia.com.au/response-arrangements/emergency-plant-pest-response-deed-epprd/

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) (Figure 14)[64] All signatories affected by the EPP (both government and industry) are then notified immediately, and a Consultative Committee on Emergency Plant Pests (CCEPP)[65] meeting is convened. 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 suspected EPP to the ACPPO or the CCEPP.

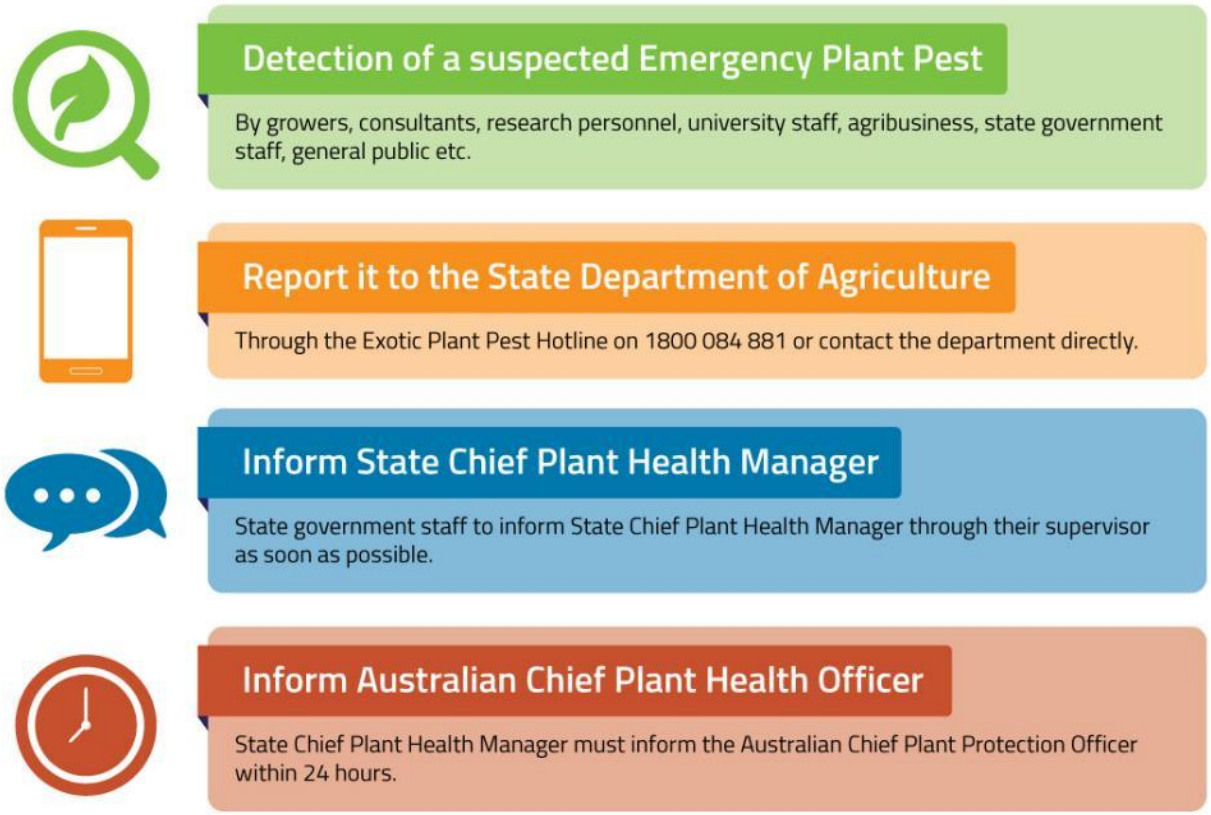

Figure 14. Reporting of suspect EPPs and notification process.

Once a pest is notified to the CCEPP, all EPPRD signatories that are affected by the EPP play a part in the national response. This is primarily through the two national decision-making committees, both of which contain a representative from Raspberries and Blackberries Australia (RABA) and Strawberries Australia Inc. (SAI)

The committees are:

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

[64] https://www.agriculture.gov.au/agriculture-land/plant/health/acppo
[65] https://www.agriculture.gov.au/agriculture-land/plant/health/committees/ccepp

If the EPP is deemed ineradicable, a decision is made on another course of action, namely containment or long-term management. In 2016, a Transition to Management (T2M) phase was incorporated into the EPPRD following approval by all EPPRD Parties. T2M may only be initiated if a response plan has been approved and started and it has been agreed that eradication is not possible. Its aim is to provide a formalised structure for transitioning a response under the EPPRD from the eradication of an EPP under an approved Response Plan to management of the EPP outside of the EPPRD processes. T2M is not an automatic process as the parties to the response have to agree it is needed and what activities will be included. Its aims to provide a mechanism to enable the affected industry to transition to ongoing 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 https://www.planthealthaustralia.com.au/response-arrangements/.

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 Rubus and strawberry industries.

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 https://www.planthealthaustralia.com.au/response-arrangements/emergency-plant-pest-response-deed-epprd/owner-reimbursement-costs/.

Currently ORCs are not available to blueberry growers in the event of an EPP incursion as the Australian Blueberry Growers' Association (AGMA) are not signatories to the EPPRD. Should the AGMA become signatories to the EPPRD, ORCs would be available to blueberry growers when there is an approved response plan under the EPPRD.

Industry specific response procedures

Industry communication

Raspberries and Blackberries Australia (RABA) and Strawberries Australia Inc. (SAI) are the peak industry bodies for the Australian Rubus and strawberry industries, i.e. signatories to the EPPRD, and will be the key industry contact points if a plant pest affecting the Rubus or strawberry industry is detected and responded to using the arrangements in the EPPRD. RABA and SAI will have responsibility for relevant industry communication and media relations (see PLANTPLAN[66] for information on approved communications during an incursion). The contacts nominated for the CCEPP and the NMG by RABA and SAI will be contacted 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.

Information on state, territory and regional biosecurity movement restrictions

The ability to control movement of materials that can carry and spread berry pests is of high importance. Each state/territory has quarantine legislation in place to control the importation of berry material interstate and intrastate, and to manage agreed pests if an incursion occurs. 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 Subcommittee on Market Access, Risk and Trade (SMART; previously the Subcommittee 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 berries and berry related commodities can be obtained by contacting your local state or territory agriculture department directly (Table 20), or through the SMART website[67] 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. 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 agriculture department.

[66] https://www.planthealthaustralia.com.au/response-arrangements/plantplan/
[67] https://interstatequarantine.org.au/

Table 20. Contact details and information sources.

Organisation	Website/Email	Phone	Address	Legislation/Biosecurity Manuals	Emergency Plant Pest Hotline
National					1800 084 881
Berries Australia	https://berries.net.au/ Webform contact page: https://berries.net.au/home/about/berries-australia/contact-team/	1300 201 713	PO Box 578, Archerfield, Qld 4108		
Department of Agriculture, Fisheries and Forestry (DAFF)	agriculture.gov.au	(02) 6272 3933 1800 020 504	GPO Box 858 Canberra ACT 2601	*Biosecurity Act 2015* *Biosecurity Regulation 2016* https://www.awe.gov.au/biosecurity-trade/policy/legislation	
Plant Health Australia (PHA)	planthealthaustralia.com.au E. biosecurity@phau.com.au	(02) 6215 7700	Level 1, 1 Phipps Cl Deakin ACT 2600	https://www.planthealthaustralia.com.au/biosecurity/risk-mitigation/biosecurity-planning/	
ACT					1800 084 881
Environment ACT	https://www.environment.act.gov.au/parks-conservation/plants-and-animals/biosecurity E. ACTBiosecurity@act.gov.au	13 22 81	Environment, Planning and Sustainable Development Directorate GPO Box 158 Canberra City ACT 2601 480 Northbourne Avenue Dickson ACT 2602	*Plant Disease Act 2002* *Pest Plants and Animals Act 2005* https://www.environment.act.gov.au/__data/assets/pdf_file/0007/902293/act-biosecurity-strategy-2016-2026.pdf	
New South Wales					1800 084 881
Department of Primary Industries and Regional Development (NSW DPIRD)	dpi.nsw.gov.au/biosecurity/plant E. biosecurity@dpi.nsw.gov.au E. quarantine@dpi.nsw.gov.au	(02) 6391 3100	Locked Bag 21 Orange NSW 2800	*Biosecurity Act 2015* *Biosecurity Regulation 2017* *Biosecurity Order (Permitted Activities) 2017* and other supporting legislation such as Control Orders https://www.dpi.nsw.gov.au/biosecurity/managing-biosecurity/legislation	Operates 08:30 – 16:30 Monday to Friday. After hours answering machine service with messages followed up the next business day.

Organisation	Website/Email	Phone	Address	Legislation/Biosecurity Manuals	Emergency Plant Pest Hotline
Queensland					1800 084 881
Biosecurity Queensland, a part of the Qld Department of Primary Industries (Qld DPI).	https://www.daf.qld.gov.au/ E. info@daf.qld.gov.au	13 25 23	275 George St, Brisbane Qld 4000 GPO Box 46, Brisbane, Qld, 4001	*Biosecurity Act 2014* *Biosecurity Regulation 2016* https://www.daf.qld.gov.au/__data/assets/pdf_file/0004/379138/qld-biosecurity-manual.pdf	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.
Northern Territory					1800 084 881
Department of Agriculture and Fisheries, Northern Territory (DAF NT)	https://nt.gov.au/industry/agriculture/food-crops-plants-and-quarantine E. plantbiosecurity@nt.gov.au E. citruscanker@nt.gov.au	(08) 8999 2118 1800 931 722 (Citrus canker)	Berrimah Farm Makagon Road Berrimah NT 0828	*Plant Health Act 2008* *Plant Health Regulations 2011* https://industry.nt.gov.au/__data/assets/pdf_file/0011/396587/Plant-Quarantine-Manual.pdf	Operates 08:00 – 16:30 Monday to Friday. After hours answering machine service with messages followed up the next business day.
South Australia					1800 084 881
Primary Industries and Regions SA (PIRSA)	pir.sa.gov.au	(08) 8207 7820	25 Grenfell St, Adelaide, SA 5000 GPO Box 1671 Adelaide, SA 5001	*Plant Health Act 2009* *Plant Health Regulations 2022* pir.sa.gov.au/biosecurity/plant_health/importing_commercial_plants_and_plant_products_into_south_australia	Operates all hours
Biosecurity SA-Plant Health	https://pir.sa.gov.au/biosecurity/plant_health E. pirsa.planthealth@sa.gov.au E. pirsa.planthealthmarketaccess@sa.gov.au	(08) 8207 7820 1300 666 010 (Fruit fly & Quarantine) (08) 8207 7814 (Market Access and Interstate Certification Assurance)	33 Flemington Street Glenside SA 5065		
South Australian Research and Development	https://pir.sa.gov.au/research/about_sardi	(08) 8303 9400	Plant Research Centre Waite Campus 2B Hartley Grove		

Organisation	Website/Email	Phone	Address	Legislation/Biosecurity Manuals	Emergency Plant Pest Hotline
Institute (SARDI)	E. pirsa.sardi@sa.gov.au		Urrbrae SA GPO Box 397 Adelaide SA 5001		
Tasmania					1800 084 881
Biosecurity Tasmania, a part of the Department of Natural Resources and the Environment Tasmania (NRE)	https://nre.tas.gov.au/biosecurity-tasmania E. Biosecurity.Tasmania@nre.tas.gov.au	1300 368 550 (Product Integrity) (03) 6165 3777	Department of Natural Resources and Environment Tasmania GPO Box 44, Hobart Tas 7001 Biosecurity Operations Branch, 13 St Johns Avenue, New Town, Tas, 7008	*Biosecurity Act 2019* *Plant Quarantine Act 1997* *Weed Management Act 1999* https://nre.tas.gov.au/documents/Plant%20Biosecurity%20Manual%20Tasmania.pdf	Operates all hours
Victoria					1800 084 881
Agriculture Victoria (AgVic), a part of the Department of Energy, Environment and Climate Action (DEECA)	https://www.deeca.vic.gov.au/ https://agriculture.vic.gov.au/ E. plant.protection@ecodev.vic.gov.au	13 61 86 (03) 9032 7515 (Crop Health Services)	Various office locations across Victoria, list accessible: https://agriculture.vic.gov.au/about/contact-us AgriBio Specimen Reception Main Loading Dock 5 Ring Road La Trobe University Bundoora Vic 3083	*Plant Biosecurity Act 2010* *Plant Biosecurity Regulations 2016* agriculture.vic.gov.au/psb	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.
Western Australia					1800 084 881
Department of Primary Industries and Regional Development, Western Australia (DPIRD WA)	agric.wa.gov.au/ E. info@agric.wa.gov.au	(08) 9368 3333	DPIRD, 1 Nash Street, Perth, WA 6000 Pest and Disease Information Service (PaDIS) 3 Baron-Hay Court South, Perth WA 6151	*Biosecurity and Agriculture Management Act, 2007* https://www.agric.wa.gov.au/qtine/default.asp	Operates 08:30 – 16:30 Monday to Friday. After hours answering machine service with messages followed up the next business day.

New South Wales

Information on pre-importation inspection, certification and treatment requirements may be obtained from dpi.nsw.gov.au/biosecurity.

Northern Territory

Administrative authority for regional quarantine in the Northern Territory (NT) is vested in the Department of Agriculture and Fisheries (DAF NT) 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 2118 or email plantbiosecurity@nt.gov.au.

For more information refer to the DAF NT website (https://daf.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 Qld DPI website https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/moving/restrictions/into-qld.

Further details can be obtained from the Qld DPI Customer Service Centre on 13 25 23.

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. 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 Natural Resources and Environment Tasmania (NRE Tas) Biosecurity website (https://nre.tas.gov.au/biosecurity-tasmania) 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 https://nre.tas.gov.au/biosecurity-tasmania/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 Energy, Environment and Climate Action (DEECA) https://agriculture.vic.gov.au/biosecurity/moving-plants-and-plant-products/plant-biosecurity-legislation#h2-0.

Some items may need to be presented to a DEECA 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 Agriculture Victoria (AgVic) on the web at agriculture.vic.gov.au/psb or by phone 13 61 86.

Western Australia

The lead agency for agricultural biosecurity in Western Australia is the Department of Primary Industries and Regional Development (DPIRD WA). 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 maintain 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 https://www.agric.wa.gov.au/biosecurity-quarantine/quarantine/intrastate-movement or by phone (08) 9334 1800.

On-farm 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 an incursion and increase the probability of early detection. This should in turn reduce the likelihood of a costly incident response, thereby reducing costs to business, 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 Biosecurity section (page 79). The Australian berry sector 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.

Key references – Biosecurity Plan

Australasian Plant Genetics (APG) (2022). Website. Available online at: https://ausplantgenetics.com.au/home/strawberry/

Australian Plant Pest Database (APPD) (2024). Plant Health Australia. Available online at: https://www.appd.net.au/

Berries Australia (2024). Website. Available online at: https://berries.net.au/

CABI (2024). CABI Compendium. Wallingford, UK: CAB International. Available online at: https://www.cabidigitallibrary.org/

Department of Agriculture, Fisheries and Forestry (DAFF) (2023). Rubus levy and charge. Available online at: https://www.agriculture.gov.au/agriculture-land/farm-food-drought/levies/rates/rubus

DAFF (2011). *Import Risk Analysis Handbook 2011.* DAFF, Canberra. Available online at: https://www.ippc.int/static/media/files/cnpublications/2013/06/05/1366783022_import-risk-analysis-handbook-20.pdf

DAFF (2021). Strawberries levy. Available online at: https://www.agriculture.gov.au/agriculture-land/farm-food-drought/levies/rates/strawberry

DAFF (2022). *National Biosecurity Strategy*. DAFF, Canberra. CC BY 4.0. Available online at: https://www.biosecurity.gov.au/sites/default/files/2022-08/National%20Biosecurity%20Strategy%28final%29.pdf

Department of Agriculture and Water Resources (DAWR) (2016). *Biosecurity Import Risk Analysis Guidelines 2016: Managing biosecurity risks for imports into Australia*. DAWR, Canberra. Available online at: https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/bira-guidelines-2016.pdf

Food and Agriculture Organization of the United Nations (FAO) (2006). *Diagnostic protocols for regulated pests. International Standards for Phytosanitary Measures No. 27.* Secretariat of the International Plant Protection Convention, FAO, Rome. Available online at: https://www.fao.org/3/cb2615en/CB2615EN.pdf

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, FAO, Rome. Available online at: https://www.fao.org/3/j1302e/j1302e.pdf

FAO (2007). *Framework for pest risk analysis. International Standards for Phytosanitary Measures No. 2*. Secretariat of the International Plant Protection Convention, FAO, Rome. Available online at: https://www.fao.org/3/k0125e/k0125e.pdf

FAO (2018). Surveillance. *International Standards for Phytosanitary Measures No. 6.* Secretariat of the International Plant Protection Convention, FAO, Rome. Available online at: https://www.ippc.int/static/media/files/publication/en/2018/06/ISPM_06_2018_En_Surveillance_2018-05-20_PostCPM13_KmRiysX.pdf

Hort Innovation (2025). *Australian Horticulture Statistics Handbook (AHSH) 2023/24*. Horticulture Innovation Australia Limited, Sydney NSW. Available online at: https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/

International Committee on Taxonomy of Viruses (ICTV) (2024). Available online at: https://ictv.global/taxonomy/

Plant Health Australia (PHA) (2020). *National Plant Biosecurity Status Report*. Plant Health Australia, Canberra, ACT. Available online at: https://www.planthealthaustralia.com.au/wp-content/uploads/2021/08/2020-National-Plant-Biosecurity-Status-Report.pdf

PHA (2022). PLANTPLAN: Australian Emergency Plant Pest Response Plan. Plant Health Australia, Canberra ACT. Available online at: https://www.planthealthaustralia.com.au/response-arrangements/plantplan/

Seeman, O.D., & Beard, J.J. (2011). Identification of exotic pest and Australian native and naturalised species of *Tetranychus* (Acari: Tetranychidae). *Zootaxa*, 2961:1–72.

Shearer PW, Jones VP, 1996. Diel feeding pattern of adult female southern green stink bug (Hemiptera: Pentatomidae). Environmental Entomology, 25(3):599-602; 23

Todd, J.W., Herzog, D.C. (1980). Sampling Phytophagous Pentatomidae on Soybean. In: Kogan, M., Herzog, D.C. (eds) Sampling Methods in Soybean Entomology. Springer Series in Experimental Entomology. Springer, New York, NY. https://doi.org/10.1007/978-1-4612-9998-1_23.

APPENDIX 1: THREAT SUMMARY TABLES

Blueberry pests were previously included in previous versions of the *Biosecurity Plan for the Australian Berry Sector*; however, they were not reviewed. To better align the Threat Summary Tables (TSTs) with more current information the blueberry TST underwent a formal review in 2024. Over 120 exotic pests and diseases were identified as part of the review process for the Blueberry TST in 2024.

In the next review period for the *Biosecurity Plan for the Australian Berry Sector*, the TSTs for strawberry and Rubus will be due for review and should have the same process applied to ensure consistency.

Summarised information on entry, establishment and spread potentials and economic consequences of establishment are provided where available. 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 57. An explanation of the method used for calculating the overall risk can be found on the PHA website. Additional information on High Priority Pests (HPPs) listed in the TST can be found in pest-specific information documents (Table 10).

When conducting the review of the TST for blueberries some changes have been made to the way information is presented. Generalised statements on the movement/dispersal and symptoms/affected plant part have been used for each Order. In situations where an Order may have more variety in their behaviour these statements have been broken down further to Family level.

A "Comments" column has been included to include any very specific information when available. E.g. Number of eggs laid per adult female or generations per year.

Acari

General movement statement:

Mites can move inconspicuously as they are small and hide out of sight. Natural movement between plants aids local spread, spider mites can spread further via silken webs blown with wind (Fulcher et al., 2015). Local movement of fruit and plants can also lead to further spread. Long distance dispersal is possible with trade of plant material as mites can avoid surface applied pest treatments. Spread may be less likely with fruit (Craemer, 2018; Walter & Proctor, 2013).

General symptoms statement:

Plant parasitic mites primarily cause damage by piercing leaves, buds, stems, flowers and fruits to drain the contents of individual cells. Mites can overwinter under bark, in buds or other small gaps (De Lillo & Duso, 1996). Symptoms caused by mites can present as galls formed on stems and branches, witches-broom symptoms, leaf-curling, deformed leaves and fruit and discoloured fruit. These symptoms lead to reduced photosynthesis, yield and growth reduction, unsalable fruit and can lead to secondary infection (Lopez & Liburd, 2020). Spider mites specifically will produce webbing that can be obvious in severe infestations (Fulcher et al., 2015).

Scientific name[68]	Common name[68]	Host(s)[68]	Geographic distribution[68]	Comments	Entry potential	Est.[69] potential	Spread potential	Economic impact	Overall risk
Acalitus vaccinii	Blueberry bud mite	*Vaccinium corymbosum* (blueberry), *Vaccinium virgatum, Gaylussacia baccata (black huckleberry) (Craemer,* 2018).	United States of America, South Africa (Craemer, 2018).	*A. vaccinii* causes high flower bud mortality, poor fruit set and size, fruit reddening and blistering. Symptoms can be confused with other damage sources, and the mites are so small they have to be observed on a microscope to diagnose (Sial, 2022).	MEDIUM [244]	MEDIUM[245]	MEDIUM [246]	HIGH[247]	LOW

[68] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[69] Establishment potential.

Coleoptera[70]: Cerambycidae

General movement statement:

Most Cerambycid species can fly, with some species showing sexual dimorphism of flight capability. Typically, adults will fly during the day and depending on if they feed can live between days to months. Flightless species generally move between 20-200m, and flight-capable species have been recorded to fly between a wide range from 1km to several hundreds of kms. Movement from human activities has also contributed to the spread, especially in wooden products and packaging (Wang, 2017). Cerambycid pests are frequently intercepted from wooden packaging and often emerge months after entry (Eyre & Haack, 2017).

General symptoms statement:

Cerambycids generally fall into two categories: xylophagous (feeding on wood) or phytophagous (feeding on herbaceous plants). Xylophagous species are often specialised in the part of the plant they feed on and its health state. Adult females will oviposit in the relevant plant part and larvae feed inside plant tissue. Damage varies depending on the plant material (Eyre & Haack, 2017).

Scientific name[71]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[72] potential	Spread potential	Economic impact	Overall risk
Anoplophora chinensis (syn. *A. malasiaca)*	Black and white longhorn; White-spotted longicorn beetle	Highly polyphagous.[248]	Native range: China, Hong Kong, Indonesia, Japan, North Korea, South Korea, Malaysia, Myanmar, Philippines, Taiwan, Vietnam. Introduced range: Croatia (few occurrences), France (transient), Italy (restricted distribution), Turkey (transient) (EPPO, 2020).	The lifecycle of *A. chinensis* is completed between 1-2 years. An average of 70 eggs are oviposited in roots and bark after adult females cut incisions in the plant. Larvae feed on the internal tissue of the plants, creating tunnels and frass as they move (EPPO, 2020).	MEDIUM [249]	MEDIUM [250]	LOW[251]	LOW[252]	NEGLIGIBLE
Oemona hirta	Lemon tree borer	Highly polyphagous.[253]	New Zealand (EPPO, 2021).		MEDIUM [254]	MEDIUM [255]	MEDIUM [256]	MEDIUM[257]	LOW

[70] Coleoptera are a diverse order which impacts movement and damage types. Based on the identified pests to the blueberry industry, family's general movement and symptoms are covered here, specific information for each pest will be included in the comments section if necessary.
[71] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[72] Establishment potential.

Chrysomelidae

General movement statement:

Most Chrysomelids populations will stay around the same host plants and rarely move far. Populations are often localised and may develop preferences for specific hosts (Strauss, 1988). Adults can jump to escape predation and can fly to find new hosts, especially in warmer conditions (Burgess, 1977).

General symptoms statement:

Damage from the different life stages vary, adults will often feed on plant tissue, leaves, flowers and buds. Adult females lay eggs on leaves and on ground debris and larvae will feed on roots vigorously to then overwinter (Cabrera & Rocca, 2012; Fitzpatrick, 2009).

Scientific name[73]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[74] potential	Spread potential	Economic impact	Overall risk
Colaspis pseudofavosa (C. floridana)	Blueberry leaf beetle	Polyphagous.[258]	Mexico, United States of America (southern).		MEDIUM [259]	MEDIUM [260]	MEDIUM	HIGH[261]	MEDIUM
Neochlamisus cribripennis (syn. *Chlamisus cribripennis)*	Blueberry case beetle	*Vaccinium angustifolium* (Canadian Food Inspection Agency, 2023).	Canada, United States of America.	Eggs are laid on stems and leaves and covered in a case of black excrement, adults overwinter in leaf litter (Crozier, 1993).	LOW[262]	LOW[263]	LOW	LOW[264]	NEGLIGIBLE
Rhabdopterus picipes	Cranberry rootworm	*Vaccinium* spp. (blueberry, raspberry), *Malus* spp. (Harman, 1940). [265]	United States of America.		LOW[266]	LOW[267]	LOW	LOW[268]	NEGLIGIBLE

[73] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[74] Establishment potential.

Curculionidae

General movement statement:

Most Curculionidae weevils can fly, species that may need to seek out other hosts can fly up to hundreds of kms to find a new food source. Fruit with eggs often fall to the ground where larvae will then overwinter and emerge (Showler, 2006). Ambrosia beetles typically fly up to 50m in low wind areas when suitable hosts are accessible (Werle et al., 2015). Movement of wood-boring weevils may be higher risk as most of their life stages are internally within a tree host.

General symptoms statement:

Curculionidae generally fall into two main categories of plant damage, wood-boring and plant material consumption. This family include ambrosia beetles who inoculate trees with fungi as they create galleries to further populate and feed on the fungi (Biedermann & Nuotclà, 2020). Curculionid larvae predominantly live inside all parts of plants, from underground roots to buds, flowers and seeds, some larvae feed exposed on leaves or in the soil on roots (Oberprieler et al., 2007). Oviposition of females in plant parts and fruit often results in a mass loss of yield as a result.

Scientific name[75]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[76] potential	Spread potential	Economic impact	Overall risk
Anthonomus musculus	Cranberry weevil; Blueberry blossom weevil	*Vaccinium corymbosum* (blueberry), *Vaccinium macrocarpon* (cranberry).	Canada (western), United States of America (western) (Silva et al., 2018).	Adult females lay 50-60 eggs in their lifetime (Szendrei & Rodriguez-Saona, 2009).	MEDIUM [269]	LOW[270]	LOW[271]	LOW[272]	NEGLIGIBLE
Anthonomus signatus (syn. *A. pallidus)*	Strawberry bud weevil	Primarily a pest of *Fragaria ananassa* (strawberry), minor hosts include *Rubus caesius* (dewberry), *Rubus fruticosus* (blackberry), *Rubus idaeus* (raspberry), *Rubus occidentalis* (black raspberry), *Rosa* spp. and *Vaccinium* spp. (EPPO, 2003).	Canada, United States of America (EPPO, 2003).	Females oviposit around 80 eggs into flower buds and will chew the stem to prevent the flower developing further (Jeger et al., 2017).	LOW[273]	MEDIUM [274]	MEDIUM [275]	MEDIUM[276]	LOW
Conotrachelus nenuphar	Plum curculio	Host preference differs between generations.[277]	Canada, United States of America (EPPO, 2021).	C. nenuphar has two distinct strains generally aligning with the distribution of the species across North America. The "northern strain" is univolltine and the "southern strain" is multivoltine. Choices in host often depend on the	MEDIUM [278]	MEDIUM [279]	MEDIUM [280]	HIGH[281]	MEDIUM

[75] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[76] Establishment potential.

Scientific name[75]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[76] potential	Spread potential	Economic impact	Overall risk
				generation in conjunction with area, host availability and environmental features. Females can lay up to 400 eggs in their 12-month lifespan (Lampasona et al., 2020).					
Cryptorhynchus obliquus (C. umbrosus)	Crown girdler	*Vaccinium* spp.	United States of America.		MEDIUM[282]	MEDIUM	MEDIUM	HIGH[283]	MEDIUM
Nemocestes incomptus	Woods weevil	*Fragaria* spp. (strawberry), *Rubus* spp. (raspberry, blackberry), *Vaccinium* spp. (blueberries), *Rhododendron* spp., *Primula* spp. (Breaker, 1965).	Canada, United States of America.		LOW[284]	LOW[285]	LOW[286]	LOW[287]	NEGLIGIBLE
Otiorhynchus ovatus	Strawberry root weevil	*O. ovatus* is considered a generalist and found on a variety of hosts[288].	Wide native geographic range[289]. Introduced range: Argentina, Canada, United States of America, New Zealand (UkrBIN, 2024).	*O. ovatus* is noted as present in Australia, however all records of specimens in Australia are originally from overseas recorded in APPD.	MEDIUM[290]	HIGH[291]	HIGH[292]	MEDIUM[293]	MEDIUM
Sciopithes obscurus	Obscure root weevil	*Fragaria* spp. (strawberry), *Rubus idaeus* (raspberry), *Vaccinium* spp. (blueberries), *Rhododendron* spp. and other shrubs (Bell, 1977).	Canada, United States of America.	In GBIF *S. obscurus* is noted to be a synonym of *Perigaster obscura* however this is not reflected in other literature.	LOW[294]	LOW[295]	LOW	LOW[296]	NEGLIGIBLE

Elateridae

General movement statement:

Larvae movement is limited, between 1-1.5m but don't move if suitable food is available. Adult movement ability is dependent on species (sexual dimorphism, flight times etc.), some species have been observed to fly up to 200m (Traugott et al., 2015).

General symptoms statement:

Larvae feed on roots of a variety of crops leading to yield loss and secondary infections. Adults will feed on plant material, less damage is reported (Traugott et al., 2015).

Scientific name[77]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[78] potential	Spread potential	Economic impact	Overall risk
Heteroderes rufangulus (syn. *Conoderus rufangulus)*	Red-angled click beetle	Polyphagous.[297]	Argentina, Brazil, Chile, Paraguay, Uruguay (Velez-Gavilan, 2022).	Taxonomic changes and several reported synonyms have led to *H. rufangulus* being placed in different taxonomic groups. It is currently accepted as a member of Heteroderes, other families it has previously been assigned to include Conoderus, Heteroderes and Monocrepidius (Velez-Gavilan, 2022).	HIGH[298]	LOW[299]	MEDIUM[300]	LOW[301]	VERY LOW

[77] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[78] Establishment potential.

Scarabaeidae

General movement statement:

Most of its life is in larval form in soil, adults are short-lived and will fly to trees, often attracted by previous damage. Spread is most likely to occur of larvae in soil of imported plant material (Jackson, 2009).

General symptoms statement:

The larvae stage feeds on live roots in the soil and are more damaging to grasses or finer root systems of nursery plants. Adults often feed on leaves, flowers, sap and fruit (Jackson, 2009).

Scientific name[79]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[80] potential	Spread potential	Economic impact	Overall risk
Costelytra zealandica	Grass-grub beetle	Polyphagous.[302]	New Zealand.	The larvae of *C. zealandica* feed on the roots of grasses and are considered a significant pest of these products. Adults can cause significant defoliation of fruit trees and pine trees (Brumley et al., 2020).	MEDIUM [303]	LOW[304]	MEDIUM [305]	LOW[306]	VERY LOW
Cyclocephala longula	Masked chafer; White grub	Turfgrass, *Vaccinium* spp.	Canada, United States of America, Mexico.		LOW[307]	LOW[308]	LOW[309]	MEDIUM[310]	VERY LOW
Popillia japonica	Japanese beetle	Highly polyphagous.[311]	Native range: Japan, Russia (Kunashir). Introduced range: Canada, United States of America, Italy (restricted distribution), Portugal (Azores), Switzerland (restricted distribution) (EPPO, 2020).	The odour and the location in direct sun play a pivotal role in the selection of host plants, in Japan the host range is smaller than in introduced countries (EPPO, 2020).	MEDIUM [312]	HIGH[313]	HIGH[314]	HIGH[315]	HIGH

[79] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[80] Establishment potential.

Diptera

General movement statement:

Diptera are a large and diverse order but typically exhibit similar movement patterns due to the structure of their wings. They have one pair of wings for flight in addition to hind wings which are small and maneuverable called halteres. Halteres allow flies to balance and change direction in the air as they fly, making most Diptera highly mobile (Perveen & Khan, 2021).

General symptoms statement:

Diptera species which are pests of blueberry have a short lifespan. Cecidomyiidae adult females lay eggs in buds, larvae will then feed on the flowers and young plant material creating galls and stopping bud formation (Tokuda & Yukawa, 2021). Drosophilidae and Tephritidae fruit flies damage fruit when females lay eggs directly into the fruit. Larvae will then hatch and eat the flesh. They will complete their development within the fruit leading to fruit being unsalable (Helvacı, 2021). Control and management of fruit flies is also costly depending on the methods available which adds to the cost for growers (Dias et al., 2022).

Scientific name[81]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[82] potential	Spread potential	Economic impact	Overall risk
Dasineura oxycoccana (syn. *Cecidomyia oxycoccana)*	Blueberry gall midge	*Vaccinium* spp. (*V. angustifolium, V. corymbosum, V. macrocarpon, V. virgatum*) (Topičová & Kapitola, 2016).	Native range: United States of America. Introduced range: Albania, Croatia, Czechia, France, Germany, Italy, Latvia, Lithuania, Slovenia, Switzterland, United Kingdom, Canada, Mexico, Morocco, Japan, South Korea (EPPO, 2022; Topičová & Kapitola, 2016).	*D. oxycoccana* is multivoltine and has 5-6 generations per year. Adult females lay between 5-10 eggs per vegetative bud prior to bud burst. Larvae then drop to the ground after feeding on the bud and pupate in soil (Survilienė & Kazlauskaitė, 2019).	LOW[316]	MEDIUM[317]	MEDIUM [318]	HIGH[319]	MEDIUM
Drosophila suzukii	Spotted winged drosophila	*D. suzukii* is reported to have a wide host range which has been extensively researched. Over time this has resulted in some species being added and removed from host lists, however a recent study in Europe that hosts which are considered "unsuitable" may still allow for larvae development (Kenis et al.,	Algeria, Comoros, Georgia, Kenya, Mayotte, Morocco, Réunion, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Finland, France, Germany, Greece, Hungary, Ireland, Italy Montenegro, Morocco, Netherlands, Poland, Portugal (including Azores, Madeira), Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom,	*D. suzukii* shows sexual dimorphism with males displaying a dark spot on the top edge of each wing and females having a large, serrated ovipositor. The serrated ovipositor allows females to pierce fruit skin, a female can lay between 350-400 eggs in their lifetime with 3-13 generations produced depending on temperature (EPPO, 2020).	HIGH[321]	HIGH[322]	HIGH[323]	EXTREME[324]	EXTREME

[81] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[82] Establishment potential.

Scientific name[81]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[82] potential	Spread potential	Economic impact	Overall risk
		2016). [320]	China, India, Iran, Israel, Japan, Korea, Myanmar, Pakistan, Taiwan, Thailand, Canada, Mexico (transient), United States of America (including Hawaii), Argentina, Brazil, Chile, Uruguay, French Polynesia (EPPO, 2020).						
Rhagoletis mendax	Blueberry fruit fly; Blueberry maggot	*Vaccinium* spp. (*V. angustifolium, V. ashei, V. corymbosum, V. myrtilloides, V. pallidum, V. stamineum, V. vacillans, Gaylussacia* spp. (*G. baccata, G. frondosa, G. dumosa*).[325]	Canada, United States of America (Rodriguez-Saona et al., 2015).	Adults have a pre-reproductive period of one to two weeks, when they will forage for nutrients on various plants. On sexual maturity, flies' mate and females begin ovipositing. Normally, a single egg is laid into a berry. Females produce 25 to 100 eggs over a period of 15 to 30 days (Steck & Payne, 2020).	LOW[326]	HIGH	HIGH	HIGH	MEDIUM
Rhagoletis tabellaria	Fruit fly	*Cornus* spp. (*C. sericea, C. stolonifera*), *Vaccinium* sp. (*V. parvifolium*), *Prunus* spp. (*P. avium, P. emarginata*), *Prosartes hookeri* (Yee et al., 2015).	Canada, United States of America.	The *R. tabellaria* species group currently contains four members including *R. bushi*, *R, tabellaria*, *R. electromorpha* and *R. persimilis*. Only *R. tabellaria* has been associated with blueberry out of this group (Hulbert et al., 2018).	LOW[327]	HIGH[328]	HIGH	HIGH[329]	MEDIUM
Zaprionus indianus	African fig fly	*Z. indianus* feeds on bacteria and yeast in decomposing fruit, following its introduction to North America the reported host range of *Z. indianus* has increased .[330]	Wide geographic range[331].	*Z. indianus* is considered a cryptic species of the indianus complex with *Z. africanus*, *Z. gabonicus* and *Z. megalorchis* (Bragard et al., 2022). *Z. indianus* females produce around 60–70 eggs on average during their life and primarily feed on damaged and overripe fruit. They can live sympatrically with *D. suzukii* and will lay eggs in fruit previously damaged by *D. suzukii* females (Bragard et al., 2022).	LOW[332]	LOW[333]	HIGH[334]	NEGLIGIBLE	NEGLIGIBLE

Hemiptera[83]: Auchenorrhyncha (cicadas, spittlebugs, leafhoppers, planthoppers and treehoppers)

General movement statement:

Auchenorrhyncha have long legs and use their legs and wings to jump or propel themselves to move (Burrows, 2012). Sexual reproduction occurs as a rule, but pseudogamy and true parthenogenesis have been documented in some species. Most lifecycles are completed in one year. Although most true hoppers complete their life history within a small area, long-distance dispersal might be common among some Auchenorrhyncha (Bartlett et al., 2018).

General symptoms statement:

Auchenorrhynchan pests infest a wide variety of crops and ornamentals and can cause substantial economic damage through direct harm to plants (e.g., hopper-burn) or by serving as vectors of agents of plant disease, including phytoplasmas (Skinner et al., 2019). Generally, true hoppers are monophagous or narrowly oligophagous. Among the true hoppers, species can be phloem, xylem, or parenchyma feeders. Large infestations produce copious honeydew, leading to the growth of sooty mold (Bartlett et al., 2018).

Scientific name[84]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[85] potential	Spread potential	Economic impact	Overall risk
Eurhizococcus brasiliensis	Brazilian ground pearl, Soil scale	Polyphagous.[335]	Brazil	Pest biology and lifecycle - Symptoms reported to include gradual decline of host vigor, thinner and shorter shoots, smaller leaves as well as leaf loss, dieback and mortality (EFSA, 2019).	LOW[336]	MEDIUM	LOW[337]	MEDIUM	VERY LOW
Homalodisca vitripennis (factoring *Xylella fastidiosa)*	Glassy winged sharpshooter	Highly polyphagous.[338]	Mexico, United States of America, Cook Islands, French Polynesia, Chile, Easter Island.		HIGH	HIGH	HIGH	MEDIUM (w/out Xylella) EXTREME (w/ Xylella)[339]	MEDIUM (w/out Xylella) EXTREME (w/ Xylella)
Lycorma delicatula (syn. *Aphaena delicatula; L. delicatulum)*	Spotted lantern fly	Highly polyphagous.[340] Highly polyphagous feeding on a wide range of host plants representing 103 plant taxa (Urban & Leach, 2023). Preferred host plants include *Ailanthus altissima* and *Vitis vinifera* (Lee et. al, 2019).	China, Japan, South Korea, United States of America.	This species is a phloem-feeding plant-hopper that feeds on plant sap and generates sugary excrement (honeydew) that accumulates on understorey plants which can attract other insects and provide a substrate on which sooty mould can develop (Urban & Leach, 2023). Reported to be a	HIGH[341]	HIGH[342]	MEDIUM[343]	MEDIUM[344]	MEDIUM

[83] Hemiptera are a diverse order which impacts movement and damage types. Based on the identified pests to the blueberry industry, suborders' general movement and symptoms are covered here, specific information for each pest will be included in the comments section if necessary.
[84] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[85] Establishment potential.

Scientific name[84]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[85] potential	Spread potential	Economic impact	Overall risk
				significant pest of vineyards and ornamental plants in the eastern United States of America (Urban & Leach, 2023).					
Ricania speculum	Asian planthopper, Black planthopper, Ricanii planthopper	Highly polyphagous.[345]	China, India, Indonesia, Japan, Malaysia North Korea, Philippines, South Korea, Taiwan, Vietnam, Italy. Also reported in Laos, Thailand, Cambodia, Singapore, Myanmar and Sri Lanka (NSW DPIRD, 2007). Also found in North Korea (Rossie & Lucchi, 2015).		LOW	MEDIUM[346]	HIGH	MEDIUM[347]	LOW
Scaphytopius acutus (factoring *blueberry stunt disease)*	Sharpnosed leafhopper	Polyphagous[348]	United States of America	*Scaphytopius acutus* is also capable of transmitting a celery-infecting strain of aster-yellows virus from infected periwinkle *(Vinca rosea*) and aster (*Callistephus chinensis*) to periwinkle, aster, and ladino clover (*Trifolium repens*) (Chiykowski, 2011). Also reported to vector alfalfa witches' broom virus in the United States of America (Utah) (Glover & McAllister, 1960) and X-disease virus (Palmiter et. al, 1960).	LOW	MEDIUM[349]	HIGH	VERY LOW (w/out phytoplasma) EXTREME (w/ phytoplasma)[350]	NEGLIGIBLE
Scaphytopius frontalis (factoring *blueberry stunt disease)*	Sharpnosed leafhopper, Yellowfaced leafhopper	Vaccinium spp. (blueberries).	United States of America, Canada, Mexico		LOW	LOW	LOW	VERY LOW (w/out phytoplasma) EXTREME (w/ phytoplasma)[350]	NEGLIGIBLE
Scaphytopius magdalensis (factoring *blueberry stunt disease)*	Sharpnosed leafhopper	Polyphagous.[351]	United States of America, Canada		LOW	LOW	LOW	VERY LOW (w/out phytoplasma) EXTREME (w/ phytoplasma)[350]	NEGLIGIBLE
Scaphytopius verecundus (factoring *blueberry stunt disease)*	Sharpnosed leafhopper	Polyphagous.[352]	United States of America		LOW	LOW	MEDIUM	VERY LOW (w/out phytoplasma) EXTREME (w/ phytoplasma)[353]	NEGLIGIBLE

Heteroptera (true bugs)

General movement statement:

Every major landmass harbor different species, and migrations to new habitats may be aided by natural agents (e.g., wind, birds, floating debris) or by humans. Eggs may be laid singly or in clusters. Eggs generally are stuck to a surface or inserted into the tissues of a selected host plant. Nymphs are often wingless; flight is common among adult heteropterans. Adults don't tend to fly far and rely on hitchhiking to move far distances (Froeschner, 2023).

General symptoms statement:

Heteroptera in general are larger than aphids and leafhoppers, and consequently their stylets are thicker. Size affects aspects of pathogen transmission during feeding (Mitchell, 2004). Feeding locations on the plant include leaves, stems, roots, buds, fruits, and seeds and may differ among developmental stages or vary seasonally. Three categories of plant tissue – meristem, vascular, and ground – have been reported as sites of ingestion or damage (Panizzi et al., 2021).

Scientific name[86]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[87] potential	Spread potential	Economic impact	Overall risk
Halyomorpha halys	Brown marmorated stink bug	Highly polyphagous.[354]	Algeria, Morocco, Armenia, China, Japan, Kazakhstan, Nepal, North Korea, South Korea, Taiwan, Turkey, Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, France, Georgia, Germany, Greece, Hungary, Italy, Liechtenstein, Malta, Moldova, North Macedonia, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Ukraine, United Kingdom, Canada, United States of America, Chile.	Pest biology and lifecycle - Whilst this species has a wide host range, it exhibits strong preferences for certain species, preferring those with fruiting structures (Penca & Hodges, 2019). This species is most observed to feed on fruiting structures of plants, although it is also capable of feeding on vegetative structures and of piercing through the bark of some trees to feed (Penca & Hodges, 2019).	HIGH	HIGH	HIGH	HIGH[88]	HIGH
Leptoglossus chiliensis	Brown Chilean leaf footed bug	Blueberry, grape, citrus. Also found on *Buddleja globosa*, *Nothofagus antartica* and Solanum tuberosum (Coscaron & Pall, 2015).	Argentina (Coscaron & Pall, 2015).		LOW	MEDIUM	MEDIUM	MEDIUM	LOW

[86] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[87] Establishment potential.
[88] Reported to affect fruit quality of blueberries at harvest with damage to blueberry fruits in the form of increased levels of external discolouration and internal damage (tissue necrosis) (Wiman et. al, 2015). Serious damage to blueberry fruits in the form of fruit deformation, softening, shrinkage and internal tissue necrosis has been reported in Serbia (Konjevic, 2022). Exposure of blueberries to *Halyomorpha halys* has also been reported to be associated with a decrease in berry weight and lower content of dry matter in fruits (Konjevic, 2022).

Sternorrhyncha (psyllids, whiteflies, aphids, mealy bugs)

General movement statement:

Adult jumping plant-lice, adult whiteflies, and many adult aphids have two pairs of wings. All adult female scale insects and most adult female aphids are wingless. Adult male scale insects usually resemble small flies in having the hind wings reduced to small balancers, in a few scale insect species males are apterous. The absence of wings in adult females of scale insects and many aphids means that the immature stages of these groups can be difficult to distinguish from their adults (Gullan & Martin, 2009).

General symptoms statement:

Sternorrhynchans use their stylets to probe plant tissues intracellularly or intercellularly. The tips of the stylets always enter cells at the site of ingestion and are accompanied by secretion of a solidifying saliva. Sternorrhynchans excretes honeydew that may contaminate foliage; it serves as a substrate for the growth of black sooty mold fungi that can impede photosynthesis and reduce plant vigor. Honeydew often attracts ants that may protect the Sternorrhynchans from their natural enemies, especially predatory and parasitic insects (Gullan & Martin, 2009).

Scientific name[89]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[90] potential	Spread potential	Economic impact	Overall risk
Dialeurodes citri	Citrus whitefly	Highly polyphagous.[355]	Algeria, Egypt, Morocco, Nigeria, Tunisia, Afghanistan, Azerbaijan, Bangladesh, China, Hong Kong, India, Israel, Japan, Lebanon, Macau, Pakistan, South Korea, Sri Lanka, Taiwan, Tajikistan, Thailand, Turkey, Uzbekistan, Vietnam, Albania, Croatia, France, Georgia, Greece, Italy, Malta, Montenegro, Russia, Slovenia, Spain, Bahamas, Barbados, Bermuda, Costa Rica, Cuba, El Salvador, Guatemala, Mexico, Puerto Rico, United States of America, New Caledonia, Argentina, Chile, Colombia, Guyana, Peru.	Reported to be capable of causing serious damage on *Citrus* spp. hosts through extraction of large quantities of sap and production of unsightly sooty mould. Considered to be one of the most important pests of *Citrus* spp. and recommended to be a quarantine pest in all citrus-growing areas where its occurrence has not yet been detected.	LOW[356]	HIGH	HIGH	LOW[357]	VERY LOW
Ericaphis fimbriata (Rating with *Blueberry scorch Carlavirus)*	Blueberry aphid	*Vaccinium ashei*, *Vaccinium caudatifolium*, *Vaccinium stenophyllum*, *Vaccinium vitis-idaea* (Dransfield & Brightwell, 2021). Also found on *Vaccinium corymbosum* (highbush blueberry), *Vaccinium macrocarpon*	United States of America, Canada, The Netherlands, Italy, United Kingdom (Plant Biosecurity and Product Integrity, 2017). Also found in Sweden (Dransfield & Brightwell, 2021) and Poland (Netherlands Food and Consumer Product Safety Authority, 2012).	Pest biology and lifecycle - Through feeding, blueberry aphid causes damage to host plants in the form of deformed leaves and reduced plant vigour. Blueberry aphid also impacts host plant health by secreting honeydew and	MEDIUM [360]	MEDIUM	MEDIUM [361]	HIGH (w/out virus) EXTREME (w/ virus) [362]	MEDIUM

[89] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[90] Establishment potential.

Scientific name[89]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[90] potential	Spread potential	Economic impact	Overall risk
		(cranberry) and *Vaccinium membranaceum* (black huckleberry) (Netherlands Food and Consumer Product Safety Authority, 2012).[358]		encouraging fungal growth. Blueberry aphid is also the main vector of blueberry scorch virus (BIScV).[359]					
Illinoia pepperi (syn. *Masonaphis pepperi)* (factoring *Blueberry shoestring virus)*	Blueberry aphid	Blueberry	United States of America.	Pest biology and lifecycle - Reported to vector blueberry shoestring virus; a virus which is known to cause a reduction in yield and a slow decline of bushes over time (Schilder & Miles, 2008).	LOW	MEDIUM	MEDIUM	LOW (w/out virus) MEDIUM (w/ virus)	VERY LOW
Phenacoccus aceris	Apple mealybug, maple mealybug, Polyphagous mealybug	*Hedera* spp. (Ivy), *Malus domestica* (apple), *Platanus* spp. (planes), *Prunus avium* (sweet cherry), *Ribes* spp. (currants), *Ribes rubrum* (red currant). Also found on Birch, linden, mountain ash, cotoneaster, hawthorn, *Spirea* spp., Blueberry (Beers, 2007).	China, Greece, Hungary, Italy, Lithuania, Poland, United States of America.	Pest biology and lifecycle - Reported to vector grape leaf roll associated viruses (Sforza et. al, 2004) and little cherry virus (Beers, 2007).	MEDIUM	HIGH	HIGH	MEDIUM[363]	MEDIUM

Hymenoptera

General movement statement:

Adult wasps fly and crawl to oviposit in suitable hosts. Wind currents may assist in further natural spread and movement of uninspected plant material with galls (Isaacs et al., 2020).

General symptoms statement:

Many Hymenoptera species are considered parasitoids and used as a method of controlling other plant pests. Cynipid gall wasps are primarily responsible for direct damage to plants including blueberry bushes. Adult females will lay eggs in plant material with a venom designed to damage the surrounding cells leading to galls forming (Egan et al., 2018). Formation of galls leads to overall weakening of the plant and reduced yield of fruit (Csóka et al., 2005).

Scientific name[91]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[92] potential	Spread potential	Economic impact	Overall risk
Hemadas nubilipennis	Blueberry stem gall wasp	*Vaccinium* spp. (*V. angustifolium, V. myrtilloides, V. corymbosum*) (Canadian Food Inspection Agency, 2023).	Canada (eastern states), United States of America (eastern states) (Canadian Food Inspection Agency, 2023).	Adult females emerge from galls of the previous year and lay between 12-15 eggs per shoot, following oviposition, she will move to the tip of the shoot and stab the apical meristem to prevent further growth (West & Shorthouse, 1989). After gall formation, inquiline wasp species can also inhabit the same gall (DeVisser et al., 2023).	HIGH[364]	MEDIUM[365]	MEDIUM [366]	MEDIUM[367]	LOW

[91] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[92] Establishment potential.

Lepidoptera[93]: Bombycoidea

General movement statement:

Adults are usually nocturnal, although some Saturniinae and many Hemileucinae fly in the daytime (Scudder & Cannings, 2007). Adults don't have functioning mouthparts and exhibit little tendency towards long-distance dispersal (Scoble et al., 2017).

General symptoms statement:

Pupae usually are enclosed in a silken cocoon, often incorporating leaves (Scudder & Cannings, 2007). Saturniids tend to be associated as larvae with the foliage of woody plants (Scoble et al., 2017).

Scientific name[94]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[95] potential	Spread potential	Economic impact	Overall risk
Saturnia pavonia	Silk moth, Small emperor moth	Highly polyphagous.[368]	Morocco, Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Ukraine, United Kingdom.	Pest biology and life cycle - *Vaccinium* spp. reported to be the preferred host plant at high altitude and latitude in Europe.	LOW	VERY LOW	LOW	VERY LOW	NEGLIGIBLE

[93] Lepidoptera are one of the largest orders of insect species. As pests, Lepidoptera have impacted both agricultural production and natural resources, with forests also being impacted. Behaviour of Lepidoptera varies across suborders and families, blueberry pests have been separated by superfamilies below (Scoble et al., 2017).
[94] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[95] Establishment potential.

Geometroidea

General movement statement:

The geometroid families are generally nocturnal (Kawahara et al., 2017). In some species the females are short-winged or wingless, limiting movement (Scudder & Cannings, 2007).

General symptoms statement:

The larvae usually are externally feeding defoliators, although some attack fruits, dead leaves and stored products; a few are carnivorous (Scudder & Cannings, 2007).

Scientific name[96]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[97] potential	Spread potential	Economic impact	Overall risk
Itame argillacearia	Blueberry Spanworm	*Vaccinium angustifolium* (low bush blueberry/wild blueberry) (Crozier, 1995), *Vaccinium corymbosum* (high bush blueberry), Cranberries (Ramanaidu, 2010).	Canada, United States of Ameirca (Ramanaidu, 2010).	Larvae feed on leaves, flower buds and blossoms of host plants. Flight ranges of adult moths reported to be unknown. Adult females lay eggs at the base of the blueberry plant (Crozier, 1995).	LOW	HIGH	HIGH	MEDIUM[369]	LOW
Operophtera bruceata	Bruce spanworm	*Malus domestica* (apple), *Rubus idaeus* (raspberry), *Vaccinium* spp. (blueberries).	Canada (Native).	Closely related species to *Operophtera brumata*; both species are difficult to distinguish based on wing patterns, but males are distinguishable by distinct genital morphology (Havill et. al, 2017). Some hybridisation has been reported between *Operophtera brumata* and *Operophtera bruceata*. Outbreaks are reported to be rare. Reported to be common across the Northern United States of America and Canada (Havill et. al, 2017). *Operophtera bruceata* is native to Canada (Hebert & St-Antoine, 2012).	LOW	LOW	LOW[370]	LOW	NEGLIGIBLE
Operophtera brumata	Winter moth	Highly polyphagous.[371]	Algeria, Tunisia, Armenia, Azerbaijan, Georgia, Iran, Japan, Kazakhstan, Turkey, Turkmenistan, Albania, Austria, Belarus, Belgium, Bulgaria,	Highly polyphagous and feed on over 100 species of host plants; particularly on *Quercus robur* (Oak). Complete defoliation of host trees is possible during heavy infestations. On apple hosts, reported to	LOW	LOW[98]	LOW[99]	LOW[100]	NEGLIGIBLE

[96] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[97] Establishment potential.
[98] Highly polyphagous and feed on over 100 species of host plants; particularly on *Quercus robur* (Oak).
[99] Dispersal occurs when newly-hatched larvae crawl or are carried to foliage by air currents. Larvae also reported to drift on the wind (Edland, 1971).
[100] Considered an economically important defoliating pest of fruit and deciduous trees in western Europe with the species reported to have caused serious defoliation in deciduous fruit, forest and shade trees in parts of Canada.

Scientific name[96]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[97] potential	Spread potential	Economic impact	Overall risk
			Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, Moldova, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, Canada, United States of America.	cause fruitlets to become deformed causing loss of crop value even at low densities. Closely related species to *Operophtera bruceata*; both species are difficult to distinguish based on wing patterns, but males are distinguishable by distinct genital morphology (Havill et. al, 2017). Some hybridisation has been reported between *Operophtera brumata and Operophtera bruceata* (Havill et. al, 2017).					

Lasiocampoidea

General movement statement:

Mature larvae wander and, when shelter is found, pupate in cocoons made of silk and hair. The adults produce eggs banded around twigs and covered with hardened foam; the moths overwinter as unhatched larvae (Scudder & Cannings, 2007). Adults are nocturnal, though a number of exceptions exist where males fly during the day (Kawahara et al., 2017).

General symptoms statement:

Larvae of the Lasiocampidae feed mostly on deciduous trees and shrubs. Caterpillars often cause severe defoliation during cyclical outbreaks (Scudder & Cannings, 2007).

Scientific name[101]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[102] potential	Spread potential	Economic impact	Overall risk
Tolype innocens		*Vaccinium* spp.	Brazil. Also found in Argentina, Paraguay, Uruguay (Louzada et. al, 2011).	Caterpillars feed on leaves and new shoots of blueberry host plants. Larvae of the genus *Tolype* have been reported to cause chemical burns in blueberry pickers where fruits are harvested manually (Louzada et. al, 2011).	LOW	MEDIUM	MEDIUM	LOW[372]	VERY LOW

[101] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[102] Establishment potential.

Noctuoidea

General movement statement:

Adults of this diverse group are largely nocturnal and strongly attracted to light (Scudder & Cannings, 2007). Noctuoidea have adapted to resemble looper caterpillars, which can move quickly along the substrate by losing prolegs on their bodies (Byrne & Moyle, 2019).

General symptoms statement:

Noctuoidea generally have a strong proboscis which enables adults to feed extensively on plant nectar, sap and fermenting fruit. Some larvae will rest in the soil during the day and emerge at night, feeding on the bases of young plants or climbing higher and eating shrubs and tree foliage. Many are stem and root borers. Others feed openly on leaves and stems, or chew fruits, buds and flower heads. Some become gregarious and migratory at high densities; these armyworms are among the most destructive moth pests. (Scudder & Cannings, 2007).

Scientific name[103]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[104] potential	Spread potential	Economic impact	Overall risk
Lymantria dispar	Spongy moth	Highly polyphagous.[373]	Wide geographic range[374].	Polyphagous with a wide host range. Larvae defoliate host plants by feeding on flushing buds and later, on newly expanded leaves with high populations capable of causing total tree defoliation. The Asian strain (Lymantria dispar asiatica) poses a greater threat than the European strain (Lymantria dispar dispar) (Srivastava et. al, 2020).	HIGH[375]	HIGH[376]	HIGH[377]	HIGH	HIGH
Lymantria monacha	Nun moth	Highly polyphagous.[378]	Wide geographic range[379].	Females generally produce a total of 70–300 eggs per mating event. Newly hatched larvae similar in appearance to those of *Lymantria dispar*. Picea abies (Norway spruce) and Pinus sylvestris (Scots pine) are reported to be the species most preferred -and damaged - by *Lymantria monacha*. On coniferous hosts, can cause complete defoliation. Each larva consumes about 1 squared metre of leaves in its lifetime. Adult moths do not feed and live for less than a week (Plant Biosecurity and Product Integrity, 2016).	HIGH[380]	MEDIUM	HIGH[381]	HIGH[382]	HIGH
Orgyia antiqua (syn. *Orgyia recens)*	European tussock moth, Rusty tussock	Highly polyphagous.[383]	Armenia, China, Turkey, Austria, Belgium, Bulgaria, Czechia, Denmark, Estonia,	Very polyphagous. Health risks - Skin irrational reported to occur on human contact with hairs.	LOW	HIGH[384]	HIGH[385]	LOW[386]	VERY LOW

[103] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[104] Establishment potential.

Scientific name[103]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[104] potential	Spread potential	Economic impact	Overall risk
	moth		Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, Canada, United States of America, Chile.						
Orgyia leucostigma	White-marked tussock moth	Highly polyphagous.[387]	Canada (Native), Cuba, United States of America (Native)	Young larvae are reported to chew small holes in leaves and cause skeletonisation whilst older larvae can consume entire leaves. Entire trees and shrubs may be defoliated during an outbreak. *Orgyia leucostigma* is considered similar to other species such as *Orgyia antiqua*, *Orgyia detrita* and *Orgyia definita*. Reported as a pest of shade trees, walnut orchards, poplar and Christmas tree plantations, and blueberry crops. Health risks - Human pickers engaged to pick *Orgyia leucostigma* -infested crops of *Vaccinium corymbosum* (Highbush blueberry) have been reported to suffer from severe tussockosis (dermatitis and allergic reactions caused by hairs on larvae or in cocoons) (Schowalter, 2018).	LOW	MEDIUM[388]	MEDIUM[389]	LOW[390]	VERY LOW
Peridroma saucia	Pearly underwing moth, Variegated cutworm	Highly polyphagous.[391]	Wide geographic range[392].	Generalist feeder on vegetable crops, cereals, ornamentals, fruit and forage (Scott-Dupree et. al, 2008). Reported to feed readily on numerous plants (Heppner et. al, 2008).	MEDIUM	MEDIUM	MEDIUM[393]	MEDIUM[394]	LOW
Spodoptera eridania	Southern armyworm	Highly polyphagous.[395]	Wide geographic range[396].	A temperature of 20-25°C is optimum for development of this sub-tropical species. Breeding may be continuous with a single female capable of ovipositing 1500-3000 eggs over its lifetime (Montezano & Specht, 2019).	MEDIUM	MEDIUM[397]	MEDIUM	LOW[398]	VERY LOW
Xestia c-nigrum	Spotted cutworm	Highly polyphagous.[399] Preferred host plants include herbaceous dicotyledonous plants and low-growing shrubs. More severe damage	Morocco, Afghanistan, China, Georgia, India, Japan, Kazakhstan, Kyrgyzstan, North Korea, Pakistan, South Korea, Turkey, Uzbekistan, Vietnam,	Larvae reported to cause damage by feeding on developing shoots and plant buds of host plants. Reported to damage leaf and flower buds and host plant foliage through feeding which in turn, results in reduced yield (Landolt	MEDIUM	HIGH[400]	MEDIUM	LOW[401]	VERY LOW

Scientific name [103]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[104] potential	Spread potential	Economic impact	Overall risk
		reported where weedy plants grow adjacent to or among crop plants.	Albania, Austria, Belgium, Bulgaria, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Ukraine, United Kingdom (Channel Islands), Canda, El Salvador, Mexico, United States of America.	et. al, 2010).					

Papilionoidea

General movement statement:

Most Papilionoidea are diurnal (Kawahara et al., 2017). Early instars look like bird droppings and may be overlooked in the field (Byrne & Moyle, 2019).

General symptoms statement:

Most caterpillars are external feeders, but some tie leaves together with silk for shelters (Byrne & Moyle, 2019).

Scientific name[105]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[106] potential	Spread potential	Economic impact	Overall risk
Aporia crataegi	Black-veined white	Polyphagous.[402] This pest has not been researched extensively on *Vaccinium* spp. hosts.	Algeria, Morocco, Tunisia, Armenia, Azerbaijan, China, Georgia, Iran, Iraq, Israel, Japan, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Mongolia, Turkey, Turkmenistan, Albania, Andorra, Austria, Belgium, Bulgaria, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Ukraine.		LOW	LOW	MEDIUM	LOW[403]	NEGLIGIBLE

[105] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[106] Establishment potential.

Pyraloidea

General movement statement:

Pyraloidea are frequently intercepted agricultural pests and elicit quarantine actions on fresh produce and stored products entering the United States from abroad (Scoble et al., 2017). Most Pyraloidea are nocturnal (Kawahara et al., 2017).

General symptoms statement:

Pyralid larvae are concealed feeders with a great diversity of feeding strategies, shelter building and hosts: e.g. stem borers; consumers of stored food products; defoliators; fruit borers; and seed eaters (Byrne & Moyle, 2019).

Scientific name[107]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[108] potential	Spread potential	Economic impact	Overall risk
Acrobasis vaccinii	Cranberry fruit worm	*Vaccinium* spp. (blueberries), *Vaccinium corymbosum* (blueberry), *Vaccinium macrocarpon* (cranberry); *Vaccinium australe* (Small blueberry), *Vaccinium stamineum* (deerberry) *Vaccinium cory*mbosum (blueberry), *Vaccinium vitis-idaea* (cowberry or mountain cranberry), *Gaylussacia* spp. (huckleberry).	United States of America, Canada.		LOW	HIGH	HIGH	MEDIUM	LOW
Chrysoteuchia topiaria (Crambus hortuellus)	Cranberry girdler, Girdle worm	*Poa* spp. (meadow grass), *Alopecurus pratensis* (foxtail), *Agrostis alba* (red top), *Pseudotsuga menziesii* (douglas-fir), *Vaccinium macrocarpon* (Cranberry), *Vaccinium* spp. (blueberries); *Rumex acetosella* (Sheep sorrel); young larvae feed on soft tissues such as crowns, leaves, and roots of grasses; mature larvae feed on bark of cranberry and conifer seedling roots and crowns; also feed on blueberry and many species of herbaceous plants.	Canada, United States of America.		MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

[107] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[108] Establishment potential.

Tineoidea

General movement statement:

The bagworms (Psychidae) are known for their tendency toward female neoteny (delayed development), in the most extreme cases resulting in pupal mating, and several other features correlated with eruptive or outbreak species, high fecundity, dispersal via larval ballooning on silken threads, and polyphagous feeding habits (Scoble et al., 2017). Both nocturnal and diurnal behaviour has been reported from Tineoidea (Kawahara et al., 2017). A majority of Psychidae females are wingless (Rhainds et al., 2009).

General symptoms statement:

Most species are polyphagous defoliators with a broad range of hosts. Larvae can tolerate long periods of starvation lasting a few weeks to several months, larvae often die when they are transferred to a new plant species during development, suggesting that host preference is induced through larval experience (Rhainds et al., 2009).

Scientific name[109]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[110] potential	Spread potential	Economic impact	Overall risk
Liothula omnivora	Bag-moth, Common bag-moth, Casemoth	Highly polyphagous.[404]	New Zealand (Native).	Larvae feed on a wide range of host plants. Larvae have been reported to defoliate and ring branches of currant plants, cause minor damage to the leaves of New Zealand flax and cause damage to needles of Pinus radiata (Ooi, 1967).	LOW	HIGH	HIGH[405]	MEDIUM[406]	LOW

[109] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[110] Establishment potential.

Tortricoidea

General movement statement:

Tortricid eggs are strongly flattened and scale-like, making them easily hidden out of sight. Leafrolling larvae often pupate in a silk-tied shelter on the food plant; many boring larvae pupate in the ground. Most adults are nocturnal, but there are several brightly coloured day-flying groups (Scudder & Cannings, 2007). Tortricoidea are frequently intercepted agricultural pests and elicit quarantine actions on fresh produce and stored products entering the United States from abroad (Scoble et al., 2017). Most Tortricoidea are noturnal (Kawahara et al., 2017).

General symptoms statement:

Tortricid larvae are varied in their feeding habits, ranging from leaf rollers, flower- and litter-feeders, and gall-makers to borers of roots, fruits, and seeds (Scoble et al., 2017).

Scientific name[111]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[112] potential	Spread potential	Economic impact	Overall risk
Acleris laterana (syn. *Acleris latifasciana)*	Broad barred button moth	*Rubus* spp., *Crataegus* spp., *Populus* spp., *Prunus* spp., *Rosa* spp., *Sorbus* spp., *Salix* spp., *Vaccinium* spp., *Filipendula ulmaria*, *Spiraea* spp., *Symphytum officinale*, *Rhododendron* spp..	Europe (British Isles), Northern Asia and North America.		LOW	HIGH	MEDIUM	LOW	VERY LOW
Adoxophyes orana	Summer fruit tortrix	Polyphagous.[407]	Armenia, Azerbaijan, China, Georgia, Japan, North Korea, South Korea, Turkey, Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Netherlands, North Macedonia, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, Ukraine.		LOW	HIGH	HIGH[408]	MEDIUM	LOW
Archips argyrospilus	Fruit tree leaf roller	Highly polyphagous.[409]	United States of America, Canada.		LOW	HIGH	HIGH	MEDIUM	LOW
Archips rosana	Rose leaf folder, Rose twist moth, European leaf roller	Highly polyphagous.[410]	Azerbaijan, Kazakhstan, Turkey, Albania, Belgium, Bulgaria, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Montenegro, Netherlands, Poland, Russia, Spain,	Adults are active after sunset. Females can lay 100-250 eggs under the bark on the lower proportions of branches in masses of 5-170 (Chepurnaya	LOW	HIGH	HIGH	MEDIUM	LOW

[111] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[112] Establishment potential.

Scientific name[111]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[112] potential	Spread potential	Economic impact	Overall risk
			Switzerland, Ukraine, United Kingdom, Canada, United States of America.	and Rybalov 1981). This species has one generation per year, with eggs overwintering and hatching the following spring (Gilligan and Epstein 2014).					
Argyrotaenia citrana (syn. *A. franciscana)*	Orange tortrix	*Citrus limon* (lemon), *Citrus* x *paradisi* (grapefruit), *Malus domestica* (apple), *Persea americana* (avocado), *Prunus armeniaca* (apricot), *Rubus* spp. (blackberry, raspberry), *Vaccinium* spp. (blueberries), *Vitis* spp. (grape).	United States of America.		MEDIUM	HIGH	MEDIUM	MEDIUM	LOW
Argyrotaenia ljungiana (syn. *Argyrotaenia pulchellana)*	Grape tortrix; grey red-barred tortrix	Highly polyphagous. Primarily a pest of grapes and apples, but also reported to attack apricot, pear, strawberry and tea.[411]	China, Georgia, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkey, Uzbekistan, Austria, Belgium, Bulgaria, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom (Channel Islands).	Reported to damage a wide variety of plants with most economic losses occurring in apple, grape and tea (Gilligan & Epstein, 2014). Pest of apple and grapevine in mainland Europe (Alford, 2007). In apple, larvae cause serious damage to maturing fruits removing large areas of skin and tissue leading fruit to be unmarketable (Alford, 2007).	LOW[412]	HIGH[413]	MEDIUM[414]	LOW[415]	VERY LOW
Argyrotaenia velutinana	Red banded leafroller	Polyphagous.[416]	Canada, United States of America		MEDIUM	HIGH	HIGH	HIGH	HIGH
Choristoneura rosaceana (Loxotaenia rosaceana)	Oblique banded leaf roller	Highly polyphagous.[417]	Canada, Mexico, United States of America.		MEDIUM	HIGH[418]	HIGH[419]	HIGH[420]	HIGH
Clepsis persicana	White triangle tortrix, green needleworm	Polyphagous.[421]	Canada, United States of America.		LOW	LOW[422]	MEDIUM	LOW[423]	NEGLIGIBLE
Croesia curvalana	Blueberry leaftier	*Vaccinium angustifolium* (low bush blueberry), *Vaccinium corymbosum* (high bush blueberry)	Canada, United States of America		HIGH	HIGH	MEDIUM	HIGH	HIGH
Ctenopseustis obliquana	Brown headed leafroller	Polyphagous.[424]	New Zealand		HIGH[425]	HIGH	HIGH	MEDIUM	MEDIUM
Grapholita packardi (syn. *Cydia packardi)*	Cherry fruit worm	*Crataegus* spp. (hawthorns), *Crataegus pubescens*, *Cydonia oblonga* (quince), *Malus domestica*	Canada, Mexico, United States of America.	Reported as an occasional pest of blueberry in the United States of America (North Carolina,	LOW[427]	HIGH	HIGH[428]	HIGH[429]	MEDIUM

Scientific name[111]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[112] potential	Spread potential	Economic impact	Overall risk
		(apple), *Prunus avium* (sweet cherry), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Prunus virginiana* (common chokecherrytree), *Pyracantha* spp. (Firethorn), *Pyrus communis* (European pear), *Rosa* spp. (roses), *Vaccinium corymbosum* (blueberry). Also found on *Vaccinium* spp. and *Vaccinium macrocarpon* (EPPO, 2002).		Michigan and New Jersey). Larvae feed on blueberry and cherry fruits internally and overwinter in pruned twigs. Feeding damage spoils fruit quality and marketability and reduces crop yield (EPPO, 2018). Except for *Vaccinium* (Ericaceae), all hosts are members of the Rosaceae.[426]					
Gypsonoma aceriana	Poplar twig borer	*Acer campestre* (field maple), *Betula* spp. (birches), *Erica* spp. (heaths), *Populus* spp. (poplars), *Populus alba* (silver-leaf poplar), *Populus balsamifera* (balm of Gilead), *Populus deltoides* (poplar), *Populus nigra* (black poplar), *Populus* x *euramericana*, *Vaccinium* spp. (blueberries). Mainly feeds on Poplar hybrids with a preference for *Populus trichocarpa* [*Populus balsamifera* subsp. *trichocarpa*] x *Populus deltoides* clones.	Iraq, Turkey, Albania, Austria, Belarus, Belgium, Bulgaria, Croatia, Czechia, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, North Macedonia, Norway, Poland, Portugal, Russia, Serbia, Slovakia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, Canada, United States of America.		LOW[430]	MEDIUM	HIGH[431]	LOW[432]	VERY LOW
Hendacaneuri shawiana	Blueberry tip borer	*Vaccinium* spp. (blueberry) (Schaefers, 1962).[433]	United States of America (New York (Geneva)) (Schaeffer, 1962).	Reported to cause damage to blueberries in the form of damage to the tips of current-season wood causing wilt and die back, with no discernible yield reduction. Larvae spend their entire developmental period within a single blueberry stem (Schaefers, 1962).	LOW	HIGH	HIGH	LOW[434]	VERY LOW
Planotortrix excessana (syn. *Tortrix excessana)*	Greenheaded leafroller, Orchard leafroller	Polyphagous. *Actinidia chinensis* (Chinese gooseberry), *Diospyros* spp. (malabar ebony), *Malus domestica* (apple), *Prunus armeniaca* (apricot), *Vaccinium* spp. (blueberries). Also found on *Eucalyptus* spp., *Sequoia*	New Zealand (Galbreath et. al, 1984) and United States of America (Hawaii) (EPPO, 2016; Gilligan & Epstein, 2014).		MEDIUM[435]	MEDIUM[436]	MEDIUM	MEDIUM[437]	LOW

Scientific name[111]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[112] potential	Spread potential	Economic impact	Overall risk
		sempervirens, *Pinus* spp., *Pseudostsuga menziesii* (EPPO, 2016).							
Proeulia chrysopteris	Fruit leaf roller	Polyphagous.[438]	Chile.	Larvae reported to feed on flowers, fruits, leaves and shoots. Similar in outward appearance to insects of the genus *Nesochoris*. Larvae have a feeding preference for fruits as opposed to foliage. Larvae reported to be highly polyphagous.	LOW	HIGH	HIGH[439]	LOW[440]	VERY LOW
Rhopobota naevana (syn. *R. unipunctana)*	Black-headed fireworm, Holly tortrix	*Solanum tuberosum* (potato). Also found on *Vaccinium macrocarpon* (cranberry) (Fitzpatrick, 2006) and *Vaccinium ovatum* (evergreen huckleberry) (Slessor et. al, 1987). Also reported to feed on *Ilex* spp. (Holly), apple, cherry, *Crataegus* spp., *Fraxinus* spp., *Prunus* spp., *Pyrus* spp., *Sorbus* spp., *Spiraea* spp. and *Syringa* spp. (Hall, 2009).	India, Sri Lanka, Lithuania.	Larvae reported to feed on developing leaf and flower buds and fruit of cranberry (Fitzpatrick, 2006). Diurnal moths reported to lay eggs on the undersides of cranberry leaves (Slessor et. al, 1987).	LOW	MEDIUM	MEDIUM[441]	MEDIUM[442]	LOW
Sparganothis sulfureana	Sulphur-coloured leafroller, False yellow-headed vineworm	*Euphorbia esula* (leafy spurge), *Vaccinium* spp. Also reported on celery, corn, red cedar, jack pine, Scotch pine, strawberry, willow, elm, alfalfa, cranberry and apple (Teerink & Carlson, 1988).	United States of America (North Dakota, Wisconsin).	Polyphagous. Larvae reported to feed mostly on new leaves and terminal buds (Teerink & Carlson, 1988). Reported to cause minor damage to leafy spurge and to be an economically important on apple (Teerink & Carlson, 1988).	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW

Thysanoptera

General movement statement:

Thrips are known for being highly invasive and difficult to control as they are very small and easily hide in large numbers in tight places. Adult thrips are not strong fliers but will migrate to different host plants readily, wind has also been identified as a mode of natural movement (Reddy, 2016). If suitable secondary host plant material is in the area, thrips will migrate then return to the preferred host, population sizes can increase quickly following migration (Ramachandran et al., 2001). Long distance spread via trade has facilitated incursions of exotic thrips, this is often seen with agricultural produce (Morse & Hoddle, 2006).

General symptoms statement:

Damage caused by thrips varies including, nuisance pests to field workers or the public, contaminants of food products, by direct plant damage affecting yield or cosmetic appearance, as vectors of plant diseases, and as perceived quarantine risks that negatively impact trade (Morse & Hoddle, 2006). Damage to crops can more directly result in distortion, discoloration, silvering and bronzing of leaves and fruits (Ramachandran et al., 2001).

Scientific name[113]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[114] potential	Spread potential	Economic impact	Overall risk
Catinathrips kainos	Blueberry thrip	*Vaccinium angustifolium* (lowbush blueberry) (Drummond & Annis, 2009; Langille & Forsythe, 1972).	United States of America (Liburd et. al, 2005).	Feeding by adult thrips causes new leaves to curl and form a protective layer over the thrips. Leaf curls also serve as feeding sites on the host plant as this species lays its eggs within them (Fitzpatrick, 2008). Individuals are believed to migrate into the soil to complete development and are reported to overwinter as adults in the soil (Hall, 2012; Langille & Forsythe, 1972).	LOW[443]	LOW[444]	MEDIUM[445]	LOW[446]	NEGLIGIBLE
Frankliniella bispinosa	Florida flower thrips	Polyphagous.[447]	United States of America (Florida, Georgia), Bermuda, the Bahamas (Mound et al., 2019).	Online some geographic distribution includes Georgia (country), however there is no corresponding reference. As *F. bispinosa* is primarily located in Florida and Georgia (state), this may have been miscommunicated. The lifecycle of *F. bispinosa* is very short and in Florida this leads to over 10 generations developing in a year (Arthurs et al., 2022).	MEDIUM[448]	MEDIUM[449]	MEDIUM[450]	HIGH[451]	MEDIUM

[113] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[114] Establishment potential.

Scientific name[113]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[114] potential	Spread potential	Economic impact	Overall risk
Frankliniella tritici	Eastern flower thrips	Highly polyphagous.[452]	Indonesia, Georgia, Iraq, Kazakhstan, Hungary, Poland, Romania, Russia, Spain, Ukraine, Canada, Puerto Rico, United States of America, Brazil (De Oliveira et al., 2023; El-Wahab et al., 2011; Virteiu et al., 2015).[453]		MEDIUM[454]	MEDIUM	MEDIUM	HIGH[455]	MEDIUM
Frankliniella vaccinii	Blueberry thrips	*Vaccinium angustifolium* (lowbush blueberry) (Drummond & Annis, 2009; Langille & Forsythe, 1972). Also found on *Vaccinium arboreum* (Sparkleberry) (Braman et. al, 1996).	United States of America (Liburd et. al, 2005).	Feeding by adult thrips causes new leaves to curl and form a protective layer over the thrips. Leaf curls also serve as feeding sites on the host plant as this species lays its eggs within them (Fitzpatrick, 2008). The presence and abundance of thrips in blueberry plantings has been reported to be heavily influenced by climatic conditions. Flower thrips generally have a very short lifecycle of approximately 18 to 22 days under ideal conditions, and will complete multiple generations per year (Finn, 2003). Individuals are believed to migrate into the soil to complete development and are reported to overwinter as adults in the soil (Hall, 2012; Langille & Forsythe, 1972).	LOW[456]	LOW[457]	MEDIUM[458]	LOW[459]	NEGLIGIBLE
Scirtothrips citri (syn. *Euthrips citri)*	California citrus thrips	Polyphagous.[460]	Israel, United States of America (southern states), Mexico (EPPO, 2022).	Adult females lay around 25 eggs in live plant tissue. Two of the four life stages involve feeding on plant material and in the warmer months the lifecycle is completed in 2-3 weeks (EPPO, 2022).	HIGH[461]	HIGH[462]	MEDIUM[463]	HIGH[464]	HIGH
Scirtothrips dorsalis complex (exotic species)	Chilli thrips	Highly polyphagous.[465]	Africa, the Americas, the Caribbean, Asia, Europe, Oceania.[466]	S. dorsalis can reproduce both sexually and parthenogenically and depending on temperatures can have between 4-8 generations per year. Larvae and adults feed particularly on young, developing tissue including shoots, leaves, young fruit, and flowers (EPPO, 2023).	HIGH[467]	HIGH[468]	MEDIUM[469]	HIGH[470]	**HIGH**

Bacteria and Phytoplasmas: Bacteria

General movement statement:

Propagation with bacteria-infected plant material is a major way plant pathogenic bacteria are moved over great distances. Plant pathogenic bacteria can be splashed about by rain or carried by the wind, birds or insects. Bacterial pathogens enter plants through wounds, principally produced by adverse weather conditions, humans, tools and machinery, insects, and nematodes, or through natural openings such as stomata, lenticels, hydathodes, nectar-producing glands, and leaf scars. People can unwittingly spread these bacteria by pruning infected plants and facilitating the entrance of bacteria carried on pruning tools into the pruning cuts. Most foliage invaders are spread from plant to plant by windblown rain or dust. Between hosts they may grow harmlessly on plant surfaces and then can overwinter or survive unfavourable environmental periods or the absence of a susceptible host by either going dormant in infected tissue, infested soil or water, or in an insect vector (Williams et al., 2017).

General symptoms statement:

Bacteria: Although the plant host may affect symptom expression, there are four basic types of symptoms associated with bacterial diseases of plants. These symptom groupings are necrosis, vascular wilt, soft rot, and overgrowth. Numerous bacterial species kill cells, resulting in rapid necrosis (death) of tissues, which is the most encountered bacterial disease symptom. Necrosis may affect only small areas or may be so extensive that it leads to death of the plant host. Other bacterial species can cause vascular wilt, most often typified by the drooping of foliage caused by occlusion of vascular tissue, which inhibits movement of water and vascular fluid. Depending on the severity of the infection, water-deprived tissues may become necrotic, leading to defoliation and the complete collapse of the plant. The third symptom type results from the dissolution of plant tissues by macerating enzymes and the subsequent release of cellular fluids. This symptom is commonly known as soft rot and occurs most often in fleshy fruit, vegetables, and ornamentals. It is frequently accompanied by a foul odour produced by secondary bacteria growing on the diseased tissue. The fourth type of symptom is typified by abnormal overgrowths of infected leaves, stems, trunks, or roots. These overgrowths often take the form of galls (plant tumors), leafy galls, fasciation (multiple fused, flattened stems), or phyllody (conversion of flower parts to leaflike structures) (Kado, 2016).

Scientific name[115]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[116] potential	Spread potential	Economic impact	Overall risk
Nocardia vaccinii	Bud-proliferating gall of blueberry	*Vaccinium* spp.	United States of America (Maryland).	Limited publications on this pathogen. Reported symptoms include galls at the soil line, most buds abort at an early stage of development, but some grow into weak shoots giving a witches' broom effect. The shoots eventually die and the gall tissue, initially soft and white, becomes hard and brown to black. The plants develop poorly (Bradbury, 1987).	LOW	MEDIUM[471]	MEDIUM	LOW	VERY LOW
Agrobacterium rubi (syn. *Rhizobium rubi)* (Flores-	Cane gall of Rubus; Knotting of	*Rubus* spp. (R. occidentalis, *R. idaeus*, *R. loganobaccus*), *Rosa* spp., *Vitis vinifera*, *Daphne*	Denmark, France, Germany, Greece, Hungary, Netherlands, Canada,	In Europe non-tumor inducing strains were found to cause symptoms in addition to *R. rubi* (Kuzmanović et al., 2019). Symptoms usually	HIGH	LOW	LOW[472]	LOW[473]	NEGLIGIBLE

[115] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[116] Establishment potential.

Scientific name[115]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[116] potential	Spread potential	Economic impact	Overall risk
Felix et. al, 2020)	raspberry	*mezereum*, *Vaccinium corymbosum* (Abrahamovich et al., 2014)	United States of America, Argentina.	present as spherical, white, rough, spongy wart-like galls which turn dark, brown and woody after 6 months. Some strains appear to cause root proliferation (Alippi et al., 2010).					
Xylella fastidiosa spp. *(Xf subsp. multiplex; Xf subsp. fastidiosa; Xf subsp. unknown) (Delbianco et al., 2022).*	Blueberry leaf scorch (BLS)	*Vaccinium* spp. (*V. corymbosum*, *V. ashei*, *V. virgatum*, *V. darrowii*, V. *angustifolium*) (Delbianco et al., 2022).[474]	United States of America (Alabama, Georgia, Louisiana).[475]	Symptoms of BLS include leaf scorch, dieback, and stem yellowing which can lead to plant death (Oliver et al., 2015).	MEDIUM [476]	MEDIUM (w/out vector)[477]	MEDIUM (w/out vector)[478]	MEDIUM (w/out vector)[479]	LOW

Phytoplasmas

General movement statement:

Phytoplasma: Phytoplasmas are pleomorphic, wall-less intracellular bacteria that are spread principally by insects of the families Cicadellidae (leafhoppers), Fulgoridae (planthoppers), and Psyllidae (jumping plant lice), which feed on the phloem of infected plants, ingesting phytoplasmas and transmitting them to the next plant on which they feed. They are also graft-transmissible (Hogenhout et al., 2008).

General symptoms statement:

In plants, phytoplasmas induce symptoms that suggest interference with plant development. Typical symptoms include: witches' broom (clustering of branches) of developing tissues; phyllody (retrograde metamorphosis of the floral organs to the condition of leaves); virescence (green colouration of non-green flower parts); bolting (growth of elongated stems); formation of bunchy fibrous secondary roots; reddening of leaves and stems; generalised yellowing, decline and stunting of plants; and phloem necrosis (Hogenhout et al., 2008).

Scientific name[117]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[118] potential	Spread potential	Economic impact	Overall risk
Candidatus Phytoplasma solani 16SrXII-A (Stolbur group)	Blueberry Reddening Disease	Highly polyphagous.[480]	Wide geographic range[481].	When observed in the field in Serbia symptoms included yellowing and reddening observed on the upper leaves and proliferating shoots. Fruits also ripened unevenly (Starović et al., 2013).	LOW[482]	LOW[483]	LOW[484]	HIGH[485]	LOW
Candidatus Phytoplasma asteris (Aster yellows group) (16SrI-E; 16SrI-(E/A)AI); 'Ca. P. phoenicium'-related strain (16SrIX-E); 'Ca. Phytoplasma hispanicum' (Mexican periwinkle virescence group) (16SrXIII-(A/I)I)[486]	Blueberry stunt (BBS) disease	*Vaccinium* spp. (*V. corymbosum*, *V. angustifolium*) (Brochu et al., 2023).	Canada, United States of America (Hammond et al., 2021).	Symptoms caused by BBS include shortened internodes, leading infected bushes to appear severely stunted with bushy branches. Leaves are cupped slightly downward and may also have chlorotic edges that turn red late in the growing season. Fruit on infected plants ripens late or not at all. Often, infected bushes go undetected because symptoms can be subtle, especially early in the disease, or easily mistaken for other diseases (Hammond et al., 2021).	LOW[487]	LOW[488]	LOW[489]	HIGH[490]	LOW
Candidatus Phytoplasma Vaccinium witches'-broom phytoplasma str. VAC (milkweed yellows phytoplasma subgroup) (16SrIII-F)	Vaccinium witches'-broom	*Vaccinium* spp. (*V. corymbosum*, *V. myrtillus*, *Heracleum sosnowski*, *Dictamnus albus* (Saccardo et al., 2012).	Germany, Italy, Lithuania (Saccardo et al., 2012; Valiunas et al., 2004).[491]	Observed symptoms include chlorosis, little leaf, shoot proliferation and witches' broom. It has not been confirmed if these symptoms are only caused by Vaccinium witches'-broom (Saccardo et al., 2012).	LOW	LOW	LOW[492]	HIGH	LOW

[117] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[118] Establishment potential.

Fungi

General movement statement:

Fungal spores are readily dispersed by wind, water, insects, nematodes, farm and wild animals, birds, fungi and humans. Some pathogens can disperse in soil; for example, rhizomorphic fungi like (*Armilaria mellea*), produce interwoven hyphal strands (rhizomorphs) that grow through the soil to reach new hosts. Other pathogens can be dispersed by soil, for example, during agronomic operations in a field when the soil is moved from one place to another via agricultural instruments, animals, workers' feet, etc. This movement can also happen via soil erosion. The most important method of pathogen dispersal by soil is the transfer of soil attached around the roots of seedlings. Diseased plants and their parts (other than seeds) prove to be good source of pathogen dispersal when such diseased plants or their parts are transported to other places and grown. Seeds may provide a medium for dispersal of pathogens when they either get contaminated with pathogens or contain pathogens on their seed coats or contain them inside (Soumyojit, 2017).

General symptoms statement:

The signs of plant diseases include wilting, spotting (necrosis), mold, pustules, rot, hypertrophy (overgrowth caused by increase in size of individual cells) and hyperplasia (excessive growth of host tissues caused by increased cell division), deformation, mummification, discolouration, and destruction of the affected tissue. Wilting results from the loss of turgor pressure in the cells and tissues. Spotting is mostly associated with the partial death of plant tissues. Mold and pustules occur because of fungal damage to a plant. Rot leads to both the death of intracellular contents and destruction of the intercellular substance and cell membrane (fungal dry rot). Hypertrophy and hyperplasia represent excessive growth and proliferation of the affected tissue caused by pathogens. Deformations (leaf wrinkling, twisting, and curling; threadlike leaves, fruit deformity, and double-floweredness) can be caused by various biotic and abiotic factors caused by an outflow of the products of photosynthesis, uneven intake of nutrients by the plant, or uneven growth of various tissue elements. In mummification, plant organs are damaged by the fungal mycelium, which leads to plant shrinkage, darkening, or compaction. Colour changes usually occur because of chloroplast dysfunction and low content of chlorophyll in the leaves, which manifests itself in the light colour of some leaf areas (mosaic discolouration) or the entire leaf (chlorosis) (Nazarov et al., 2020).

Scientific name[119]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[120] potential	Spread potential	Economic impact	Overall risk
Alternaria vaccinii	Black spot disease (Rahimloo & Ghosta, 2015)	*Brassica oleracea* var. *capitata* (cabbage), *Vaccinium* spp. (blueberries).	Argentina, Iran.		LOW	LOW	LOW	LOW	NEGLIGIBLE
Asteroma inconspicuum (syn. *Gloeocercospora inconspicua, Gloeosporium inconspicuum, Gloeosporina inconspicua, Cylindrosporella inconspicua, Gloeosporium inconspicuum var. campestre*)(Index Fungorum)[493]	Gloeocercospora leaf spot, Elm Leaf Spot, Twig Blight	Main host is *Ulmus* spp.. Other hosts include Blueberry.	United States of America, Italy	Reported to cause anthracnose on American and English elms (Horst, 2013). Considered to be of minor importance as a leafspot disease to blueberry in North Carolina (USA) (All About Blueberries Community of Practice, 2019 citing Cline, 2014). Symptoms reported to include small to medium (1/4 to 1/2 inch) circular-to-angular dark brown	LOW	MEDIUM[494]	MEDIUM[495]	LOW[496]	VERY LOW

[119] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[120] Establishment potential.

Scientific name [119]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[120] potential	Spread potential	Economic impact	Overall risk
				lesions surrounded by a dark border appearing on host plant foliage (Cline, 2014).					
Botryosphaeria corticis (syn. *Physalospora corticis)*	Blueberry cane canker, Blueberry stem canker, Dieback of Blueberry	*Vaccinium* spp. (Hilario et. al, 2019)	United States of America (Hilario et. al, 2019).		MEDIUM [497]	HIGH	HIGH[498]	HIGH	HIGH
Botrytis pseudocinerea	Grey mould	*Brassica napus*, *Brassica napus* var. *oleifera*, *Solanum lycopersicum* (Tomato), *Vaccinium* spp., *Vitis vinifera* (Grape). Also found on blackberry (Walker et. al, 2011) and strawberry (Plesken et. al, 2015).	China, France, Spain, United States of America (California).	*Botrytis pseudocinerea* unable to be distinguished from the endemic species, *B. cinerea*, based on morphology or field symptoms alone (Walker et al., 2011). Feeds on flowers and fruit (Madeiras & Schloemann, 2020).	MEDIUM	HIGH	HIGH	HIGH	HIGH
Diaporthe nobilis		*Actinidia* spp., *Castanea mollissima* (hairy chestnut), *Punica granatum* (pomegranate), *Vaccinium* spp. (blueberries). Other hosts include apple (Sun et. al, 2019), Poplar (Xu et. al, 2022), *Camelia sinensis* (Li et. al, 2017), *Capsicum annum* (Zhang et. al, 2016) and grapes (Feng et. al, 2024).	China.	Infected fruits showed soft and rotted lesions, covered with grayish or white mycelium under high humidity (Yu et al., 2018).	LOW	NEGLIGIBLE	LOW	MEDIUM[499]	NEGLIGIBLE
Diaporthe vaccinii (syn. *Phomopsis vaccinii)*	Phomopsis blight, Phomopsis canker, Phomopsis twig blight of blueberry	*Vaccinium* spp.	China, Latvia, Norway, Canada, United States of America, Chile.		LOW[500]	MEDIUM[501]	MEDIUM [502]	HIGH[503]	MEDIUM
Dothichiza caroliniana	Double spot	*Vaccinium corymbosum* (Baino et. al, 2007)	Argentina (Baino et. al, 2007), United States of America (Oregon State University Extension Service, 2022).	Symptoms reported to include light to dark brown circular leaf spots 10 to 15 mm in diameter with dark reddish borders, secondary necrotic area around the original spot, large necrotic area surrounding a pale, smaller spot, black pycnidia bearing an amber rubbery cirrhi (Baino et. al, 2007).	LOW	MEDIUM	MEDIUM	LOW[504]	VERY LOW
*Erysiphe penicillata (*syn. *Erysiphe vaccinii; Microsphaera vaccinii; Microsphaera penicillata)*	Blueberry disease; Powdery mildew	*Alnus cordata, A. glutinosa, A. hirsuta, A. incana, Vaccinium corymbosum, V. virgatum, V. angustifolium, V. myrtilloides (*Ellis, 2021).	United States of America (Glawe, 2006).[505]	Symptoms on blueberry leaves usually do not develop until midsummer. The leaves show light green, yellow or reddish areas and puckering. Water-soaked spotting is visible on leaf undersides. White, powdery growth may develop on the upper leaf surfaces (Michigan State University, N.D.).	LOW	MEDIUM	HIGH[506]	MEDIUM[507]	MEDIUM

Scientific name [119]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[120] potential	Spread potential	Economic impact	Overall risk
Exobasidium maculosum	Exobasidium leaf and fruit spot	*Vaccinium corymbosum* (Northern highbush blueberry), *Vaccinium virgatum* (Blueberry) (Brewer et. al, 2014). Also found on *V. corymbosum* hybrids (Stewart et. al, 2015)	Canada, United States of America (Brewer et. al, 2014).		HIGH	HIGH	HIGH[508]	MEDIUM[509]	MEDIUM
Gloeosporium myrtilli (syn. *Gloeosporium minus, Valdensia myrtilli, Saliastrum myrtilli)*[510]	Dieback of Blueberry, Stem Canker of Blueberry, Gloeosporium leaf spot and stem canker	Vaccinium angustifolium, V. corymbosum, V. macrocarpon (Cranberry), V. myrtillus (Bilberry) (Canadian Food Inspection Agency, 2023)	Canada, United States of America, Estonia, Turkey (Canadian Food Inspection Agency, 2023).		MEDIUM	MEDIUM[511]	HIGH	MEDIUM[512]	LOW
Godronia cassandrae (syn. *Fusicoccum putrefaciens, Sphaeronaema radula)*[513]	Canker of Blueberry, Fruit rot of Cranberry (EPPO, 2015), Fusicoccum canker, Godromia canker	*Vaccinium* spp., *Vaccinium corymbosum* (Blueberry), *Vaccinium macrocarpon* (Cranberry)	Russia, Canda (Nova Scotia, Quebec), United States of America (Michigan). Also found in Norway (Zhao et. al, 2019).	Symptoms reported to include cankers which can kill affected branches (Sabaratnam, 2012).	MEDIUM	HIGH	HIGH[514]	HIGH[515]	HIGH
Macrophomina vaccinii	Blueberry Stem Blight	*Pogostemon cablin* (Patchouli), *Vaccinium* spp..	China.		LOW	LOW	LOW	MEDIUM[516]	VERY LOW
Monilinia fructigena (syn. *Oospora fructigena)*	Brown rot	Apple, Apricot, Blueberry, Cherry, Fig, Peach, Pear, Persimmon, Plum, Quince and Strawberry (Plant Biosecurity and Product Integrity, 2017).	Europe, Asia, Middle East.[517]	Symptoms reported to include concentric circles of fungal growth on rotten, infected fruit (Plant Biosecurity and Product Integrity, 2017).	HIGH[518]	HIGH[519]	HIGH[520]	HIGH	HIGH
Monilinia oxycocci (syn. *Sclerotinia oxycocci)*	Cottonball disease of cranberry	*Vaccinium* spp.	India, United States of America. Also reported in Lithuania (Sinkevičienė et. al, 2023), Denmark, Norway, Sweden and Finland (Gibson, 2012).	Symptoms reported to include diseased berry seed cavities containing a white, cottony fungus growth (Oregon State University, 2024).	LOW	LOW	MEDIUM	MEDIUM[521]	VERY LOW
Monilinia vaccinii-corymbosi (syn. *Sclerotinia vaccinii-corymbosi)*	Mummy berry, Cottonball disease	*Vaccinium corymbosum*, *V. angustifolium*, *Vaccinium* spp..	Austria, Canada, Chile, Europe, Slovenia, United	Symptoms reported to include mature infected berries that turn pink to light brown and develop a wrinkled appearance (Plant	MEDIUM [522]	HIGH[523]	HIGH[524]	HIGH[525]	HIGH

Scientific name[119]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[120] potential	Spread potential	Economic impact	Overall risk
			States of America (Alvarez Osorio et. al, 2022; Munda, 2011; Plant Biosecurity and Product Integrity, 2018).	Biosecurity and Product Integrity, 2018). Diseased berries eventually shrivel and harden before dropping to the ground (Plant Biosecurity and Product Integrity, 2018).					
Pestalotia photiniae (syn. *Pestalotiopsis photiniae)*	Leaf spot disease of lowbush blueberry	*Camellia japonica* (camellia), *Camellia sasanqua* (Sasanqua), *Dendrobium devonianum*, *Dendrobium thyrsiflorum*, *Pinus massoniana* (masson pine), *Podocarpus macrophyllus* (Long-leaf podocarpus), *Roystonea regia* (cuban royal palm), *Vaccinium* spp. (blueberries), *Vaccinium angustifolium* (Lowbush blueberry). Also found on *Photinia* spp. (Ellis, 2022).	China, Vietnam. Also reported in New Zealand (Landcare Research New Zealand, 1983).	In a humid environment, black, sessile and discoid conidiomata developed on the spots and exuded a pink spore mass that turned brown with age. Leaves eventually dropped off with the disease (Chen et al., 2010).	LOW	MEDIUM[526]	HIGH	MEDIUM	LOW
Calyptospora columnaris (syn. *Pucciniastrum goeppertianum)*[527]	Cone Blister Rust, Witches' broom rust of blueberry	*Abies balsamea* (Balsam fir), Blueberry.	United States of America (Madeiras & Schloemann, 2020).	[528]	MEDIUM	MEDIUM[529]	HIGH[530]	MEDIUM[531]	LOW
Septoria albopunctata	Septoria Leaf Spot	*Rhododendron* spp. (Azalea), *Vaccinium* spp. (blueberries), *Vaccinium angustifolium* (Lowbush blueberry), *Vaccinium ashei*, *Vaccinium corymbosum* (blueberry), *Vaccinium ovatum* (Box blueberry), *Vaccinium virgatum*.	South Korea, United States of America.	Damage causes defoliation and poor growth. Stem lesions and leaf spots are most severe on small plants or on the lower parts of large plants (Cline, 2014).	LOW	LOW[532]	HIGH[533]	MEDIUM	VERY LOW
Sirococcus conigenus (syn. *Hysterium conigenum)*	Sirococcus blight, Sirococcus shoot blight, Sirococcus tip blight, Shoot blight of conifers	Polyphagous.[534]	Morocco, Bhutan, Austria, Czechia, Finland, Germany, Italy, Russia, Spain, Sweden, Switzerland, United Kingdom, Canada, United States of	Pest biology and life cycle - The fungus overwinters in infected needles and shoots. Spores can cause infection on young, growing plant parts; specifically, on, or next to, the base of new needles and spread to the shoots of the host plant; eventually lesions expand; killing the shoots. The infection may move into one-year-old twigs and kill them. Infected young trees can	LOW	MEDIUM	HIGH[535]	LOW	VERY LOW

Scientific name [119]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est. [120] potential	Spread potential	Economic impact	Overall risk
			America.	become badly disfigured or killed. In a mature tree, infection is typically limited to the lower branches and does not severely damage the health of the tree. The most severe infections occur in years with longer than normal wet periods (Koetter & Grabowski, 2019).					

Nematodes

General movement statement:

Parasitic nematodes are readily spread by any physical means that can move soil particles about—equipment, tools, shoes, birds, insects, dust, wind and water. In addition, the movement of nematode-infested plants or plant parts will spread the parasites (Williams et al., 2017).

General symptoms statement:

Plant parasitic nematodes may attack the roots, stems, foliage and flowers of plants. Typical root symptoms indicating nematode attack are root knots or galls, root lesions, excessive root branching, injured root tips and stunted root systems. Symptoms on the above-ground plant parts indicating root infection are a slow decline of the entire plant, wilting even with ample soil moisture, foliage yellowing and fewer and smaller leaves. These are, in fact, the symptoms that would appear in plants deprived of a properly functioning root system. Bulb and stem nematodes produce stem swellings and shortened internodes. Bud and leaf nematodes distort and kill bud and leaf tissue. In some cases, such as with the Soybean cyst nematode (*Heterodera glycine*, yield loss may take place with no visible symptoms (Williams et al., 2017).

Scientific name [121]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[122] potential	Spread potential	Economic impact	Overall risk
Belonolaimus longicaudatus	Sting nematode	Highly polyphagous.[536]	India, Pakistan, Saudi Arabia, Turkey, Bahamas, Bermuda, Costa Rica, Puerto Rico, United States of America.		LOW	MEDIUM[537]	MEDIUM	MEDIUM[538]	LOW
Hemicycliophora vaccinium & *H. vidua*[539]	Sheath nematodes	*Acer* sp., *Anethum graveolens*, *Arundo* sp., *Beta vulgaris*, *Betula papyrifera*, *Brassica oleracea*, *Daucus carota*, *Ficus* spp., *Fragaria* x *ananassa*, *Lactuca sativa*, *Lolium perenne*, *Medicago sativa*, *Paeonia* spp., *Picea glauca*, *Prunus* spp., *Prunus pensylvanica*, *Raphanus sativus*, *Scirpus* spp., *Solanum lycopersicum*, *Tagetes* spp., *Trifolium repens*, *Ulmus* spp., *Ulmus propinqua*, *Vaccinium* spp., *V. macrocarpon*, *Vitis vinifera* (Nemaplex.UCDavis.edu, 2024).	Canada, United States of America (Nemaplex.UCDavis.edu, 2024; Warner, 2022).	Sheath nematodes can inhibit root growth but don't appear to be host specific (Nemaplex.UCDavis.edu, 2024).	LOW	MEDIUM	LOW	LOW[540]	NEGLIGIBLE
Longidorus diadecturus (factoring *Peach rosette mosaic nepovirus)*	Needle nematode	*L. diadecturus* is regarded as being non-specific for host plants and has been found in a variety of different soil types. The primary risk from *L. diadecturus* is as a vector	Canada, United States of America, China (EPPO, 2022).	*L. diadecturus* feed on root tips causing small galling and stunting of roots (EPPO, 2022).	LOW[541]	MEDIUM[542]	LOW[543]	LOW (w/out PRMV) MEDIUM (w/ PRMV)[544]	NEGLIGIBLE

[121] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[122] Establishment potential.

Scientific name [121]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[122] potential	Spread potential	Economic impact	Overall risk
		of *Nepovirus persicae* (Peach rosette mosaic virus (PRMV)). It has been confirmed to vector PRMV to *Vitis labrusca* (American grape), *Cucumis sativus* (cucumber), *Vaccinium* spp. (blueberry), *Acer negundo* (box elder), *Cercis canadensis* (redbud), *Ulmus americana* (American elm) (EPPO, 2022).							
Meloidogyne carolinensis	Blueberry root knot nematode	*Beta vulgaris*, *Brassica oleracea*, *Daucus carota*, *Raphanus sativus*, *Rhododendron* spp., *Salsola richteri*, *Vaccinium angustifolium*, *V. corymbosum* (Nemaplex.UCDavis.edu, 2024).	United States of America (Nemaplex.UCDavis.edu, 2024).	Reported in blueberry fields in North Carolina in the 80's, however is not associated with disease e.g. Blueberry replant disease (Jagdale et al., 2013).	MEDIUM	LOW	MEDIUM	LOW[545]	VERY LOW
Merlinius joctus (syn. *Tetylenchus joctus)*		Highbush blueberry varieties.	United States of America (Warner, 2022).	Commonly found in fields of blueberries with good and bad plant growth and doesn't appear to have a major impact (Zasada et al, 2010).	LOW	LOW	LOW	LOW[546]	NEGLIGIBLE

Oomycetes

General movement statement:

Spreads naturally by moving through soil and infected roots, and in run-off. Animals spread when infested soil gets caught in their feet and fur and it drops off in uninfested areas. Humans spread when they disturb and move infested soil. Through their activities, humans have spread further and faster than any other means of spread. Oomycetes also form dormant resting structures that enable their survival for years under hostile environmental conditions (DBCA, 2022; Jung et al., 2018).

General symptoms statement:

The diseases they cause include seedling blights, damping-off, root rots, foliar blights and downy mildews. *Pythium* spp. cause seed and root rots and damping off diseases (Hayden et al., 2013). In contrast, Phytophthora species cause fine root losses, root and collar rots and bleeding bark cankers, and airborne Phytophthora species causing leaf necrosis, shoot blights, fruit rots and bleeding bark cankers (Jung et al., 2018).

Scientific name [123]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[124] potential	Spread potential	Economic impact	Overall risk
Phytophthora kernoviae (syn. *P. kernovii)*	Phytophthora blight	Highly polyphagous.[547]	Ireland, United Kingdom, Argentina, Chile, New Zealand (EPPO, 2022).	[548]	HIGH[549]	HIGH[550]	HIGH[551]	HIGH[552]	HIGH
Phytophthora ramorum	Sudden oak death	Highly polyphagous.[553]	Belgium, Croatia, Denmark, Finland (transient), France, Germany, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, United Kingdom, Japan, Vietnam, Canada (transient), United States of America, Argentina (EPPO, 2020).		HIGH[554]	HIGH[555]	HIGH[556]	EXTREME[557]	EXTREME

[123] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[124] Establishment potential.

Viruses

General movement statement:

Plant viruses can spread through insect vector transmission, such as aphids, thrips, and whiteflies; mechanical transmission, such as through horticultural activities like vegetative propagation and pruning; propagation by budding and grafting, or by cuttings; infected seeds, sap, divisions, grafted plant varieties, bulbs, and pollen (University of Maryland Extension, 2023).

General symptoms statement:

Symptoms of plant virus infection include necrotic spots; abnormal dark green and light green mosaic and mottling of leaves; growth distortion; stunting; ring patterns or bumps on plant foliage; abnormal flower colouration and formation; fruits may ripen unevenly; reduced fruit number and size. Symptoms may resemble fungal and bacterial diseases or environmental stresses (Flores et al., 2005; Williams et al., 2017).

Scientific name [125]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[126] potential	Spread potential	Economic impact	Overall risk
Vitivirus vaccinii	Blueberry green mosaic-associated virus (BGMaV)	*Vaccinium corymbosum* (Thekke-Veetil & Ho, 2019).	United States of America (New Jersey) (Thekke-Veetil & Ho, 2019).	Green-mosaic-affected blueberry plants show green-colored mosaic patterns on their foliage, differing slightly from other mosaic viruses (Thekke-Veetil & Ho, 2019).	LOW	LOW	LOW[558]	LOW[559]	NEGLIGIBLE
Nepovirus vaccinii	Blueberry latent spherical virus (BLSV)	*Vaccinium corymbosum*, *Chenopodium quinoa*, *Luffa cylindrica*, *Nicotiana benthamiana* (Isogai et al., 2011).	Japan (Isogai et al., 2011).		LOW	LOW	MEDIUM [560]	NEGLIGIBLE [561]	NEGLIGIBLE
Blueberry shock ilarvirus (Ilarvirus BSV)	Blueberry shock	*Vaccinium* spp. (*V. corymbosum*, *V. macrocarpon*) (Thomas-Sharma et al., 2018).	Canada, United States of America (Thomas-Sharma et al., 2018).	Virus-infected blueberries developed a second flush of foliage after blooming and fewer berries in late summer, while other symptoms of blighting on blossoms and leaves were similar to Blueberry scorch virus. After 1–3 years, the flower and fruit of the infected blueberries seemed to be growing normally, with no additional symptoms (Saad et al., 2021).	LOW[562]	MEDIUM	HIGH[563]	HIGH[564]	MEDIUM
Blueberry fruit drop associated virus (Vaccinivirus cadovaccinii)	Blueberry fruit drop	Blueberry	Canada, United States of America (Diaz-Lara & Martin, 2016) No record of any expansion of its current range (Canadian Food Inspection Agency, 2023).	Pest biology and lifecycle - The method by which this virus establishes, and spreads is not currently known (Canadian Food Inspection Agency, 2023).	LOW[565]	LOW	LOW[566]	MEDIUM[567]	VERY LOW

[125] Information in this column is generally recorded from CABI unless specified with a corresponding reference (CABI, 2024).
[126] Establishment potential.

Scientific name [125]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[126] potential	Spread potential	Economic impact	Overall risk
Blueberry leaf mottle virus (Nepovirus myrtilli)	Leaf mottle	*Vaccinium* spp. (blueberries), *Vaccinium angustifolium* (Lowbush blueberry), *Vaccinium corymbosum* (blueberry), *Vitis labrusca* (fox grape). Also found on *Vaccinium* hybrids, *Vaccinium myrtilloides* and *Vitis vinifera* (EPPO, 2023).	South Korea, Canada, United States of America.	BLMoV-infected blueberry bushes show varying degrees of symptom severity depending on the cultivar. BLMoV has been detected in commercial blueberry fields as well as wild Vaccinium spp. bushes surrounding the field, implying virus movement between cultivated and wild areas (Saad et. al, 2021).	MEDIUM [568]	MEDIUM[569]	MEDIUM [570]	HIGH[571]	MEDIUM
Blueberry mosaic associated ophiovirus (Ophiovirus vaccinii)	Blueberry mosaic, Blueberry Mosaic Associated Virus	*Vaccinium corymbosum* (blueberry)	United States of America, South America, Asia, Europe, New Zealand and South Africa (Saad et. al, 2021). Also found in Slovenia (Thekke-Veetil et. al, 2015).	Mosaic diseases cause blueberry bushes to have bright yellow to yellow-green colouration on their leaves, resulting in mosaic and mottling patterns that sometimes turn pink. Symptoms can occur in patches or may be widely spread across the infected bush, and they can appear at any time of year (Saad et. al, 2021).	MEDIUM	MEDIUM	LOW[572]	HIGH[573]	LOW
Blueberry necrotic ring blotch virus (Blunervirus vaccinii)	Blueberry necrotic ring blotch	*Vaccinium* spp.	Southeastern United States of America.	Infected blueberries have distinct necrotic rings with green cores, but when the rings fused, they resembled the symptoms of fungal diseases. Early defoliation can occur in severely infected bushes, which can be mistaken for Septoria leaf spot disease. Unlike blueberry red ringspot virus, which usually only affects the upper leaf surface and stems, blueberry necrotic ring blotch virus infected leaves may have necrotic rings on both the upper and lower surfaces, but the stems do not show symptoms (Saad et. al, 2021).	MEDIUM	LOW[574]	LOW[575]	LOW[576]	NEGLIGIBLE
Blueberry red ringspot virus (Soymovirus maculavaccinii)	Red ringspot	*Vaccinium corymbosum*, *V. formosum* and possibly *V. macrocarpon.*	Japan, South Korea, Czechia, Poland, Slovakia, Slovenia, United States of America. Also found in Belarus, Canada and Serbia (Saad et. al, 2010; Saad et. al, 2021).	Symptoms are usually seen in late summer and early autumn on older leaves as red blotches resulted from the coalescence of round red spots. Also common is the appearance of pale green lesions surrounded by red rings with a diameter of 2–3 mm and 5–15 mm on leaves and stems, respectively. The red spots on leaves are a typical disease diagnostic characteristic that is commonly observed on the upper leaf surface, but both sides of the leaves can be symptomatic depending on the cultivar. Sometimes the red rings can also be visible on ripening fruit but disappear as the fruit	MEDIUM	HIGH	LOW[577]	MEDIUM[578]	LOW

Scientific name [125]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[126] potential	Spread potential	Economic impact	Overall risk
				ripens. Infected fruits can also become distorted and unmarketable (Saad et. al, 2021).					
Blueberry scorch virus (Carlavirus vaccinii)	Scorch	*Sambucus nigra* (elder), *Vaccinium* spp. (blueberries), *Vaccinium ashei*, *Vaccinium corymbosum* (blueberry), *Vaccinium macrocarpon* (cranberry), *Vaccinium membranaceum*, *Vaccinium virgatum*.	Italy, Netherlands, Switzerland, United Kingdom, Canada, United States of America. Also found in Germany and China (Saad et. al, 2021).	Reported symptoms include full blighting of blossoms, necrosis of young foliage, and stem dieback in susceptible cultivars, noting some cultivars may appear asymptomatic. Scorched flowers can either stay on the bushes until the next season or fall off right away. Some infected cultivars can produce a red line shape or chlorosis at the leaf margins. Expression of symptoms is influenced by a number of factors, including the season of occurrence, cultivar, and virus strain. Symptoms appear after many years upon infection, suggesting a latent phase in the disease's growth until it spreads across the entire plant (Saad et. al, 2021).	MEDIUM	HIGH	LOW[579]	HIGH[580]	MEDIUM
Blueberry shoestring virus (Sobemovirus)	Shoestring	*Vaccinium* spp.	Poland, Canada, United States of America.	SSV has a four-year latent cycle before causing symptoms on healthy blueberry plants in an infected area, and it spreads horizontally from bush to bush. Flower 'breaking' can occur when longitudinal pink streaks appear on the petals. Infected leaves are narrow and curled, with the symptom of a shoestring. When the surface of immature berries on infected plants is exposed to light, it may turn prematurely reddish-purple (Saad et. al, 2021).	MEDIUM	HIGH	LOW[581]	HIGH[582]	MEDIUM
Blueberry virus A (Bluvavirus vaccinii)	Blueberry bronze leaf curl	Blueberry	Japan.	In the case of Blueberry virus A, the virus is symptomless in single infections but may be involved in a disease complex in Michigan where plants infected with BVA exhibit a bronze leaf curl symptom (Martin & Tzanetakis, 2018).	LOW	HIGH	LOW	NEGLIGIBLE	NEGLIGIBLE
Peach rosette mosaic virus (Nepovirus persicae)	Peach rosette mosaic	*Acer rubrum*, *Prunus angustifolia*, *Prunus domestica*, *Prunus dulcis*, *Prunus persica*, *Prunus salicina*, *Prunus umbellata*, *Rumex crispus*, *Solanum carolinense*, *Taraxacum officinale*, *Vaccinium corymbosum*, *Vitis* hybrids,	Turkey, Egypt, Canada, United States of America.	In highbush blueberry (*Vaccinium corymbosum*), leaves become strap-like or crescent shaped, although symptoms are unevenly distributed over affected bushes (EPPO, 2002).	LOW[583]	LOW	LOW[584]	LOW[585]	NEGLIGIBLE

Scientific name [125]	Common name	Host(s)	Geographic distribution	Comments	Entry potential	Est.[126] potential	Spread potential	Economic impact	Overall risk
		Vitis labrusca, *Vitis vinifera* (EPPO, 2002).							
Tobacco ringspot virus (Nepovirus nicotianae) (exotic blueberry infecting strains)[586]	Tobacco ringspot virus, TRSV	Highly polyphagous.[587]	Congo (DRC), Egypt, Malawi, Morocco, Nigeria, Togo, Zambia, China, India, Indonesia, Iran, Japan, Kyrgyzstan, Nepal, North Korea, Sri Lanka, Taiwan, Jordan, Lebanon, Oman, Saudi Arabia, Turkey, Belarus, Croatia, Georgia, Hungary, Italy, Lithuania, Netherlands, Poland, Russia, Ukraine, United Kingdom, Canada, Cuba, Dominican Republic, Mexico, United States of America, Australia (some strains), New Zealand, Papua New Guinea, Brazil, Chile, Uruguay, Venezuela (EPPO, 2002).[588]	In blueberries, the symptoms are general stunting of the plant, chlorotic and necrotic spots on the leaves, and stem dieback.	MEDIUM [589]	MEDIUM (w/out vector) HIGH (w/ vector)	LOW (w/out vector) HIGH (w/ vector)[590]	HIGH[591]	LOW (w/out vector) HIGH (w/ vector)
Tomato ringspot Nepovirus (Nepovirus lycopersici) (subgroup C)	Tomato ringspot virus	Wide host range spanning over multiple families. Hosts include blueberry, blackberry, raspberry, gooseberry, apple, stonefruit, currants, grapevine, strawberry, *Pelargonium* spp. and various weed species.	China, India, Iran, Japan, Jordan, Korea, Oman, Pakistan, Turkey, Egypt, Togo, Canada, Mexico, USA, Puerto Rico, Brazil, Chile, Colombia, Peru, Venezuela, Belarus, Croatia, France, Italy, Lithuania, Poland, Russia, Serbia, Slovakia, Slovenia, Montenegro, Fiji, New Zealand.		MEDIUM	MEDIUM (w/out vector) HIGH (w/ vector)	LOW (w/out vector) HIGH (w/ vector)	HIGH	LOW (w/out vector) HIGH (w/ vector)

Rubus and Strawberry

The information provided in the Threat Summary Table (TST) is an overview of exotic plant pest threats to the rubus and strawberry industries. The *Biosecurity Plan for the Australian Berry Sector Version 1.0* (published in 2020) included TSTs for the rubus and strawberry industries covering over 330 exotic pests and diseases.

Summarised information on entry, establishment and spread potentials and economic consequences of establishment are provided where available. Pests under official control[127] or eradication may be included in these tables where appropriate. However, berry pests that are established but regionalised within Australia are not covered by TST but may be assessed in state biosecurity plans. Assessments may change given more detailed research and will be reviewed with the biosecurity plan. These tables includes pests of leviable *Rubus* (*Rubus idaeus, Rubus fruticosus* and leviable hybrids) and strawberry (*Fragariae* x *ananassa*) species.

Full descriptions of the risk rating terms can be found on page 57. Additional information on High Priority Pests (HPPs) listed in the TST can be found in pest-specific information document (Table 10).

Invertebrates

Table 21. Berry invertebrate threat summary table.

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
Acari (mites)											
Rubus and Strawberry	***Amphitetranychus viennensis*** (syn. *Tetranychus viennensis*)	Hawthorn spider mite, sweet cherry spider mite	Rosaceae including almond, cherry, strawberry, fig, hawthorn, pear, peanut, hazel, quince, common cotton, sour cherry, apricot, peach, blackthorn, limes, apple, plum, sweet cherry, quince raspberry, red currant	Leaves and fruits	Can be transmitted through vectors such as birds, large insects, wind, humans and infested plant material[592]	Azerbaijan, China, UK, Georgia, Japan, Korea, Pakistan, Taiwan, Turkey, Spain, Poland, Uzbekistan, Austria, Greece, Serbia Bulgaria, France, Iran Germany, Hungary, Lithuania, Belgium Moldova, Romania, Russia, Slovakia, Armenia, Lebanon, Czechia, Kazakhstan, Portugal, Moldova, Italy, Syria, Sweden, Netherlands, Ukraine, Montenegro,	MEDIUM	HIGH	MEDIUM	HIGH	**MEDIUM**

[127] 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.
[128] Establishment potential.

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
						Switzerland, Tajikistan					
Rubus	***Cenopalpus pseudospinosus***	Rust mite	Raspberry	Leaves (under surfaces)	Infested plant material and clothing	Greece, Ukraine[129]	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Eotetranychus carpini*** (syn. *Tetranychus carpinis, E. carpini*)	Yellow mite, yellow vine mite	Polyphagous including raspberry, plum chestnut, apple, hazelnut, pear grapevine, cherry, blackberry, ornamental plants	Leaves, old and young shoots	Spread through contaminated machinery, equipment and wind-dispersal	France, Mexico, Syria Algeria, Croatia, Italy Armenia, USA, Ukraine Slovenia, Azerbaijan, China, Finland, Spain, Germany, UK, Greece, Georgia, Serbia, Iran, Hungary, Lebanon, Morocco, Turkey, Russia, Netherlands, Poland, Romania, Tunisia, Switzerland	MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH	**MEDIUM**
Rubus	***Epitrimerus gibbosus***	Blackberry rust mite	Raspberry and blackberry	Leaves	Can spread through infested plant material and clothing	Europe (Armenia, Austria, Denmark, Finland, Germany, Hungary, Italy, UK Poland)	MEDIUM	MEDIUM	LOW	LOW	**NEGLIGIBLE**
Rubus	***Neotetranychus rubi***	Raspberry mite	Raspberry	Leaves	Can spread through infested plant material	Europe, Asia	MEDIUM	MEDIUM	LOW	LOW	**NEGLIGIBLE**
Strawberry	***Oligonychus ilicis***	Southern red mite	Wide host range[593]	Foliage	Infested plant material and soil	East Asia, North and South America, Europe, Japan, Korea	HIGH[594]	HIGH	HIGH	HIGH	**HIGH**
Rubus and Strawberry	***Tetranychus pacificus***	Pacific spider mite	Polyphagous including pome and stone fruit, grapevines, melon ornamental tree species, apple, fig, *Citrus* spp., maize, cotton, almond, walnut, lucerne	Leaves	Can spread over long distances on infested plant material, wind dispersal, clothing and machinery. Localised spread, from plant to plant is by walking.	Canada, Mexico, United States, Europe	MEDIUM[595]	HIGH	MEDIUM	HIGH	**MEDIUM**

[129] Little is known about the biology of this mite which so far has a limited distribution around the world according to current published literature.

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			strawberry, bean grapevine, rose, *Prunus* spp, *Ribes* spp., *Rubus* spp., *Brassica* spp., pear sunflower, pumpkin								
Rubus and Strawberry	***Tetranychus turkestani***	Strawberry spider mite	Apple, okra, pear, Citrus, clover, fig, cherry, peach, cotton, almond, strawberry, *Rubus* spp., banana, carrot, stone fruit, rose, soybean, maize, beans, quince, lucerne, lettuce, blackcurrant, parsley, grapevine	Leaves	Can spread over long distances on infested plant material, wind dispersal, clothing and machinery. Localised spread, from plant to plant by walking.	Europe, South America, North America, New Zealand, Africa and Asia (including the Middle East)	MEDIUM[596]	HIGH	HIGH	HIGH[597]	**HIGH**
Coleoptera (beetles and weevils)											
Rubus and Strawberry	***Adoretus sinicus***	Chinese rose beetle	Wide host range including grape, copperleaf, beans, peanut, okra, tea, broccoli, cacao, cotton, peanuts, cucumber, sweet potato, sugarcane, taro, jackfruit, soybean, starfruit, raspberry, ginger, strawberry	Whole plant	Transmitted through wind (dispersal of *A. sinicus*), Infested plant material and adults are capable of flight.	China, India, Thailand, Indonesia, Korea, USA, Malaysia, Singapore, Taiwan, Vietnam, American Samoa, Caroline Islands, Guam, Micronesia, Northern Mariana Islands	HIGH[598]	MEDIUM[599]	MEDIUM[600]	HIGH[601]	**MEDIUM**
Rubus	***Agrilus cuprescens***	Raspberry buprestid, rose stem borer	Raspberry, blackberry and *Rosa* spp[602]	Stems, leaves, canes	Infested plant material and adults capable of flight.	Europe, North Asia and North America	LOW	LOW	LOW	MEDIUM-HIGH[603]	**VERY LOW-LOW**
Rubus	***Agrilus ruficollis***	Red necked cane borer	Boysenberry and wild varieties of raspberry and dewberry	Stems, leaves	Infested plant material and adults are capable of flight.	North America, Europe and Northern Asia (except China)	LOW	LOW	LOW	MEDIUM-HIGH[604]	**VERY LOW-LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
Rubus and Strawberry	***Anthonomus bisignifer***	Strawberry bud weevil	Strawberry, raspberry and roses	Inflorescence	Infested plant material and adults are capable of flight[605]	Japan, North Korea, South Korea, Russia	LOW[606]	MEDIUM	LOW-MEDIUM	LOW[607]	**NEGLIGIBLE -VERY LOW**
Rubus and Strawberry	***Anthonomus rubi***	Strawberry blossom weevil	Raspberry, strawberry and rose	Leaves, flower buds, fruit	Infested plant material and adults are capable of flight	Belgium, Denmark, Former USSR, Poland, Russia, Sweden, Switzerland, Romania	LOW	MEDIUM	LOW-MEDIUM	LOW-MEDIUM[608]	**NEGLIGIBLE -LOW**
Rubus and Strawberry	***Anthonomus signatus*** (syn. *Anthonomus bisignatus*)[609]	Strawberry bud weevil[610]	Strawberry, blueberry, *Rubus* spp. (including dewberry)	Inflorescence and leaves, flower buds	Infested plant material and adults are capable of flight	Canada and USA[611]	LOW	MEDIUM	MEDIUM-HIGH	HIGH [612]	**MEDIUM**
Rubus and Strawberry	***Batophila aerata***	Raspberry flea beetle	Blackberry, raspberry, loganberry, strawberry	Leaves	Transmitted through infested planting material	Europe, France, South England, Corsica, Italy, Germany, Slovenia, Greece, Spain, North Africa	LOW	LOW	LOW	LOW[613]	**NEGLIGIBLE**
Rubus	***Byturus ochraceus*** (syn. *B. olivaceus, B. aestivus, B.fumatus, B.rosae*)	Raspberry beetle	Blackberry, raspberry, *Rubus procerus* (Himalayan berry), loganberry, hawthorn, apple, pear	Flowers, fruit, leaves, unopened buds, open flowers, developing leaves	Transmitted through infested planting material. Adults are strong fliers.	Afghanistan, Bhutan, Georgia Japan, Nepal, Taiwan, Turkey, Italy, Austria, Belgium, UK, Bulgaria, Finland, Czechia, Spain, Denmark, Estonia, France, Latvia, Serbia, Germany, Hungary, Ireland, Lithuania, Sweden, Netherlands, Norway, Poland, Russia, Switzerland, Ukraine, Yugoslavia, North America	LOW	LOW	LOW	MEDIUM	**VERY LOW**
Strawberry	***Conoderus* spp. (including *C. rudis, C. amplicollis* and *C. falli*)**	Wireworm	Polyphagous including potato peanut, maize, soybean, cotton, sweetpotato, tomato, cowpea, tobacco and strawberry	Below ground plant parts	Localised spread by flying and walking	Georgia and USA	LOW	LOW	LOW	LOW	**NEGLIGIBLE**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
Rubus	***Coreus marginatus***	Dock leaf bug[614]	Blackberry, raspberry, gooseberry, dock, sorrel and related plants in the Polygonaceae family.[615]	Nymph feeds on leaves and stems, other nymphs and adult feed on seeds	Infested plant material and adults are capable of flight.	Europe, Asia and North Africa	MEDIUM	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus	***Cotinis nitida***	Green June beetle, fig eater beetle	Polyphagous including corn, oats, *Rubus* spp. sorghum, alfalfa, vegetables, grass tobacco, turf, grapevine and ornamentals	Fruit, roots, ripe fruit[616]	Localised spread by flying and walking.	North America	MEDIUM	MEDIUM	MEDIUM	MEDIUM	**LOW**
Rubus	***Glischrochilus quadrisignatus*** (syn. *Glischrochilus canadensis, G. similis*)	Four spotted sap beetle, beer bug, picnic beetle	Polyphagous including maize, *Rubus* spp., tomato	Leaves, stems, flowers, fruit[617]	Infested plant material and adults are capable of flight.	USA, Former USSR, Czechoslovakia, Japan, Italy, Canada, Netherlands, Serbia, Montenegro	MEDIUM	MEDIUM	MEDIUM	MEDIUM[618]	**LOW**
Rubus	***Harmonia axyridis***	Harlequin ladybird	Pumpkin, apple, pear, grapevine, *Rubus* spp., plum, peach	Fruit	Infested plant material. Spread through wind-dispersal and adults are capable of flight.	The Americas, Europe, Middle East, Asia.[619]	LOW	MEDIUM[620]	MEDIUM-HIGH	LOW[621]	**VERY LOW-NEGLIGIBLE**
Rubus	***Merhynchites wickhami*** (syn. *Rhynchites wickhami*)	Western rose curculio	Blackberry, raspberry, thimbleberry and rose[622]	Leaves, buds	Adults are strong fliers and capable of spreading over long distances.	North America	LOW	LOW	MEDIUM	LOW[623]	**NEGLIGIBLE**
Rubus	***Macrodactylus subspinosus***	Rose chafer	Polyphagous including apple, *Rubus* spp., rose and grapevine	Leaves, flowers, fruit, larvae on the roots	Infested plant material and adults are capable of flight	Present in USA and Canada	MEDIUM	MEDIUM	MEDIUM	MEDIUM[624]	**LOW**
Strawberry	***Melalgus confertus***	Branch and twig borer	Cherry, almond, strawberry tree	Twigs, branches	Infested plant material	USA and Canada	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Melolontha melolontha***	White grub cockchafer	Polyphagous including beet, hazel, maple, beech,	Fruit, Inflorescence, leaves, roots	Infested plant material and adults are capable of flight	China, Turkey, Austria, Belarus, Belgium, Spain, Bulgaria, Czechia, Slovenia,	LOW-MEDIUM	MEDIUM[625]	MEDIUM	MEDIUM	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			grapevine, strawberry, apple, pasture crops, oak, raspberry, potato, dandelion, turf grasses and grape		for localised spread.	UK, Croatia, Denmark, Latvia Estonia, Finland, India, France, Malta, Serbia, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Switzerland, Ukraine, Netherlands, Poland, Romania, Sweden					
Rubus	***Merhynchites bicolor*** (syn. *Rhynchites bicolor*)[626]	Rose curculio, eastern rose curculio	Blackberry, raspberry, thimbleberry, rose	Leaves	Infested plant material and infested soil.	Canada and USA[627]	LOW	LOW	MEDIUM	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Nemocestes incomptus***	Strawberry root weevil, woods weevil	Blueberry, blackberry, raspberry and strawberry	Roots, leaves, buds, flowers	Infested plant material and adults are capable of flight	Canada (Unconfirmed report), USA	LOW	LOW	LOW	LOW[628]	**NEGLIGIBLE**
Rubus and Strawberry	***Neoendorphins germanicus*** (syn. *Rhynchites germanicus, Coenorhinus germanicus*)	Strawberry Rhynchites	Blackberry, raspberry, rose, strawberry, dogwood, willow, oak	Leaves	Long distance dispersal through movement of infested fruit	Europe	LOW	LOW	LOW	LOW[629]	**NEGLIGIBLE**
Rubus	***Oberea bimaculata***	Raspberry cane borer, flat-faced long horn beetle	Raspberry and blackberry	Stems	Infested plant material	Canada and USA[630]	UNKNOWN	LOW	LOW	LOW[631]	**UNKNOWN**
Rubus	***Orchestes fagi*** (syn. *Rhynchaenus fagi*)	Strawberry weevil, beech leaf mining weevil	Oak, beech, *Rubus* spp. [632]	Leaves	Long distance dispersal through movement of infested fruit.	North America, Europe, Japan, North Africa	LOW	LOW	LOW	LOW[633]	**NEGLIGIBLE**
Strawberry	***Oribius inimicus***	Grey weevil	Polyphagous including pepper, Citrus, strawberry, apple, avocado	Leaves	Infested plant material and adults capable of flight.	Papua New Guinea[634]	LOW	LOW	LOW	MEDIUM[635]	**VERY LOW**
Rubus	***Otiorhynchus armadillo***	Armadillo weevil, vine weevil	Alders, Camellia, nuts, Azalea, ivy, beech, holly, olive,	Leaves, roots[636]	Infested plant material and crawling from one	France, Switzerland, Austria, Germany, Spain, Italy, Poland, Netherlands,	LOW	LOW[638]	LOW	MEDIUM	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			juniper, spruce, willow, plum, bay *Rubus* spp., elder.		plant to the next	Sweden, Norway and UK[637]					
Rubus	***Otiorhynchus clavipes***	Red-legged weevil	Polyphagous including apple gooseberry, plum, raspberry, currant, strawberry, grapevine	Leaves, roots	Adults are flightless. Can spread through infested plant material.	Denmark, Sweden, UK[639]	LOW	LOW	UNKNOWN	LOW	**UNKNOWN**
Rubus and Strawberry	***Otiorhynchus ovatus***	Strawberry root weevil	Strawberry, raspberry, blackberry, eastern white cedar, hemlock, blueberry	Roots	Infested plant material and soil contaminated with larvae[640]	Africa, Turkey, Spain, Canada, Austria, Belarus, Belgium, Sweden, Bosnia & Herzegovina, Bulgaria, Poland, Hungary, Italy, Denmark, Estonia, UK Finland, Norway, Germany, Ireland, Lithuania, Russia, Slovenia, France, Switzerland, Latvia	LOW-MEDIUM	MEDIUM-HIGH	MEDIUM-HIGH	MEDIUM	**LOW-MEDIUM**
Rubus	***Otiorhynchus singularis***	Clay-coloured weevil	Polyphagous including apple, raspberry, pear, gooseberry, hops, currant, spruce grapevine, fir	Stems, buds, leaves, roots	Can fly long distances on wind currents. Can spread through infested plant material	Canada, USA, Austria, Croatia, Italy, Poland, UK Denmark, Estonia, Finland, Germany, Ireland, Lithuania, Macedonia, Spain, Netherlands, Russia, Belgium Switzerland, France, Yugoslavia (former)[641]	LOW	LOW[642]	UNKNOWN	LOW	**UNKNOWN**
Rubus and Strawberry	***Paria fragariae***	Strawberry rootworm	Strawberry, peach, *Rubus* spp., crabapple	Leaves, roots	Infested plant material and machinery Adults are capable of flight[643]	USA and Canada (Ontario and Quebec)	LOW-MEDIUM	MEDIUM	MEDIUM	MEDIUM[644]	**LOW**
Rubus	***Phyllopertha horticola***	Garden chafer	Hazelnut, oak, birch, cherry, rose, cereals, cabbage, cucumber, beets and raspberry	Leaves, flowers and fruit	Adults are strong fliers for long distance transmission.	Europe, Asia[645]	LOW	LOW[646]	LOW	LOW[647]	**NEGLIGIBLE**
Rubus	***Phyllophaga anxia***	Common June	Wide range of plants	Roots	Infested plant	North America	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
		bug, white grub, May beetle	including corn, fir, elm, oak, poplar, rose, birch aspen, raspberry, willow, walnut, apple, ash, birch, dogwood, ebony, magnolia, maple, honeysuckle, lilac, hackberry		material and machinery.						
Rubus and Strawberry	***Popillia japonica***	Japanese beetle	Broad host range including lime, soybean, corn, blackberry, rose, raspberry, maple, strawberry, stone fruit, grapevine, blueberry, rhubarb	Whole plant	Infested plant material and machinery and adults are capable of flight.	Europe, Asia and North America	MEDIUM	HIGH	HIGH	HIGH	**HIGH**
Rubus and Strawberry	***Sciopithes obscurus***	Obscure root weevil, strawberry root weevil	Oak, strawberry, raspberry, yew blackberry, grapevine, cranberry, blueberry	Roots, leaves[648]	Long distance dispersal through movement of infested plant material.	Canada and USA	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Stelidota geminata***	Strawberry sap beetle	Has a broad host range including strawberry, corn, raspberry, apple, peach, oak, maple	Fruit	Infested propagation material and wind dispersed. Adults capable of flight.	US, South America, Europe, Central America	LOW	LOW-MEDIUM	LOW-MEDIUM	MEDIUM[649]	**VERY LOW-LOW**
Strawberry	***Tyloderma fragariae***	Strawberry crown borer	Polyphagous including turnip, strawberry, celery asparagus, carrot, cabbage, lettuce, onion, bean, beet, cotton, pea, corn, tomato, alfalfa, clover, soybean, tobacco	Crown, leaves	Infested propagation material and wind dispersed. Adults capable of flight.	North America	LOW-MEDIUM	MEDIUM-HIGH	MEDIUM-HIGH	MEDIUM	**LOW-MEDIUM**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
Diptera (flies and midges)											
Rubus	***Agromyza idaeiana*** (syn. *A. spiraeae*)	Rose leafminer	Raspberry, thimbleberry, strawberry and ornamentals	Leaves	Infested plant material. Adults are capable of flight.	Europe	LOW	LOW	LOW	LOW[650]	**NEGLIGIBLE**
Strawberry	***Anastrepha fraterculus***	South American fruit fly	Broad host range including peach, strawberry, Citrus, stone fruit, apple, grapevine, coffee, mango, avocado, gooseberry, plum kiwifruit, almond, mandarin, cherry, walnut	Fruit	Infested plant material. Adults capable of flight.	Mexico, Costa Rica, El Salvador, Panama, Guatemala, Honduras, Nicaragua, Trinidad & Tobago, Brazil, Peru, Argentina, Bolivia, Colombia, Ecuador, Guyana, Paraguay, Belize, Suriname, Uruguay, Venezuela	LOW	MEDIUM	MEDIUM[651]	UNKNOWN	**UNKNOWN**
Rubus	***Ceratitis rosa***	Natal fruit fly[652]	Polyphagous including Citrus, coffee, avocado, apple, mango, plum, apricot, blackberry, peach, papaya	Fruit	Infested plant material, machinery and soil. Adults are capable of flight	Eswatini, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, South Africa, Tanzania, Zambia	LOW	HIGH	MEDIUM[653]	HIGH	**MEDIUM**
Rubus	***Contarinia agrimoniae*** (syn. *C. rubicola*)	Blackberry flower midge, blackberry gall midge	Blackberry and raspberry	Flower buds	Infested plant material, soil and adults are capable of flight	North America	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Dasineura plicatrix***	Blackberry leaf midge	Blackberry and raspberry[654]	Leaves	Infested plant material and adults are capable of flight.	North America, UK	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Drosophila suzukii***	Spotted winged Drosophila	*Rubus* spp., apple, blueberry, grapes, strawberry, peach, cherry, plum, persimmon, apricot, stone fruit, Japanese mulberry, common fig	Fruit	Adults capable of flight. Can spread via infested plant material	Bangladesh, China, India, Japan, Korea, Myanmar, Iran, Serbia, Pakistan, Taiwan, UK Thailand, Réunion, Canada, Mexico, USA, Argentina, Brazil, Italy Austria, Belgium, Croatia, France, Spain Germany, Hungary, Netherlands,	MEDIUM	HIGH	HIGH	EXTREME[655]	**EXTREME**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
						Poland, Portugal, Russia, Slovenia, Sweden, Switzerland					
Rubus	***Lasioptera rubi***	Raspberry stem gall midge	Raspberry	Leaves	Infested plant material and adults are capable of flight	Europe, China, Japan and Korea[656]	LOW	LOW	LOW	UNKNOWN	**UNKNOWN**
Rubus	***Pegomya rubivora***	Raspberry cane maggot, loganberry cane fly	Meadowsweet and raspberry[658]	Stem[657]	Adults are capable of flight. Spread through infested plant material and machinery	UK, Ireland, Austria, Czechia, Belgium, Spain, Denmark, Estonia, Finland, France, Russia, Germany, Hungary, Norway, Poland, Slovakia, Sweden	LOW	UNKNOWN	LOW	MEDIUM[658]	**UNKNOWN**
Rubus and Strawberry	***Resseliella theobaldi***	Raspberry cane midge	Strawberry, raspberry and loganberry	Stems[659]	Infested plant material and adults are capable of flight.	Poland, Great Britain, Switzerland, Hungary	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Hemiptera (stink bugs, aphids, mealybugs, scale, whiteflies and hoppers)											
Rubus and Strawberry	***Adelphocoris lineolatus***	Lucerne bug	Wide host range with a total of 37 wild plants, and 20 species of cultivated plants[660]	Whole plant	Adults are capable of flight[661]	Asia, Europe and North America[662]	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Amphorophora agathonica***[663]	Strawberry aphid	Red raspberry, black raspberry, thimbleberry and salmonberry	Leaves and fruit	Infested plant material and movement of hitchhikers	Canada and USA	MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM[664]	**VERY LOW-LOW**
Rubus	***Amphorophora idaei***[663]	Large raspberry aphid	Raspberry and loganberry	Leaves	Plant material and hitchhikers	UK	MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM[664]	**VERY LOW-LOW**
Rubus	***Amphorophora rubitoxica*** (syn. *A. parviflori*)		Raspberry, blackberry and thimbleberry	Leaves and fruit	Infested plant material and movement of hitchhikers	Canada	MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM	**VERY LOW-LOW**
Rubus	***Aphis idaei***[665]	Small raspberry aphid	Raspberry and loganberry	Leaves	Infested plant material	Europe, west Siberia, New Zealand, North America	MEDIUM	LOW	LOW	MEDIUM	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
Rubus	***Aphis rubicola***[666]	Raspberry aphid	Raspberry	Leaves	Infested plant material	Canada and USA	LOW	LOW	LOW	MEDIUM	**VERY LOW**
Rubus and Strawberry	***Aphis ruborum***	Permanent blackberry aphid	Blackberry, loganberry and strawberry (rarely)	Leaves	Infested plant material	Europe, North America and central Asia	LOW	LOW	LOW	MEDIUM	**VERY LOW**
Rubus	***Boisea rubrolineata***	Box elder bug	Blackberry, ash, box elder, maple, stone fruit	Leaves, flowers, fruit	Transmitted through infested plant material	USA	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Chinavia hilaris*** (syn. *Acrosternum hilare, Pentatoma hilaris, Chinavia hilare, Nezara hilaris*)	Green stink bug	Polyphagous.[667]	Leaves, flowers and fruit	Infested plant material, machinery and soil. Adults are capable of flight for localised spread	North America[668]	LOW	MEDIUM	MEDIUM	HIGH	**MEDIUM**
Rubus	***Dialeurodes citri***	Citrus whitefly	Broad host range including myrtle, gardenia, jasmine, privet, blackberry, stone fruit, pear, Citrus, magnolia, ivy, raspberry, castor bean	Fruit, flowers, leaves, stem	Infested plant material for long distance dispersal and adults capable of flight for short distance dispersal	The Americas, Asia, Middle East, Europe.[669]	LOW	HIGH	HIGH	MEDIUM	**LOW**
Rubus	***Dikrella californica*** (syn. *D. cruentata*)	Blueberry leafhopper, blackberry leafhopper	*Rubus* spp. and *Vaccinium* spp.	Leaves	Infested plant material. Adults are capable of flight	North America	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Dolycoris baccarum***	Sloe bug	Raspberry, beans loganberry, pear, strawberry, rice, sloe, soybean, pistachio	Fruit	Infested plant material	China, Japan, Turkey, Russia	LOW	LOW	LOW	LOW[670]	**NEGLIGIBLE**
Rubus	***Edwardsiana rosae***	Rose leafhopper	Raspberry, peach, blackberry, apple, rose grapevine	Leaves and fruit	Infested plant material and wind	Israel, Turkey, USA, Former USSR, Hungary, Italy	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Empoasca fabae***	Potato leafhopper	*Rubus* spp., tomato, potato, apple, rhubarb, melon	Leaves	Infested plant material and adults are capable of flight	India, Cuba	LOW-MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM	**VERY LOW-LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			eggplant, strawberry		and wind dispersal.[671]						
Strawberry	***Ericaphis fimbriata*[672] (without *Blueberry scorch virus* (Carlavirus))**	Blueberry aphid	Blueberry, strawberry and Nootka rose	Shoots, flower and leaves	Infested plant material and adults are capable of flight and wind dispersal	Europe and North America	MEDIUM	MEDIUM	MEDIUM	HIGH	**MEDIUM**
Rubus	***Erythroneura rubiphylla***		Blackberry	Leaves	Infested plant material and adults capable of flight.	USA	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Eurhizococcus brasiliensis***	Brazilian ground pearl	Raspberry, *Rubus* spp. blueberry, *Vitis* spp.	Leaves and roots[673]	Infested plant material and adults capable of flight.	South America	LOW	MEDIUM	LOW[674]	MEDIUM	**VERY LOW**
Rubus	***Euschistus conspersus***	Consperse stinkbug	Polyphagous including tomato blackberry, pear, almond, cotton vegetable	Fruit	Infested plant material and adults are capable of flight.	North America	LOW	HIGH	HIGH	EXTREME	**HIGH**
Rubus and Strawberry	***Halyomorpha halys***	Brown marmorated stink bug	*Halyomorpha halys* has over 100 reported host plants including hazelnut, pecan, walnut, cotton, maize, soybeans, maple, oak, fig, grapes, cherry, peach, apple, pear, olive, Citrus, vegetable crops, blueberry, Rubus spp.	Leaves and fruit	Infested plant material, conveyances and cargo. Adults capable of flight for localised spread.	China, Japan, South Korea, Taiwan, USA, Canada, Austria, Italy, France, Greece, Spain, Hungary, Germany, Romania, Russia, Slovakia, Slovenia	HIGH[675]	HIGH	HIGH	HIGH	**HIGH**
Rubus	***Homalodisca vitripennis* (rating with *Xylella fastidiosa*)**	Glassy winged sharp-shooter, GWSS	Broad host range including, Acacia, *Prunus* spp., bottlebrush, okra, laurel, blackberry, blueberry, daylily,	Leaves and stems	Infested plant material, clothing and machinery and adults capable of flight for localised spread.	Mexico, USA, Chile, Pacific Islands, Cook Islands, French Polynesia	HIGH	HIGH	HIGH	EXTREME[677]	**EXTREME**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			Bougainvillea, Dianthus, crepe myrtle, Camellia, pistachio, Citrus, Macadamia, Chrysanthemum, grapevine [676]								
Rubus	***Homalodisca vitripennis* (rating without *Xylella fastidiosa*)**	Glassy winged sharp-shooter, GWSS	Broad host range including, Acacia, *Prunus* spp., bottlebrush, okra, laurel, blackberry, blueberry, daylily, Bougainvillea, Dianthus, crepe myrtle, Camellia, pistachio, Citrus, Macadamia, Chrysanthemum, grapevine [678]	Leaves and stems	Infested plant material, clothing and machinery and adults capable of flight for localised spread.	Mexico, USA, Chile, Pacific Islands, Cook Islands, French Polynesia	MEDIUM	HIGH	HIGH	MEDIUM[679]	**MEDIUM**
Rubus	***Leptoglossus phyllopus***	Leaf-footed bug, eastern leaf-footed bug	Wide host range including Citrus, Gerbera, gladioli, daisy, thistle, rose, *Rubus* spp., cucurbits, pomegranate	Above ground parts	Infested plant material and adults are capable of flight.	North America	MEDIUM[680]	MEDIUM	MEDIUM	MEDIUM	**LOW**
Rubus and Strawberry	***Lygocoris pabulinus***	Common green caspid	Beet, blackberry, raspberry, nettles gooseberry, pear, apple, plum, flax, strawberry	Leaves	Infested plant material and adults are capable of flight.	Germany, UK, Asia, North America	UNKNOWN	UNKNOWN	UNKNOWN	MEDIUM	**UNKNOWN**
Strawberry	***Lygus hesperus***	Western plant bug, western tarnished plant bug	Cotton, strawberry, grapevine, carrot	Above ground plant parts	Infested plant material and adults are capable of flight.	North America[681]	LOW-MEDIUM[682]	HIGH	HIGH	HIGH[683]	**MEDIUM-HIGH**
Rubus and Strawberry	***Lygus lineolaris***	Tarnished plant bug	Wide host range including apple, European pear,	Above ground plant parts	Infested plant material and adults are capable of flight	Georgia (Republic of), Bermuda, Canada, Mexico, USA, El Salvador,	MEDIUM	HIGH[685]	HIGH	HIGH[686]	**HIGH**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			carrot, cotton, cherry, beans, lucerne, soybean, peach, strawberry, *Rubus* spp., clover, tomato, conifers[684]		for localised dispersal.	Guatemala, Honduras					
Strawberry	***Lygus rugulipennis***	Bishop bug, European tarnished plant bug	More than 400 hosts including alfalfa, clover, lettuce, lucerne, potato, sugarbeet, winter cereals, eggplant, strawberry[687]	Above ground plant parts	Infested plant material and adults are capable of flight.	Japan, Turkey, Finland, Canada, Bulgaria, Italy, Hungary, Lithuania, Poland, UK, Sweden, Serbia, Montenegro	MEDIUM	HIGH[688]	HIGH	HIGH	**HIGH**
Rubus	***Macrolophus rubi***[689]		Blackberry	Above ground plant parts	Infested plant material.	Bulgaria and Poland	MEDIUM	MEDIUM	MEDIUM	LOW[690]	**VERY LOW**
Rubus	***Macropsis fuscula* (without *Candidatus* phytoplasma rubi)**	Rubus leafhopper, bramble berry leafhopper	Blackberry, raspberry, *Rubus ursinus, Rubus procerus*, *Rubus laciniatus*	Leaves	Infested plant material and adults are capable of flight.	Canada	MEDIUM	LOW-MEDIUM[691]	LOW[692]	MEDIUM	**VERY LOW-LOW**
Rubus	***Macropsis fuscula* (with *Candidatus* phytoplasma rubi)**	Rubus leafhopper, bramble berry leafhopper	Blackberry, raspberry, *Rubus ursinus, Rubus procerus*, *Rubus laciniatus*	Leaves	Infested plant material and adults are capable of flight.	Canada	MEDIUM	LOW-MEDIUM[693]	LOW[694]	HIGH	**LOW**
Rubus	***Macrosiphum funestum*** (syn. *M. davidsonii, M. maxima*)	Rose aphid, blackberry aphid	*Rubus* spp., plum, rose	Flowers, leaves and stems	Infested plant material and adults are capable of flight.	UK	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Matsumuraja hirakurensis***	Raspberry aphid	Raspberry	Leaves	Adults are capable of flight.	Japan	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Mycterodus serbicus***	Planthopper	*Rubus* spp., *Platanus* spp., hazelnut	Leaves, buds, flowers, fruit and shoots	Adults are capable of flight and plant material.	Serbia and Turkey	LOW	LOW-MEDIUM	MEDIUM	LOW	**NEGLIGIBLE -VERY LOW**
Rubus	***Neopinnaspis harperi***	Harper scale	Polyphagous including Acacia, Acer, Camellia, olive, walnut, Macadamia,	Branches	Can spread by crawling, wind dispersal and infested plant	North America	LOW	LOW	LOW	LOW	**NEGLIGIBLE**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			ash, Cotoneaster, fig, Hakea, stone fruit, *Rubus* spp., avocado		material.						
Rubus and Strawberry	***Nysius raphanus***	False chinch bug	Wide host range including carrot, cabbage, cotton, flax, *Rubus* spp., wheat, sunflower, strawberry, soybean, lucerne	Whole plant, above ground	Adults are capable of flight and can via infested plant material.	US, Canada[695]	MEDIUM	MEDIUM	MEDIUM	LOW[696]	**UNKNOWN**
Rubus	***Pentatoma rufipes***	Forest bug	Raspberry, cherry, tree nuts	Leaves, fruit, flowers	Infested plant material	Europe	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Strawberry	***Philaenus spumarius***	Meadow spittlebug[697]	Strawberry	Stem	Through infested plant material and adults are capable of flight	Denmark, Estonia, Finland, Greece, Spain, Iceland, Italy, Latvia, Lithuania, Norway, Sweden, Turkey, Russia	MEDIUM-HIGH[698]	HIGH[699]	MEDIUM	MEDIUM[700]	**LOW-MEDIUM**
Rubus and Strawberry	***Psammotettix striatus*** (syn. *Psammotettix alienus*)	European leaf hopper	Wheat, corn, pear, barley, oats, strawberry, rye, triticale, apple, *Rubus* spp.	Whole plant, above ground	Infested plant material and machinery	Europe and Asia	MEDIUM	MEDIUM	MEDIUM[701]	LOW[702]	**VERY LOW**
Rubus and Strawberry	***Scaphytopius nitridus***		Wide host range including carrot, corn, potato, rice citrus, apple, pear barley, grapevine, papaya, peach, *Rubus* spp., wheat, sorghum, tomato, strawberry, weeds ornamentals	Leaves	Infested plant material and machinery	Turkey and USA (Unconfirmed report)	LOW	MEDIUM	MEDIUM	LOW[703]	**VERY LOW**
Strawberry	***Trialeurodes packardi***	Strawberry whitefly	Strawberry	Leaves	Infested plant material.	North America, South America	LOW	LOW	LOW	HIGH	**LOW**
Rubus	***Trioza tripunctata*** (syn. *Psylla*	Blackberry psyllid	Blackberry, *Pinus* spp., conifers, *Picea* spp *Juniperus* spp.	All above ground plant	Adults are capable of flight.	North America	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
	tripunctata)		*Chamaecyparis* spp.	parts							
Rubus	***Trioza trisignata***	Psyllid	Roses, blackberry, *Rubus* spp., cherry	Leaves	Spread locally by flight, wind and infested plant material.	France, Spain, Italy, Greece, Bulgaria	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Typhlocyba* spp. (including *T. prunicola, T. tenerrima*)**	Leafhopper	*Rubus* spp.	Leaves	Infested plant material, wind dispersal and flight.	Europe, British Columbia	MEDIUM[704]	LOW-MEDIUM[705]	MEDIUM	LOW-MEDIUM	**VERY LOW-LOW**
Hymenoptera (ants and wasps)											
Rubus and Strawberry	***Allantus calceatus*** (syn. *Emphytus calceatus*)	Sawfly	Rosaceae including *Rubus* spp. and strawberry	Stems	Infested plant material and adults are capable of flight.	Norway	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus and Strawberry	***Allantus cinctus***	Banded rose sawfly, curled rose sawfly	Rose, strawberry and raspberry	Leaves	Infested plant material and adults are capable of flight	Europe	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Diastrophus* spp. (exotic species including *D. rubi*)** (syn. *Callipareius* spp.)	Stem gall cynipids	Blackberry, Smilax raspberry, Potentilla,	Stem	Infested plant material and adults are capable of flight	Europe	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Empria tridens***	Raspberry sawfly	Raspberry and blackberry	Leaves and fruit	Infested plant material and adults are capable of flight	Belgium, Denmark, Finland, Russia, Japan, Croatia, Estonia, UK, France, Germany, Hungary, Mongolia, Sweden, Switzerland, Turkey, Ukraine	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Hartigia albomaculata***	Sawfly borer	Blackberry, thornless blackberry (*Rubus ulmifolius*), rose	Stems	Infested plant material and adults are capable of flight	Mediterranean Europe[706]	LOW	LOW	LOW	HIGH	**LOW**
Rubus	***Hartigia cressonii***	Raspberry horn tail	Raspberry, other brambles and rose	Stems, leaves	Infested plant material and adults are capable of flight	USA	LOW	LOW	LOW	HIGH[707]	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
Rubus	***Metallus pumilus***	Raspberry leaf-mining sawfly	Raspberry, blackberry, *Rubus flagellaris* (common dewberry) and other *Rubus* spp.	Leaves	Can spread through infested plant material.	Austria, Belgium, Croatia, Estonia, Finland, Germany, Hungary, France, Poland, Slovakia, Switzerland, Ukraine, Netherlands, UK, Ireland	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Metallus rohweri*** (syn. *M. rubi*)	Blackberry leafminer	Blackberry and dewberry	Leaves	Infested plant material.	North America	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Monophadnoides geniculatus***	Raspberry sawfly	Raspberry, blackberry and loganberry	Leaves, buds, flowers, fruit and shoots	Infested plant material and adults are capable of flight	Canada and USA	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Pamphilius sitkensis***	Sawfly	*Rubus* spp.	Leaves	Infested plant material and adults are capable of flight	Unknown	UNKNOWN	UNKNOWN	UNKNOWN	LOW	**UNKNOWN**
Rubus	***Paravespula* spp. (exotic species)**	Wasp	Red raspberry	Fruit	Infested plant material and adults are capable of flight	Canada, USA and Mexico	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Perineura rubi***	Sawfly	*Rubus* spp.	Leaves	Infested plant material and adults are capable of flight	Austria, Belgium, Croatia, Latvia, Finland, France, Germany, Scotland, Ireland, Poland, Switzerland, Estonia UK, Netherlands, Ukraine.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Strawberry	***Stenctiphora furcata***		Strawberry	Leaves	Infested plant material and adults are capable of flight	UK, Germany, France, Italy	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Lepidoptera (butterflies and moths)											
Strawberry	***Acleris comariana***	Strawberry tortrix	Strawberry	Leaves, flowers, fruit and stems	Infested plant material and adults are capable of flight	USA, Canada, Europe, Northern Asia, China, Mediterranean Basin, South and south east Asia, Korea, Japan, New Zealand	LOW	HIGH[708]	MEDIUM[709]	LOW[710]	**VERY LOW**
Rubus	***Acleris laterana***	Broad barred button moth	*Rubus* spp., *Salix* spp., *Populus* spp., *Crataegus* spp.,	Blossom and leaves	Infested plant material and adults are capable of flight	Europe (British Isles), Northern Asia and North America	LOW	HIGH	MEDIUM	LOW	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			Prunus spp., *Rosa* spp., *Sorbus* spp., *Vaccinium* spp.[711]								
Rubus	***Acronicta psi***	Grey dagger moth	Apple, plum, *Tilia*, roses, blackberry, *Cotoneaster*, *Crataegus*, *Betula*, *Salix*, *Castanea*	Leaves	Infested plant material and adults capable of flight	Europe (British Isles), North America, North Africa, central and southern Europe into Turkey [712]	LOW	HIGH[713]	MEDIUM	LOW	**VERY LOW**
Rubus	***Adoxophyes orana***	Summer fruit tortrix	Blackberry, apple, sweet cherry, plum, gooseberry, apricot, quince, blueberry, peach, blackcurrant, pear, raspberry, cotton dogrose, apricot, and roses	Whole plant leaves, growing points, blossoms and fruit	Transmitted through infested plant material and adults are capable of flight[714]	Armenia, Azerbaijan, Georgia, Japan, South Korea, Austria, Belgium, UK, Bulgaria, Croatia, Czechia, Italy, Denmark, Estonia, Finland, France, China, Germany, Greece, Hungary, Lithuania, Ukraine, Netherlands, Norway, Romania, Poland, Spain, Russia, Serbia, Slovenia, Sweden, Switzerland.	LOW	HIGH	HIGH	MEDIUM	**LOW**
Rubus	***Eudocima tyrannus*** (syn. *Adris tyrannus amurensis*)	Akebia, leaf-like moth	Grapevine, *Rubus acuminatus*, plum peach, orange, pear	Fruit	Infested plant material and adults can fly	Nepal	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Strawberry	***Agrotis malefida***	Pale-sided cutworm	Wide host range.[715]	Seedlings, leaves	Infested plant material and adults capable of flight[716]	USA, Barbados, Honduras, Columbia, North America, South America[717]	MEDIUM	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus and Strawberry	***Agrotis segetum***	Turnip moth	Wide host range.[718]	Leaves, roots and stems	Infested plant material and adults capable of flight.[719]	Asia, Middle East, Europe, Africa.[720]	HIGH[721]	HIGH[722]	HIGH	LOW	**LOW**
Rubus	***Amorbia emigratella***	Mexican Leaf roller	Polyphagous including avocado beans, blackberry, broccoli, cocoa, eggplant, gorse, guava, tomato macadamia, corn,	Leaves, fruit	Infested plant material and adults are capable of flight for localised spread.	Southern US, Central America, Hawaii, Mexico and Costa Rica	LOW	LOW	LOW	LOW	**NEGLIGIBLE**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			orange, papaya, peanut, sweet potato								
Strawberry	***Amphipoea interoceanica***	Strawberry cutworm	Strawberry	New growth	Adults capable of flight and infested plant material.	Canada	LOW-MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM	**VERY LOW-LOW**
Strawberry	***Ancylis comptana***	Strawberry leafroller	Strawberry	Leaves	Infested plant material and adults are capable of flight.	USA, Italy and Poland	LOW-MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM	**LOW**
Rubus	***Anomis mesogona***	Hibiscus looper	Citrus, rose, grape, *Rubus* spp., apple	Leaves	Infested plant material and adults are capable of flight.	North America and Europe	MEDIUM	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Strawberry	***Archips micaceana***	Leaf rolling moth, bell moth	Polyphagous including lychee, Eucalyptus, Citrus, grapes, mango, soybean, tea, pineapple, peanut strawberry[723]	Leaves, stems and fruit	Infested plant material and adults are capable of flight.	China, Hong Kong, Vietnam, Burma, Thailand	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus	***Archips podana***	Great brown twist moth, Large fruit tree tortrix, fruit tree tortrix	Highly polyphagous including quince, European pear, apple, raspberry blackcurrant, hops, plum, sweet cherry, Japanese plum, blackberry	Leaves, inflorescence	Infested plant material and adults are capable of flight for localised spread.	Georgia, Kazakhstan, South Korea, Canada, Russia, Albania, Austria, UK, Belgium, Bulgaria, Denmark, Finland, France, Italy, Germany, Hungary, Lithuania, Ukraine Netherlands, Poland, Romania, Sweden, Switzerland.	LOW	HIGH	HIGH	MEDIUM	**LOW**
Rubus	***Archips rosana***	European leaf roller, rose tortrix	Polyphagous including conifer raspberry, plum, blackberry, apple, blackcurrant, rose, European pear, and poplar	Leaves, buds, flowers, fruit	Infested plant material and adults are capable of flight.	Azerbaijan, Finland, Kazakhstan, Turkey, Canada, USA, Albania, Belgium, Bulgaria, UK, Spain, Greece, Hungary, Italy, Poland, Lithuania, Ukraine Netherlands, Russia, Switzerland, Germany, France.	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
Rubus	***Argyrotaenia citrana*** (syn. *Argyrotaenia franciscana*)	Orange tortrix	Polyphagous across over 80 species including avocado, orange, blackberry, grape, raspberry, apple, grapefruit, blueberry,	Leaves, stems, growing points, blossoms, fruit	Infested plant material and adults are capable of flight.	North America	MEDIUM	HIGH	MEDIUM	MEDIUM	**LOW**
Rubus	***Cacoecimorpha pronubana***	Carnation tortrix	Wide host range across over plant species including Gerbera, rose, Acacia, Azalea, carnation, Chrysanthemum, Euphorbia, beans, *Jasminum* spp., *Rubus* spp., Pelargonium, Rhododendron, potato	Leaves and inflorescence	Infested plant material and adults are capable of flight fir localised dispersal.	Azerbaijan, Turkey, Libya, Morocco, South Africa, Tunisia, USA, Albania, Belgium, UK Croatia, Cyprus, Spain, Denmark, France, Italy Germany, Greece, Guernsey, Hungary, Ireland, Portugal, Lithuania, Netherlands Luxembourg, Malta, Romania, Serbia, Slovenia, Sweden, Switzerland	LOW	LOW	MEDIUM	VERY LOW	**NEGLIGIBLE**
Rubus	***Chorisroneura rosaceana***	Oblique-banded leafroller	Polyphagous including apples, pears, peaches, *Rubus* spp., pistachios blueberries, Salix, Betula, Platanus, Populus, Ulmus, Acer, hazelnut	Fruit, leaves and blossoms	Infested plant material, machinery and soil. Adults are capable of flight for localised spread.	Canada, Mexico, USA	MEDIUM	HIGH[724]	HIGH[725]	MEDIUM[726]	**MEDIUM**
Rubus	***Clepsis persicana***	White triangle tortrix, green needleworm	Boxelder, maple, sweet cicely, birch, goldenrod, willow, *Alnus* spp., white fir, apple, peach, hazelnut, jack pine, blueberry, dogwood, rose, poplar, clustered mayflower, sweet fern, ash, fir, larch, spruce,	Leaves	Infested plant material and adults are capable of flight	North America	LOW	LOW[727]	MEDIUM	LOW[728]	**NEGLIGIBLE**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			Douglas fir, blackberry								
Rubus and Strawberry	***Clepsis spectrana***	Cyclamen tortrix, straw coloured tortrix moth, oblique-banded caterpillar	*Brassica* spp., apple, hops, larch, pear strawberry, grapes, cyclamen, onion, rhubarb, tomato, black currant, pepper, blackberry	Leaves and fruit[729]	Infested plant material and adults are capable of flight	Canada, Netherlands, Norway, Sweden, Turkey, Kazakhstan, US and Canada[730]	LOW	LOW	MEDIUM	LOW	**NEGLIGIBLE**
Rubus	***Cnephasia jactatana***	Black-lyre Leafroller	Gooseberry, raspberry, Citrus, persimmon, apple	Leaves	Infested plant material and adults are capable of flight	New Zealand	MEDIUM[731]	HIGH	HIGH	MEDIUM[732]	**MEDIUM**
Rubus and Strawberry	***Cnephasia longana***	Omnivorous leafroller	Polyphagous including blackberry, raspberry, strawberry, grapevine, Poaceae	Leaves, stems, fruit	Infested plant material and adults are capable of flight	Spain, Belgium, Czechia, Italy, France, Croatia, Denmark, UK, Estonia, Germany, USA, Greece, Ireland, Malta, Spain, Poland, Netherlands, Slovakia, Sweden, Switzerland	MEDIUM	MEDIUM	LOW[50]	MEDIUM	**VERY LOW**
Rubus	***Cosmia trapezina***	Dun-bar moth	Polyphagous including apple, *Rubus* spp., pear, maple, *Ribes* spp., hazelnut, birch and willow	Leaves	Infested plant material and adults are capable of flight.	Former USSR, Poland, China, Palearctic, including the UK, Europe to the Urals, northern Africa, Bulgaria, central Asia across to Korea and Japan	MEDIUM-LOW[733]	LOW	MEDIUM	LOW	**NEGLIGIBLE -LOW**
Rubus	***Ctenopseustis obliquana***	Brown headed leafroller	Rubus, apricot, peach, grapevine blueberry, apple, Chinese gooseberry	Leaves, fruits and buds	Infested plant material and adults are capable of flight.	New Zealand, Hawaii	HIGH[734]	HIGH[735]	HIGH	MEDIUM	**MEDIUM**
Strawberry	***Epichoristodes acerbella***	South African carnation tortrix, South African carnation miner, carnation	Chrysanthemum, carnation, lucerne, strawberry, Pelargoniums, stone fruit, rose	Leaves and flowers	Can spread locally by flying. Long distance dispersal is through movement of infested plant material	Kenya, Madagascar, South Africa, Bulgaria, Croatia, Denmark, France, Italy, Romania, Serbia, Slovenia, Spain[736]	MEDIUM[737]	HIGH[738]	MEDIUM	MEDIUM-LOW	**VERY LOW-LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
		worm									
Strawberry	***Estigmene acrea***	Salt marsh caterpillar	Polyphagous including alfalfa, strawberry, beet asparagus, bean, cabbage, carrot, celery, corn, pea, clover, lettuce, onion, tomato, turnip, cotton, soybean, tobacco, sugarbeet	Leaves	Can spread locally by flying and movement of infested plant material	Mexico, USA, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Canada	LOW	MEDIUM	HIGH[739]	LOW[740]	**VERY LOW**
Rubus	***Euproctis chrysorrhoea***	Brown-tail moth[741]	Maple, elm serviceberries, chestnut, Corylus, dogwood, apple, hawthorn, beech, ash, poplars, pear, Prunus, oak, rose, blackberry, willow, raspberry, rowan, grapevine	Leaves	Can spread locally by flying. Long distance dispersal is through movement of infested plant material[742]	Middle East, Europe, Asia, Europe, Oceania, North America.[743]	LOW	MEDIUM[744]	MEDIUM	MEDIUM	**LOW**
Rubus	***Graphiphora augur***	Double dart moth, soothsayer moth	Polyphagous including willow, apple, raspberry, poplars, cherry, hawthorn, Rubus	Leaves and stems	Infested plant material and adults are capable of flight.	Europe including UK and Poland, US, Canada, Eurasia across to Japan and Siberia	LOW-MEDIUM[745]	LOW[746]	LOW	LOW	**NEGLIGIBLE**
Rubus	***Gymnoscelis rufifasciata*** (syn. *G. pumilata*)	Double-striped pug, olive geometrid moth	Polyphagous raspberry, onion, Citrus, olive, corn, sorghum, carnation	Flowers, seeds	Infested plant material and adults are capable of flight.	Israel and Egypt, Palearctic region, including Near East and North Africa, widely distributed in Europe	LOW	MEDIUM	HIGH	LOW	**VERY LOW**
Strawberry	***Helicoverpa zea***	Corn earworm	Sorghum, cotton, legumes, tomato, lettuce, tobacco strawberry, maize, sunflower, spinach zucchini, cabbage, cucumber, field	Fruit, inflorescence, leaves and seed	Infested plant material and adults are capable of flight for localised spread.	The Americas, the Caribbean.[747]	LOW[748]	HIGH	HIGH	MEDIUM[749]	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			crops, chickpea, and ornamental plants								
Rubus and Strawberry	***Hepialus humuli***	Ghost swift moth	Carrot, raspberry, lettuce, beans, strawberry, oak, Chrysanthemum	Roots	Infested plant material and adults are capable of flight.	Europe	VERY LOW	LOW	MEDIUM	VERY LOW	**NEGLIGIBLE**
Rubus	***Heterocrossa rubophaga*** (syn. *Carposina rubophaga*, *C. adreptella*)	Raspberry bud moth	Blackberry, raspberry, loganberry	Buds, stems, leaves, fruit	Infested plant material and adults are capable of flight.	North America and Europe (Unconfirmed reports)	MEDIUM	HIGH	HIGH	MEDIUM[750]	**MEDIUM**
Strawberry	***Korscheltellus lupulina***	Common swift moth	Rhubarb, maize artichoke, potato, strawberry, lettuce, lucerne and tobacco	Roots, collar of plants	Infested plant material and adults are capable of flight.	Europe (Unconfirmed record)	LOW-MEDIUM	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus	***Lampronia rubiella***	Raspberry bud moth	Raspberry and loganberry	Canes, leaf buds, fruit	Infested plant material and adults are capable of flight.	North America and Europe (Unconfirmed reports)	LOW[751]	LOW	LOW	MEDIUM	**VERY LOW**
Rubus	***Lobesia botrana***	Grape berry moth	Olive, cherry, plum, privet, pomegranate, currants, grapevine[752], *Rubus* spp.,	Fruit, inflorescence	Infested plant material and adults are capable of flight for localised dispersal.	Europe, Middle East, South America.[753]	LOW[754]	LOW[755]	LOW	LOW	**NEGLIGIBLE**
Rubus	***Lymantria dispar***	Asian gypsy moth	Polyphagous including apple, *Rubus* spp., pear, oak, birch, elm, pine, blueberry, alder, spruce, cherry, stone fruit, willows, hazel, hawthorn, larch, poplars	Leaves	Spread over long distances through conveyances and cargo. Adults are capable of flight.[756]	Europe, Middle East, the Americas.[757]	HIGH[758]	HIGH	HIGH	HIGH[759]	**HIGH**
Rubus	***Lymantria monacha***	Nun moth	Birch, beech, elms, pines, spruce (*Picea* spp.), oaks. Apple, European pear, apricot, blueberry,	Leaves, stems, inflorescence	Can spread through movement of infested plant material and wind. Adults are capable	Armenia, Azerbaijan, Georgia, Japan, China, Kazakhstan, Korea, Turkey, France, Italy, Vietnam, Austria, Bulgaria, Belgium,	MEDIUM-HIGH[760]	MEDIUM[761]	HIGH	HIGH	**MEDIUM-HIGH**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			raspberry		of flight for localised spread.	Spain, Denmark, Estonia, Finland, Germany, Greece, Hungary, Lithuania, Portugal, Netherlands, Norway, Poland, Russia, Sweden, Switzerland					
Rubus	***Megalopyge lanata***	Stinging flannel moth caterpillar	Blackberry, Citrus, avocado, pear, coffee, mango, guava[762]	Leaves	Infested plant material, adults capable of flight	Brazil, Guyana, Venezuela and the Caribbean	LOW	MEDIUM-LOW	MEDIUM	VERY LOW	**NEGLIGIBLE**
Rubus	***Melanchra persicariae***	Dot moth	Silver birch, larch, blackcurrant, oak, raspberry, elder, willow	Leaves	Infested plant material, adults capable of flight	England, Scotland and Ireland	LOW	LOW[763]	MEDIUM-LOW	MEDIUM-LOW	**NEGLIGIBLE -VERY LOW**
Rubus	***Notocelia uddmanniana***	Bramble shoot borer	Blackberry, loganberry	Stems, flower buds	Infested plant material, adults capable of flight	Denmark, UK, widely distributed in Europe, Asia Minor and North Africa	LOW	LOW	LOW	MEDIUM	**VERY LOW**
Rubus	***Olethreutes concinnana*** (syn. *O. furfuranum*)[764]	Leafroller	*Rubus* spp.	Leaves	Infested plant material, adults capable of flight	North America	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Operophtera bruceata* and *O. brumata*** [765]	Bruce spanworm, winter moth	Polyphagous including maple, sycamore, apple, spruce, pear, ash, peach, oak, rose, elm, poplar, stone fruit, blueberry, raspberry, blackberry	Flowers, leaves and buds	Infested plant material and soil and adults are capable of flight for localised spread	Armenia, Azerbaijan, Georgia Japan, Tunisia Canada, Malta, France Turkey, Algeria, USA, Albania, Austria, Italy, Czechia, Spain, Denmark, Finland, Latvia, Germany, Greece, Hungary, Ireland, Moldova, Slovakia, Netherlands, Norway, Slovenia, Sweden, UK.	LOW	LOW	LOW[766]	LOW	**NEGLIGIBLE**
Rubus	***Operophtera danbyi***	Winter moth	*Rubus* spp.	Flowers, leaves, buds	Infested plant material and soil	Canada and USA[767]	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Orgyia antiqua*** (syn. *Orgyia recens*)	European tussock moth, rusty tussock	Hazelnut, elms, apple, willow, ash, blueberry, oak	Leaves	Infested plant material and adults are capable of flight	Armenia, China, UK Turkey, Canada, USA, Chile, Austria, France, Belgium,	LOW	HIGH[768]	HIGH	LOW[769]	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
		moth	blackberry, alder, raspberry, pine blackcurrant, strawberry, maple buckthorn, spruce birches, chestnut		for localised spread	Bulgaria, Spain, Denmark, Estonia, Finland, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Norway, Moldova, Netherland, Poland, Portugal, Romania, Russia, Slovakia, Sweden, Switzerland, Ukraine.					
Rubus	***Orgyia leucostigma***	White-marked tussock moth	Balsam fir, willow, box elder, apple, cherry, maize, elm, raspberry, oak and blueberry	Leaves and stems	Larvae dispersed by wind over long distances	USA and Canada	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus	***Pandemis cerasana***	Cherry brown tortrix, common twist moth, barred fruit-tree tortrix	Polyphagous including raspberry, quince, apple, peach, pear, blackcurrant and rose	Leaves, flowers, fruit	Infested plant material and adults are capable of flight	China, Canada, Italy, Bulgaria, Croatia, US, Czechia, UK, Germany, Hungary, Lithuania, Poland, Russia	LOW	HIGH	HIGH	LOW	**VERY LOW**
Rubus and Strawberry	***Papaipema nebris***	Stalk borer	Wide host range including maize, wheat, willow, lily, plum, poplar, clover, cherry, blackberry, peach, blackcurrant, elm grape, strawberry, apple, cotton, raspberry	Stems	Infested plant material and adults are capable of flight	Canada, USA and Mexico	LOW	MEDIUM	MEDIUM	LOW[770]	**VERY LOW**
Rubus	***Pennisetia marginata*** (syn. *P. hylaeiformis*)	Raspberry crown borer, raspberry clearwing moth	Blackberry, raspberry, boysenberry, thimbleberry, salmonberry, loganberry	Stems, crown and roots	Infested plant material and adults are capable of flight	North America and Europe	MEDIUM	MEDIUM	MEDIUM	HIGH[771]	**MEDIUM**
Rubus and Strawberry	***Peridroma saucia***	Variegated cutworm, pearly	Polyphagous.[772]	Whole plant	Adults are capable of flight for localised spread and long	The Middle East, North America, Europe, South	MEDIUM	MEDIUM[773]	MEDIUM	MEDIUM[774]	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
		underwing moth			distance spread can occur through infested plant material	America and parts of Asia					
Rubus	***Phalera bucephala***	Buff-tip moth	*Rubus* spp., rose, oak and beech	Leaves	Infested plant material and adults are capable of flight[775]	Britain, Russia and Asia	LOW	VERY LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Planotortrix excessana***	Green-headed leafroller, orchard leafroller	Wide host range including apple, cherries, grapes, apricot, *Rubus* spp.	Leaves and fruit	Infested plant material and adults are capable of flight for local distribution	New Zealand, US (Hawaii)	MEDIUM[776]	MEDIUM	MEDIUM	MEDIUM	**LOW**
Strawberry	***Platynota flavedana***	Variegated leafroller, rusty brown tortricid[777]	Wide host range including apple, clover, maple, rose, strawberry, poinsettia, peach, cotton, *Citrus*	Leaves	Infested plant material and adults are capable of flight	North America	LOW-MEDIUM	LOW-MEDIUM	LOW-MEDIUM	LOW-MEDIUM	**NEGLIGIBLE -LOW**
Strawberry	***Proxenus miranda***	Rough skinned cutworm, miranda moth	Strawberry, cantaloupe, dandelion, sugar beet, sweet potato, matted alfalfa	Leaves, crown, fruit	Infested plant material and adults are capable of flight.	North America (except Florida, gulf states, Newfoundland, and the arctic)	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus and Strawberry	***Sarcopolia illoba***	Mulberry caterpillar	Wide host range including cowpea, beet, pea, carrot, strawberry, bean, *Chrysanthemum*, lucerne, soybean, blackberry, mulberry	Leaves, flowers, young fruit	Infested plant material and adults are capable of flight.	Eastern Asia, Korea, Russia, Japan, northern India, Russia	LOW	LOW	LOW	VERY LOW[778]	**NEGLIGIBLE**
Rubus and Strawberry	***Saturnia pavonia***	Silk moth, small emperor moth	Polyphagous.[779]	Leaves	Adults are capable of flight Can be transmitted over long distances through infested plant material and contaminated	Europe into northern parts of Asia	LOW	VERY LOW[780]	LOW	VERY LOW	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
					machinery.						
Strawberry and blueberry	***Sparganothis sulfureana***	Sulphur-coloured leafroller, false yellow-headed vineworm	Daisies, clover, strawberry, maize, blueberry, apple, cranberry, mint, pines, *Citrus*, grape	Leaves and fruit	Infested plant material and adults are capable of flight.	North and Central America	LOW-MEDIUM	LOW-MEDIUM	LOW-MEDIUM	LOW-MEDIUM	**NEGLIGIBLE-LOW**
Rubus	***Spilonota ocellana***	Eyespotted bud moth	Plum, raspberry, blackberry, blueberry, peach, dog rose	Leaves, growing points and fruit	Infested plant material and adults are capable of flight.	North Africa, Europe, the Middle East and Asia	LOW	LOW [781]	LOW	MEDIUM[782]	**VERY LOW**
Rubus	***Spirama retorta***	Fruit sucking moth, Indian owlet moth	Rubus, *Acacia mangium, Albizzia*	Leaves and fruit	Infested plant material and adults are capable of flight	China, Korea, Japan, India, Nepal, Malaysia, Bangladesh, Thailand, Cambodia, Myanmar, Vietnam, Thailand, Sri Lanka, Philippines, Indonesia	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Strawberry	***Spodoptera albula***	Costa Rican armyworm, grey-streaked armyworm[783]	*Allium* spp., pea, peanut, maize sugarbeet, cotton cabbage, balsam soybean, banana Capsicum, tomato Chrysanthemum, Cucurbitaceae, strawberry, sweet potato, tobacco, sorghum	Leaves, fruit, stems	Infested plant material, contaminated machinery and adults are capable of flight.	Costa Rica, Honduras, Nicaragua, Columbia, Southern US, Central and South America and Caribbean	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus	***Spodoptera eridania***	Southern armyworm	Melon, avocado, strawberry, beans, peas, onion, guava, cranberry, tomato, cotton, grapevine, maize, potato, raspberry, roseleaf raspberry, passionfruit,	Leaves and fruit	Infested plant material (long distance dispersal) and adults are capable of flight for localised spread.	The Americas, the Caribbean, Africa.[784]	LOW-MEDIUM	MEDIUM	MEDIUM	LOW	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
			blueberry								
Strawberry	***Spodoptera littoralis***	Cotton leafworm	Wide host range of 40 families.[785]	Mainly leaves	Adults are capable of flight for a localised spread and can spread over long distances through infested plant material.	Africa, Middle East, Europe.[786]	MEDIUM	MEDIUM	HIGH[787]	HIGH	**MEDIUM**
Rubus	***Spodoptera ornithogalli***	Yellow striped armyworm	Wide host range.[788]	Leaves and fruit	Adults are capable of flight for a localised spread and can spread over long distances through infested plant material.	North America, Central America and the Caribbean[789]	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus and Strawberry	***Stigmella aurella*** (syn. *S. splendidissimella*)	Golden pigmy	Blackberry, raspberry, strawberry, loganberry	Leaves	Infested plant material and adults are capable of flight.	Netherlands and Portugal	LOW	MEDIUM[790]	MEDIUM	LOW	**VERY LOW**
Rubus and Strawberry	***Synanthedon bibionipennis***	Strawberry crown moth	Rosaceae including raspberry, blackberry, strawberry	Leaves, stems and roots	Infested plant material and adults are capable of flight.	North America south of Montana to Texas, introduced into Hawaii	LOW[791]	LOW	LOW	LOW	**NEGLIGIBLE**
Strawberry	***Trichoplusia ni***	Cabbage looper	Polyphagous including broccoli, cabbage, tomato, cauliflower, kale, cucumber, beet, sweet potato, lettuce, pepper, strawberry, cotton	Leaves	Infested plant material and adults are capable of flight.	Yemen, Ethiopia, Gambia, Kenya, USA, Madagascar, Nigeria, South Africa, Canada, Mexico, Argentina, Brazil, Venezuela.	LOW-MEDIUM	HIGH	HIGH	LOW[792]	**VERY LOW**
Rubus	***Xestia c-nigrum***	Spotted cutworm	Polyphagous including onion, raspberry, maple grapevine, rose, blueberry, willow, and sunflower	Leaves and stems	Infested plant material and adults are capable of flight.	Europe and North America	MEDIUM	HIGH	MEDIUM	LOW	**VERY LOW**
Rubus	***Zeuzera pyrina***	Wood	Broad host range[793]	Stems	Infested plant material and adults	Middle East, North	MEDIUM-	MEDIUM-	MEDIUM-	MEDIUM	**LOW-**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
		Leopard moth			are capable of flight.	America, Europe.[794]	HIGH	HIGH	HIGH		**MEDIUM**
Orthoptera (locusts and grasshoppers)											
Strawberry	***Gryllotalpa gryllotalpa***	European mole cricket	Cucumber, turf strawberry, carrot cotton, grasses, sugar beet, maize, tobacco, potato, lettuce, *Chrysanthemum*	Young roots	Infested plant material for long distance dispersal. Both males and females are capable of flight.	Middle East, North America, Europe.[795]	LOW	LOW	MEDIUM[796]	MEDIUM	**VERY LOW**
Rubus	***Oecanthus fultoni*** (syn. *O. nigricornis, O. pellucens*)	Snowy tree cricket, black horned tree cricket	Polyphagous including plum, cranberry, apple, peach, cherry, *Rubus* spp.	Stems, leaves fruit	Infested plant material, machinery and clothes	North America	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Strawberry	***Scapteriscus vicinus***	Changa	Wide host range including kale, baby's breath Poaceae, tomato, lettuce, tobacco, strawberry, onion, *Chrysanthemum*, sugarcane, peanut	Whole plant	Infested plant material, machinery and clothes	North America, South America	LOW	LOW-MEDIUM	MEDIUM	UNKNOWN	**UNKNOWN**
Thysanoptera (thrips)											
Strawberry	***Frankliniella bispinosa***	Florida flower thrips	Wide host range including wild radish, Capsicum, Citrus, strawberry, rose, tobacco, rye, wheat, blueberry, baby's breath, Chrysanthemum, watermelon	Whole plant, above ground	Infested plant material	USA[797], Bermuda, Bahamas	LOW	MEDIUM	MEDIUM[798]	HIGH[799]	**MEDIUM**
Rubus and Strawberry	***Frankliniella fallaciosa***	Thrips	Polyphagous including blackberry, raspberry, strawberry	Flowers, fruit	Infested plant material and wind dispersal	Canada, USA and Central and South America	MEDIUM	HIGH[800]	HIGH	LOW[801]	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est.[128] Potential	Spread Potential	Economic Impact	Overall Risk
Strawberry	***Frankliniella gemina***	Thrips	Various hosts including bean, soybean, tomato, lucerne, avocado, strawberry	Above ground plant parts	Infested plant material and wind dispersal	South America	LOW[802]	MEDIUM	MEDIUM	LOW	**VERY LOW**
Strawberry	***Frankliniella intonsa***	Flower Thrips	Wide host range including lucerne, asparagus, peach, peanut, okra, rice, Capsicum, cotton *Chrysanthemum*, strawberry, rose, soybean, tomato, *Lilium* spp., pea, peanut, common bean, adzuki bean	Fruit and Inflorescence	Infested plant material over long distances	Middle East, North America, Europe, Asia, Oceania.[803]	MEDIUM-HIGH[804]	HIGH[805]	HIGH	HIGH[806]	**HIGH**
Rubus and Strawberry	***Frankliniella tritici***	Eastern flower thrips	Wide host range including lucerne, horseradish, daisy, carrot, cotton, rye, Rubus, apple, rose plum, sweet and sour cherry, oat, peach, strawberry, soybean, common bean, asparagus	Above ground parts[807]	Spread by movement of people, wind and infested plant material	Georgia (Republic of), Iraq, Kazakhstan, Canada, USA, Puerto Rico, Czechoslovakia (former), Former USSR, Hungary, Poland, Romania, Russia, Spain, Ukraine	LOW	MEDIUM	MEDIUM[808]	HIGH[809]	**MEDIUM**
Rubus	***Thrips flavus***	Honey-suckle thrips, European flower thrips	Polyphagous including pear, *Rubus* spp., oats, *Brassica* spp., potato, daisy, pea, apricot, plum	Whole plant	Infested plant material and adults are capable of flight.	Britain, China, Japan, Taiwan	MEDIUM[810]	HIGH	HIGH	LOW[811]	**LOW**
Rubus and Strawberry	***Thrips fuscipennis***	Rose thrips	Roses, strawberry, blackberry, apple, cucumber	Flowers	Infested plant material and adults are capable of flight.	North America, China and Europe	MEDIUM-HIGH	HIGH	HIGH	HIGH	**HIGH**
Strawberry	***Thrips major***	Rubus thrips	Strawberry, peach, roses	Flowers	Infested plant material and adults are capable of flight.	Europe	MEDIUM	HIGH	HIGH	LOW	**LOW**

Pathogens

Table 22. Berry pathogen threat summary table.

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
Algae											
Strawberry	***Cephaleuros virescens***	Algal stem blotch	Cashew, Citrus, blueberry, cinnamon, tea, cocoa, avocado, strawberry, coffee	Branches and stems	spread by airborne and rain splash dispersed spores.	India, Korea, Malaysia, Taiwan, Congo (Democratic Republic), Brazil, Samoa[812]	LOW (Strawberry) HIGH (Blueberry)	MEDIUM	LOW (Strawberry)[813] MEDIUM (Blueberry)	MEDIUM	**VERY LOW**
Bacteria (including phytoplasmas)											
Strawberry	***Bronze leaf wilt phytoplasma***	Bronze leaf wilt phytoplasma	Strawberry	Leaves	Infected plant material, leafhopper vectors and dodder.[814]	West Africa	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Candidatus* Phytoplasma asteris (without vector)** (syn. *Aster yellows phytoplasma*)	Strawberry green petal, strawberry phylloid fruit, strawberry stunting, Rubus stunting, yellow disease phytoplasmas, Aster yellows phytoplasma	Wide host range including onion, celery, Inca lily, carrot, maize, turnip, cabbage, strawberry, dill, *Chrysanthemum* broccoli, China aster, French hydrangea marigold	Whole plant	Transmitted through infested vegetative propagating material, natural dispersion and vector leafhoppers, main one being *Macrosteles fascifrons*.[815]	The Americas, Asia, Europe, the Caribbean.[816]	LOW	MEDIUM	LOW	LOW	**NEGLIGIBLE**
Rubus and Strawberry	***Candidatus* Phytoplasma asteris (with vector)** (syn. *Aster yellows phytoplasma*)	Strawberry green petal, strawberry phylloid fruit, strawberry stunting, Rubus stunting, yellow disease	Wide host range including onion, celery, Inca lily, carrot, maize, turnip, cabbage, strawberry, dill, *Chrysanthemum* broccoli, China aster, French hydrangea	Whole plant	Transmitted through infested vegetative propagating material, natural dispersion, and vector leafhoppers, main one being	The Americas, Asia, Europe, the Caribbean.[818]	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
		phytoplasmas, Aster yellows phytoplasma	marigold		*Macrosteles fascifrons.*[817]						
Rubus	***Candidatus* Phytoplasma rubi (without vector)** (syn. *Black raspberry witches' broom phytoplasma*)	Witches' broom, black raspberry witches broom disease, Rubus stunt	Raspberry, blackberry, dog rose, dewberry and loganberry	Whole plant	Transmitted by infected vegetative propagating material and leafhopper vectors.	Bulgaria, Denmark, France, Germany, Hungary, Portugal, Netherlands, Italy, Norway, Slovakia, Russia, Switzerland, UK, Poland	LOW	MEDIUM	LOW	MEDIUM-HIGH[819]	**VERY LOW-LOW**
Rubus	***Candidatus* phytoplasma rubi (with vector)** (syn. *Rubus stunt phytoplasma*)	Witches' broom, black raspberry witches broom disease, Rubus stunt	Raspberry, blackberry, dog rose, dewberry, loganberry	Whole plant	Transmitted by infected vegetative propagating material and leafhopper vectors.[820]	Bulgaria, Denmark, France, Germany, Hungary, Portugal, Netherlands, Italy, Norway, Slovakia, Russia, Switzerland, UK, Poland	LOW-MEDIUM[821]	MEDIUM	MEDIUM	HIGH	**MEDIUM**
Rubus and Strawberry	***Erwinia amylovora***[822]	Fire blight	Wide host range including, pear, plum, strawberry, *Rubus* spp., firethorn, pear, apple Cotoneaster, hawthorn, quince and ornamentals	Stems, leaves, fruit	Infected plant material. Bacteria are spread via birds, wind, rain and insects. (including pollinators)	The Americas, Asia, Europe, Middle East.[823]	MEDIUM[824]	MEDIUM	MEDIUM[825]	LOW[826]	**VERY LOW**
Strawberry	***Erwinia pyrifoliae***	Black stem blight	Asian pear (*Pyrus pyrifolia*), strawberry	Leaves, stems, fruit	Infected plant material. Bacteria are spread via wind, rain and insects.[827]	Japan, Korea, Netherlands	LOW	MEDIUM	MEDIUM	MEDIUM	**LOW**
Rubus	***Rhizobium rubi*** (syn. *Agrobacterium rubi*)	Cane gall of Rubus	Rose, raspberry, loganberry, blueberry	Stems[828]	Contaminated soil, plant material, rain and aerosols.	Canada, USA, Denmark, France, Germany, Hungary, USSR, Netherlands	MEDIUM-HIGH	LOW	LOW	LOW[829]	**NEGLIGIBLE**
Strawberry	***Strawberry lethal decline phytoplasma***[830]	Strawberry lethal decline	Strawberry	Whole plant, including	Infested plant material.	Canada and USA	LOW	MEDIUM	MEDIUM	HIGH	**MEDIUM**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
				fruit							
Strawberry	***Strawberry multiplier phytoplasma***	Strawberry multiplier phytoplasma	Strawberry	Whole plant	Infested plant material.	Bahrain, USA	VERY LOW[831]	LOW	LOW	LOW	**NEGLIGIBLE**
Strawberry	***Strawberry witches' broom phytoplasma***[832]	Strawberry witches' broom phytoplasma	Strawberry	Whole plant	Infested plant material.	Japan, Canada and USA	VERY LOW	LOW	LOW[833]	LOW[834]	**NEGLIGIBLE**
Strawberry	***Xanthomonas arboricola* pv. *fragariae***	Bacterial leaf blight	Cultivated strawberries (*F. ananassa*)	Leaves	Infected plant material.	Turkey, France, Italy	LOW	MEDIUM[835]	LOW[836]	LOW[837]	**NEGLIGIBLE**
Strawberry	***Xanthomonas fragariae***	Angular leaf spot	Strawberry	Leaves, growing points	Windblown rain, infected plant material and contaminated soil	China, Korea, Brazil, Mexico, Taiwan Iran Germany, Ethiopia, Canada, USA, Spain, Austria, Uruguay, Argentina, Finland, Paraguay, Belgium, France Venezuela, Netherlands, Italy, Portugal, Bulgaria, Switzerland	HIGH[838]	HIGH[839]	HIGH[840]	HIGH	**HIGH**
Rubus	***Xylella fastidiosa* (without vector)**	Leaf scorch	Wide host range including plum, sycamore, oak, blackberry, raspberry, Citrus peach, ryegrass, Oleander, pecan, almond, maple, grape, blueberry	Leaves, stems, fruit, roots	Infected plant material, and leaf hopper vectors (including glassy winged sharpshooter)[841]	Iran, Taiwan, Canada, Mexico, USA, Europe	MEDIUM	MEDIUM	MEDIUM	MEDIUM	**LOW**
Rubus	***Xylella fastidiosa* (with vector)**	Leaf scorch	Wide host range including plum, sycamore, oak, blackberry, raspberry, *Citrus* peach, ryegrass, Oleander, pecan, almond, maple, grape,	Leaves, stems, fruit, roots	Infected plant material, and leaf hopper vectors (including glassy winged sharpshooter)[842]	Iran, Taiwan, Canada, Mexico, USA, Europe	HIGH[843]	HIGH	HIGH[844]	HIGH-EXTREME	**HIGH-EXTREME**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
			blueberry								
Fungi											
Rubus	***Armillaria mellea***	Armillaria root rot	Very broad host range.[845]	Roots and collar region	Infected plant material and airborne and soilborne spores.	The Americas, Asia, Europe, Middle East, Africa.[846]	LOW[847]	MEDIUM[848]	MEDIUM	LOW	**VERY LOW**
Rubus	***Armillaria ostoyae*** (syn. *A. solidipes, A.gallica, A. lutea*)	Armillaria Root rot	Wide host range including blackberry, cherry, *Citrus*, raspberry, oak, spruce, pine blueberry, hazelnut, peach, *Eucalyptus* and other temperate tree species.	Roots and collar region	Transmitted through infested plant material and airborne and soilborne spores	North Americas, Asia, Europe, Middle East.[849]	LOW	MEDIUM	MEDIUM[850]	LOW [851]	**VERY LOW**
Rubus	***Arthuriomyces peckianus***	Orange rust (long-cycled)	Black raspberry, purple raspberry, blackberry, dewberry	Whole plant	Airborne and rain splash borne spores	USA, Japan, China, Turkey, Russia, Mexico, Canada, Finland, Norway, Sweden	HIGH	HIGH[852]	HIGH[853]	HIGH	**HIGH**
Strawberry	***Botrytis pseudocinerea***	Grey mould	Grapevine, strawberry, blackberry tomato, blueberry	Leaves and fruit	Infected plant material and windborne spores	China, USA, France	MEDIUM (Strawberry) MEDIUM-HIGH (Blueberry)	HIGH[854]	HIGH	MEDIUM	**MEDIUM**
Rubus	***Cercosporella rubi*** (syn. *Ramularia rubi, Fusisporium rubi*)	Rosette, double blossom, boysenberry decline	Blackberry, rose, boysenberry and raspberry (rarely affected)	Fruit and flowers.	Transmitted by wind and insects	USA	LOW	MEDIUM	MEDIUM	MEDIUM[855]	**LOW**
Rubus	***Fusicladium grayianum*** (syn. *Phaeoisariopsis grayana*)	Unknown	*Prunus grayana* (cherry species), *Rubus* spp. and rose	Stems and seedlings	Infected plant material and airborne and rain splash borne spores	USA[856]	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
Rubus and Strawberry	***Gnomonia rostellata***	Root rot complex, black root rot, stem end rot	Strawberry, rose, blackberry, dewberry and red raspberry.	Leaves and stems	Infected plant material and airborne, soilborne and rain splash borne spores	Canada, USA, Spain Serbia, Switzerland Bulgaria, Austria, Belgium Poland, Czechia, Germany, Ukraine, Netherlands, France,	LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Gymnoconia nitens***	Orange rust (short-cycled)	Blackberry, black raspberry and purple raspberry[857]	Leaves	Infected plant material and airborne and rain splash borne spores	Asia, Europe, United States, Canada	HIGH	MEDIUM	MEDIUM	HIGH	**MEDIUM**
Rubus	***Hapalosphaeria deformans***	Stamen blight	Raspberry, blackberry, boysenberry, loganberry, youngberry	Flowers, fruit	Transmitted through wind, mechanical agitation and rain.	Canada, USA, Germany Denmark, Spain, Great Britain, Ireland	LOW	MEDIUM	HIGH	HIGH[858]	**MEDIUM**
Rubus	***Hormotheca rubicola***	Black spot of raspberry	Raspberry	Leaves	Transmitted through wind	Temperate North America	UNKNOWN	LOW	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Leptosphaeria thomasiana***	Cane blight	Raspberry	Stems	Spores can spread by rain splash or insect vectors	USA	LOW	LOW	LOW	LOW[859]	**NEGLIGIBLE**
Rubus and Strawberry	***Monilinia fructigena*** (syn. *Sclerotinia fructigena*)	Brown rot	Malus spp., Pyrus spp., Prunus spp. and other Rosaceae. Also reported on Vitis vinifera (Vitaceae).	Fruit, blossoms, stems and leaves	Spread by rain splash, wind, vectors, and infected plant materials (including fruit).	Europe, Asia (Japan, China). South America (Brazil, Uruguay), North America.	HIGH	HIGH	HIGH	HIGH	**HIGH**
Rubus	***Mycosphaerella ligea*** (syn. *M. rubi*)	Cane and leaf spot	Blackberry, loganberry, youngberry, wild dewberry boysenberry	Leaves, stems	Transmitted through wind and rain splash	North America, Asia and Europe	LOW	MEDIUM	MEDIUM	LOW[860]	**VERY LOW**
Rubus	***Nectria mammoidea* var. *rubi*** (syn. *N. discophora* var. *rubi*)	Nectria canker, crown rot	Raspberry	Roots, stems	Transmitted through wind and rain splash	Europe and North America	LOW	LOW	MEDIUM[861]	LOW	**NEGLIGIBLE**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
Rubus	***Phyllosticta carpogena***	Black rot	*Rubus* spp.	Leaves	Airborne and rain splash borne spores	Europe, Asia and North America	VERY LOW	LOW	LOW	LOW	**NEGLIGIBLE**
Rubus	***Phymatotrichopsis omnivora*** (syn. *P. omnivorum* and *Ozonium omnivorum*)	Texas root rot	Broad host range.[862]	Roots	Infected plant material and soilborne spores.	Asia, Africa and the Americas	LOW	MEDIUM	HIGH	HIGH[863]	**MEDIUM**
Strawberry[864]	***Phytophthora fragariae*** (*Phytophthora fragariae* var. *fragariae)*	Strawberry red stele root rot	Strawberry	Bulbs, roots and stem	Infected plant material and equipment, soilborne and waterborne spores.[865]	Africa, the Americas, Asia, Middle East, Oceania.[866]	MEDIUM[867]	HIGH[868]	HIGH[869]	EXTREME[870]	**EXTREME**
Rubus	***Pseudocercospora heteromalla*** (syn. *P. rubicola*)	Powdery mildew	*Rubus iadeus* and *Rubus ellipticus*	Leaves	Transmitted by airborne spores, infected fruit and propagative material[871]	China, Congo, Sudan, India, Ethiopia, Bhutan, New Zealand, United Kingdom	MEDIUM	MEDIUM	HIGH	LOW	**VERY LOW**
Rubus	***Pucciniastrum americanum*** (syn. *P. arcticum* var. *americanum*)	Late yellow rust	Red raspberry, wild red raspberry, purple raspberry	Leaves, stems, petioles, fruit	Through wind, rain splash and can be mechanically spread[872]	USA, Canada	HIGH	MEDIUM	MEDIUM	MEDIUM	**LOW**
Rubus	***Pyrenopeziza rubi***	Cane spot	Raspberry	Stems	Transmitted through wind and soil	North America and Europe	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Rhizoctonia rubi***	Dryberry disease	Loganberry, boysenberry	Fruit	Transmitted through infected plant material	North America	LOW[873]	UNKNOWN	LOW[874]	LOW[875]	**UNKNOWN**
Rubus and Strawberry	***Rhizopus sexualis***	Soft rot	*Rubus* spp., cherry, strawberry	Fruit	Transmitted through rain splash and soil	Widespread	LOW[876]	LOW[877]	MEDIUM[878]	LOW[879]	**NEGLIGIBLE**
Rubus	***Scytinostroma galactinum***	White root rot	Wide host range including blackberry,	Roots	Transmitted through infected	British Columbia, France, Africa, USA,	MEDIUM[880]	MEDIUM[881]	MEDIUM[882]	LOW	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
	(syn. *Corticium galactinum*)		pine, apple, peach, fir, cherry, spruce, conifer, oak		plant material and contaminated soil	Canada, USSR, Hawaii, Finland, Czechoslovakia, Japan, Poland, West Indies, Puerto Rico					
Rubus	***Septocyta ruborum*** (syn. *Rhabdospora ramealis*)	Blackberry cane spot, purple blotch of blackberries	Blackberry, dewberry, red raspberry, loganberry	Stems, lateral shoots[883]	Transmitted through rain splash and windblown rain	North America, Hungary, England, Netherlands, USSR Switzerland, Spain, Washington, Poland, Germany	LOW[884]	LOW[885]	MEDIUM[886]	MEDIUM-HIGH	**VERY LOW-LOW**
Rubus	***Sphaerulina rubi***	Raspberry leaf spot	Raspberry	Stems, leaves	Transmitted by wind	North America	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**
Rubus	***Sydowiella depressula*** (syn. *Gnomonia depressula*)	Sydowiella cane canker	Raspberry, thimbleberry and blackberry	Stems and leaves	Transmitted through infected plant material and airborne spores	North America and Europe	LOW	MEDIUM	MEDIUM	LOW[887]	**NEGLIGIBLE**
Nematodes											
Strawberry	***Belonolaimus longicaudatus*** [888]	Sting nematode	Polyphagous.[889]	Roots and leaves. Dwarfing of whole plant	Contaminated soil, seed or equipment.[890]	Pakistan, Pakistan, Saudi Arabia, Turkey, Bermuda, Mexico, USA, Bahamas, Costa Rica, Puerto Rico	LOW	MEDIUM	MEDIUM[891]	MEDIUM	**LOW**
Rubus	***Helicotylenchus platyurus***	Spiral nematode	Blackberry	Roots	Contaminated soil or equipment	Turkey, North America	MEDIUM[892]	MEDIUM	MEDIUM	MEDIUM	**LOW**
Rubus	***Hirschmanniella oryzae***	Rice root nematode	Blackberry, okra, sugarcane, rice, tomato, wheat, cotton, water hyacinth, maize.	Roots	Vectors transmitted through infested soil, and plant material.	Asia, the Americas, Africa.[893]	MEDIUM	MEDIUM[894]	LOW	LOW	**NEGLIGIBLE**
Rubus	***Hoplolaimus magnistylus***	Lance nematode	Blackberry, corn, soybean and cotton	Roots	Vectors transmitted through infested soil, and plant material.	USA	LOW	MEDIUM	LOW	MEDIUM	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
Strawberry	***Longidorus attenuatus***	Tomato black ring nematode	Wide host range including sugarbeet, tomatoes, barley, lettuce, potato, carrot, strawberry, beetroot, soybean	Root system affecting the whole plant	Transmitted through infected plant material	Ukraine	MEDIUM	MEDIUM	MEDIUM	MEDIUM[895]	**LOW**
Strawberry	***Longidorus breviannulatus***	Needle nematode	Beetroot, carrot, strawberry, corn grapevine, bent grass	Roots	Spread through movement of infested soil	Canada and USA[896]	LOW	MEDIUM	MEDIUM[897]	MEDIUM	**LOW**
Rubus and Strawberry	***Longidorus elongatus***	Tomato black ring eelworm, needle nematode	Radish, apple, blackcurrant, raspberry, oats, barley, lettuce, tomatoes, carrot strawberry, beetroot, roses peppermint, celery, cabbage, peanut, perennial ryegrass, and grapevine	Root system and whole plant	Transmitted through soil, infested plant material, machinery, run-off	Asia, the Americas, Africa, Oceania.[898]	LOW-MEDIUM	MEDIUM	LOW	MEDIUM[899]	**VERY LOW**
Rubus	***Scutellonema bradys***	Yam nematode	Okra, coconut, yam, cassava, tomato, blackberry	Roots	Transmitted through infected plant material, land vehicles and soil	Asia, the Americas, Africa, the Caribbean.[900]	LOW-MEDIUM	MEDIUM	LOW	MEDIUM[901]	**VERY LOW**
Rubus, strawberry	***Xiphinema bakeri***	Dagger nematode	Polyphagous including raspberry, strawberry, potato, tomato, *Eucalyptus*	Roots	Transmitted through infested plant material and soil.	Canada (British Columbia), USA	LOW-MEDIUM	HIGH	LOW	HIGH[902]	**LOW-MEDIUM**
Rubus and Strawberry	***Xiphinema coxi***	Dagger nematode	Polyphagous including raspberry, stone fruit strawberry, grapevine,	Roots	Infested plant material, land vehicles and soil.	USA and UK	LOW-MEDIUM	MEDIUM	LOW	LOW-MEDIUM[903]	**NEGLIGIBLE-VERY LOW**
Rubus and Strawberry	***Xiphinema diversicaudatum***[904]	Dagger nematode	Strawberry, elm, beetroot, peach, blackthorn, dog rose, blackberry, raspberry, rose, ginger, potato,	Roots and even the whole plant	Transmitted through infested plant material, land vehicles, soil, sand and gravel.	Turkey, South Africa, USA, Austria, Spain, Belgium, Bulgaria, Croatia, Czechia, Denmark, France,	HIGH[905]	HIGH	LOW	MEDIUM[906]	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
			elderberry, rice, grapevine, European pear, coconut, watermelon, asparagus			Germany, Ireland, Moldova, Netherlands, France Norway, Poland, Portugal, Russia, Slovakia, Slovenia, Sweden, NZ, Italy Switzerland, UK, Ukraine					
Oomycetes											
Rubus	***Phytophthora idaei***	Phytophthora root rot	Raspberry	Roots	Infected plant material and soil and runoff	UK	LOW	HIGH	MEDIUM	MEDIUM[907]	**LOW**
Viruses and viroids											
Rubus	***Blackberry calico virus*** **(Carlavirus)**	Blackberry calico[908]	Blackberry, loganberry, *Rubus ursinus,* boysenberry	Leaves	Infested plant material, grafting and vegetative propagation	USA	LOW	LOW[909]	LOW	LOW[910]	**NEGLIGIBLE**
Rubus	***Blackberry chlorotic ringspot virus*** **(Ilarvirus)**	Blackberry chlorotic ringspot virus	Blackberry and rose	Leaves	Infected plant material, seed and pollen.	USA and Scotland	MEDIUM	LOW	MEDIUM[911]	LOW	**VERY LOW**
Rubus	***Blackberry virus Y*** **(Brambyvirus)**	Blackberry virus	Blackberry	Leaves	Infested plant material	USA	MEDIUM	LOW	MEDIUM[912]	UNKNOWN [913]	**UNKNOWN**
Rubus	***Blackberry yellow vein associated virus*** **(Crinivirus)**	Blackberry yellow vein virus	Blackberry	Fruit	Transmitted by whiteflies (Trialeurodes)	USA[914]	MEDIUM[915]	UNKNOWN	UNKNOWN	UNKNOWN [916]	**UNKNOWN**
Rubus	***Bramble yellow mosaic virus*** **(Potyvirus)**	Bramble yellow mosaic virus	Blackberry[917]	Leaves	Transmitted by sap and seed	USA	LOW	MEDIUM	MEDIUM[918]	HIGH	**MEDIUM**
Rubus	***Cherry leaf roll virus***	Blackline, walnut	Wide host range including raspberry,	Whole plant (stunting),	Transmitted by grafting, dispersal	Asia, North America, Europe, Middle	LOW	HIGH [922]	MEDIUM [923]	MEDIUM	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
	(Nepovirus) (exotic strains) (syn. *Walnut ringspot virus*)[919]	ringspot	birch blackberry, cherry, apple, grapevine *Vaccinium darrowii*[920] and walnut	leaves	of seeds and pollen and through water.	East.[921]					
Rubus	***Cherry rasp leaf virus*** **(Cheravirus)**	Cherry rasp leaf, North American raspberry decline	Apple, cherry, peach, dandelion and raspberry	Whole plant	Through infested plant material, soil and water. Vector is a dagger nematode *X. americanum*	Canada and USA	LOW	MEDIUM	MEDIUM[924]	UNKNOWN	**UNKNOWN**
Rubus	***Raspberry green leaf blotch virus*** **(Emaravirus suspected)**	Raspberry green leaf blotch	Raspberry	Leaves	Through nematode and infected plant material	UK, Bulgaria, Serbia and Finland	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Raspberry latent virus*** **(Reovirus)**	Raspberry latent virus	Raspberry	Fruit[925]	Transmitted by vector raspberry aphid such as *A. agathonica*	Canada and USA	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	**UNKNOWN**
Rubus	***Raspberry leaf curl virus*** **(Luteovirus suspected) (without vector)**	American raspberry leaf curl	Blackberry, red raspberry, black raspberry and boysenberry	Leaves, stems, fruit	Infested plant material, vegetative propagation and aphid vectors	Canada and USA	LOW	LOW	VERY LOW	HIGH	**VERY LOW**
Rubus	***Raspberry leaf curl virus*** **(Luteovirus suspected) (with vector)**[926]	American raspberry leaf curl	Blackberry, red raspberry, black raspberry and boysenberry	Leaves, stems, fruit	Infested plant material, vegetative propagation and aphid vectors [927]	Canada and USA	MEDIUM	MEDIUM	LOW	HIGH	**LOW**
Rubus and Strawberry	***Raspberry ringspot virus*** **(Nepovirus subgroup A) (without vector)**	Ringspot of raspberry	Raspberry, currant, privet artichoke, cherry, grapevine, daffodil, and strawberry	Leaves, fruit, whole plant (stunting or death)	Transmitted by infected plant material including pollen. Vectored by *L. elongatus* and *L. macrosoma*	Iran, Kazakhstan, Turkey, Albania, Belarus, Belgium, Bulgaria, Czechia, Finland, France, Germany, Greece, Ireland, Latvia, Luxembourg,	LOW	LOW	LOW	HIGH	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
						Netherlands, Italy, Norway, Portugal, Serbia, Slovakia, UK, Russia, Switzerland, Serbia, Montenegro					
Rubus and Strawberry	***Raspberry ringspot virus* (Nepovirus subgroup A) (with vector)**	Ringspot of raspberry	Raspberry, currant, cherry, artichoke, privet grapevine, cardinal shrub, daffodil, and strawberry	Leaves, fruit, whole plant (stunting or death)	Transmitted by infected plant material including pollen. Vectored by *L. elongatus* and *L. macrosoma*	Iran, Kazakhstan, Turkey, Albania, Belarus, Belgium, Bulgaria, Czechia, Finland, France, Germany, Greece, Ireland, Latvia, Luxembourg, Netherlands, Italy, Norway, Portugal, Serbia, Slovakia, UK, Russia, Switzerland, Serbia, Montenegro	MEDIUM	MEDIUM	MEDIUM	HIGH	**MEDIUM**
Rubus	***Raspberry vein chlorosis virus* (Rhabdovirus) (without vector)** (syn. *Raspberry chlorotic net virus*)	Raspberry vein chlorosis	Raspberry, loganberry, alpine strawberry	Leaves	Transmitted infected plant material, grafting and *Aphis idaei*	Europe, Canada, New Zealand and former Soviet Union	LOW	MEDIUM	MEDIUM	MEDIUM[928]	**LOW**
Rubus	***Raspberry vein chlorosis virus* (Rhabdovirus) (with vector)** (syn. *Raspberry chlorotic net virus*)	Raspberry vein chlorosis	Raspberry, loganberry, alpine strawberry	Leaves	Transmitted infected plant material, grafting and *Aphis idaei*.	Europe, Canada, New Zealand, former Soviet Union	LOW[929]	MEDIUM	HIGH	MEDIUM[930]	**LOW**
Rubus	***Sowbane mosaic virus* (Sobeomovirus) (without vector)[931]**	Leafy gall, SoMV	Raspberry, blackberry, blackcurrant	Leaves	Transmitted by insect vectors[932]	Scotland, Switzerland	LOW	MEDIUM	LOW	LOW[933]	**NEGLIGIBLE**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
Rubus	***Sowbane mosaic virus* (Sobeomovirus) (with vector)**	Leafy gall, SoMV	Raspberry, blackberry, blackcurrant	Leaves	Transmitted by insect vectors[934]	Scotland, Switzerland	LOW	MEDIUM	MEDIUM	LOW[935]	**VERY LOW**
Rubus	***Rubus yellow net virus* (Badnavirus) (without vector)**	Rubus yellow net virus	Raspberry	Leaves	Vectored by aphids[936]	UK and USA	LOW	MEDIUM	LOW	LOW (alone) HIGH (as part of raspberry vein-banding mosaic disease complex)[937]	**NEGLIGIBLE** **LOW (as part of raspberry vein-banding mosaic disease complex)**
Rubus	***Rubus yellow net virus* (Badnavirus) (with vector)**	Rubus yellow net virus	Raspberry	Leaves	Vectored by aphids[938]	UK and USA	LOW	MEDIUM	MEDIUM	LOW (alone) HIGH (as part of raspberry vein-banding mosaic disease complex)[939]	**LOW** **MEDIUM (as part of raspberry vein-banding mosaic disease complex)**
Strawberry	***Strawberry latent C virus* (Rhabdovirus)**	Strawberry latent C rhabdovirus	*Fragaria* spp.	Whole plant	Transmitted by vectors *C. fragaefolii, C. thomasi* and *C. minor* and infested plant material.	Japan, Canada, USA	MEDIUM	HIGH	HIGH	MEDIUM	**MEDIUM**
Rubus and Strawberry	***Strawberry latent ringspot virus* (Sadwavirus) (without vector)**	Strawberry latent ringspot virus	Wide host range including blackberry, lily, raspberry, plum, peach, daffodil, strawberry, celery, rhubarb, cherry, apricot, asparagus,	Leaves, whole plant (dwarfing)	Transmitted through infected plant material (including seed in some species), grafting and *Xiphinema*	India, Lebanon, UK, Syria, Turkey, Egypt, Canada, Mexico, NZ USA, Albania, Spain, Belarus, Belgium, Croatia, Finland, France, Germany,	HIGH	HIGH[941]	LOW	MEDIUM[942]	**LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
			blackcurrant, rose, grapevine, white clover		nematodes[940]	Hungary, Ireland, Italy, Luxembourg, Netherlands, Serbia, Poland, Portugal, Switzerland					
Rubus and Strawberry	***Strawberry latent ringspot virus* (Sadwavirus) (with vector)**	Strawberry latent ringspot virus (SLRSV)	Wide host range including blackberry, lily, raspberry, plum, peach, daffodil, strawberry, celery, rhubarb, cherry, apricot, asparagus, blackcurrant, rose, grapevine, white clover	Fruit and leaves, may affect rooting ability	Transmitted through infected plant material (including seed in some species), grafting and *Xiphinema* nematodes[943]	India, Lebanon, UK, Syria, Turkey, Egypt, Canada, Mexico, NZ USA, Albania, Spain, Belarus, Belgium, Croatia, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, Netherlands, Serbia, Poland, Portugal, Switzerland	HIGH	HIGH	MEDIUM	MEDIUM	**MEDIUM**
Rubus	***Thimbleberry ringspot virus* (Unassigned) (without vector)**	Thimbleberry ringspot virus	Thimbleberry, raspberry, black raspberry and *Rubus henryi*	Leaves	Infected plant material, grafting and vectored by aphids[944945]	Canada (British Columbia)	LOW	LOW	LOW	UNKNOWN	**UNKNOWN**
Rubus	***Thimbleberry ringspot virus* (Unassigned) (with vector)**	Thimbleberry ringspot virus	Thimbleberry, raspberry, black raspberry, *Rubus henryi*	Leaves	Infected plant material, grafting and vectored by aphids[946947]	Canada (British Columbia)	LOW	LOW	MEDIUM	UNKNOWN	**UNKNOWN**
Rubus and Strawberry	***Tomato black ring* virus (Nepovirus)**	Ringspot, tomato black ring virus, lettuce ringspot	Almonds, onion, grapevine, peas, cucumber, lily, daffodil, lettuce Capsicum, bean tomato, peach, strawberry, celery, *Rubus* spp.	Whole plant	Transmitted through pollen and mechanical inoculation and nematode vectors[948949]	Greece, Hungary, Ireland, Moldova, Netherlands, Serbia Norway, Poland, Slovakia, Sweden, Switzerland, UK, Montenegro	MEDIUM (with vector) LOW (without vector)	MEDIUM	LOW	MEDIUM	**VERY LOW[950]**
Strawberry	***Tomato bushy stunt virus* (Tombusvirus)**	Tomato bushy stunt virus (TBSV)	Capsicum, tomato, eggplant, crab apple, sweet cherry, European pear,	Whole plant, including fruit	Can be transmitted through contaminated soil,	Japan, Pakistan, Singapore, Italy, Morocco, Tunisia, Canada, Mexico, USA,	LOW	MEDIUM	MEDIUM	LOW	**VERY LOW**

Affected Berry Industry	Scientific Name	Common Name	Host(S)	Affected Plant Part	Dispersal	Distribution	Entry Potential	Est. Potential	Spread Potential	Economic Impact	Overall Risk
			strawberry		plant material or seeds	Argentina, NZ, Peru, Suriname, UK Austria, Spain Czechia, Ireland, Germany, Greece, Portugal, Israel[951]					
Rubus	***Tomato ringspot virus*** **(Nepovirus) (subgroup C) (without vector)** (syn. *Blackberry mosaic virus*, *Red currant mosaic virus*)	Tomato ringspot virus	Wide host range including blueberry, blackberry, raspberry, gooseberry, apple, stone fruit, currant, grapevine, strawberry, *Pelargonium* and various weed species.	Whole plant (stunting)	Transmitted by infected plant material, possibly seedborne. Suspected nematode vector (*Xiphinema americanum*)	China, India, Iran, Japan, Jordan, Chile, Korea, Oman, Pakistan, Turkey, Egypt, Togo, Canada, Mexico, USA, Puerto Rico, Brazil, Colombia, Peru, Venezuela, NZ Belarus, Croatia, Fiji France, Italy, Serbia, Lithuania, Poland, Russia, Slovakia, Slovenia, Serbia, Montenegro	MEDIUM (Rubus)[952] HIGH (Blueberry)	MEDIUM (Rubus) HIGH (Blueberry)	LOW (Rubus) HIGH (Blueberry)	MEDIUM-HIGH[953]	**LOW-MEDIUM**
Rubus	***Wineberry latent virus*** **(Potexvirus) (without *Blackberry calico virus* (Carlavirus)**[954]	Wineberry latent virus	*Rubus* spp. including blackberry and raspberry	Leaves	Transmitted by grafting, vegetative propagation and mechanical inoculation of sap.	USA and Scotland	LOW	LOW	LOW	LOW [955]	**NEGLIGIBLE**
Rubus	***Wineberry latent virus*** **(Potexvirus) (with *Blackberry calico virus* (Carlavirus)**[956]	Wineberry latent virus	*Rubus* spp. including blackberry and raspberry	Leaves	Transmitted by grafting, vegetative propagation and mechanical inoculation of sap.	USA and Scotland	LOW	LOW	LOW	MEDIUM[957]	**VERY LOW**

Blueberry TST References

Abrahamovich, E., López, A. C., & Alippi, A. M. (2014). Agrobacterium rubi strains from blueberry plants are highly diverse. Revista Argentina de Microbiologia, 46(3), 237-241. https://doi.org/10.1016/s0325-7541(14)70078-1

AgPest. (2013). Grass-grub, brown beetle larvae. AgResearch. Available online at: https://agpest.co.nz/?pesttypes=grass-grub-brown-beetle-larvae

Alford, D.V. (2007) Pests of Fruit Crops: A Color Handbook. Elsevier, Science. ISBN 0123736765, 9780123736765. Available online: https://books.google.com.au/books?hl=en&lr=&id=jhRxGuuCY1kC&oi=fnd&pg=PA7&ots=c1IhGdrrtM&sig=7ugtl086A6RHWVk1C2Du8DzDsEY&redir_esc=y#v=onepage&q&f=false

Alippi, A. M., López, A. C., & Balatti, P. A. (2010). First Report of Agrobacterium rubi and A. rhizogenes Causing Crown and Root Gall and Hairy Root on Blueberry in Argentina. Plant Disease, 94(8), 1064. https://doi.org/10.1094/pdis-94-8-1064c

Alippi, A. M., López, A. C., & Balatti, P. A. (2012). Diversity among agrobacteria isolated from diseased plants of blueberry (Vaccinium corymbosum) in Argentina. European Journal of Plant Pathology, 134(2), 415–430. https://doi.org/10.1007/s10658-012-0001-x

Aliya, S.S.S. & Nusaibah, S.A. (2021) Fungi associated with the blighted leaf symptoms of Hevea brasiliensis in Malaysia. Forest Pathology 51(3). doi: https://doi.org/10.1111/efp.12690.

All About Blueberries Community of Practice (CoP). (2019) Armillaria Root Rot of Blueberry. Extension Foundation United States of America Department of Agriculture (USDA) National Institute of Food and Agriculture. https://blueberries.extension.org/armillaria-root-rot-of-blueberry/

All About Blueberries Community of Practice (CoP). (2019) Botryosphaeria Stem Canker of Blueberry. Extension Foundation United States of America Department of Agriculture (USDA) National Institute of Food and Agriculture. https://blueberries.extension.org/botryosphaeria-stem-canker-of-blueberry/

All About Blueberries Community of Practice (CoP). (2019) Double Spot and Gloeocercospora Leaf Spot. Extension Foundation United States of America Department of Agriculture (USDA) National Institute of Food and Agriculture. https://blueberries.extension.org/double-spot-and-gloeocercospora-leaf-spot/

Alvarez Osorio, A.K., Miles, L.A. & Miles, T.D. (2022) Mummy Berry of Blueberry Caused by Monilinia vaccinii-corymbosi: A Diagnostic Guide. Plant Health Progress 23 (3). doi: https://doi.org/10.1094/PHP-09-21-0120-DG

Anderson, R. S. (2008). A review of the genus Cryptorhynchus Illiger 1807 in the United States and Canada (Curculionidae: Cryptorhynchinae). The Coleopterists Bulletin, 62(1), 168-180. https://doi.org/10.1649/1065.1

Arévalo-Rodríguez, H. A. (2006). A study of the behavior, ecology, and control of flower thrips in blueberries towards the development of an integrated pest management (IPM) program in Florida and southern Georgia (Doctoral dissertation, University of Florida). https://ufdcimages.uflib.ufl.edu/UF/E0/01/73/68/00001/arevalorodriguez_h.pdf

Arthurs, S. P., Kok-Yokomi, M. H., & Smith, H. (2022). Florida Flower Thrips, Frankliniella Bispinosa. Featured Creatures, Publication Number: EENY-639. Available online at: https://edis.ifas.ufl.edu/publication/IN1110

Atlas of Living Australia (N.D.) Calacarus Keifer, 1940. Occurrence Records citinig specimens held in Australian reference collections. https://bie.ala.org.au/species/https:/biodiversity.org.au/afd/taxa/4ae16dbe-2026-42f1-8765-41bf379a3a17#tab_recordsView

Austin, K. & Morris, S. (2016) (Updated 2023, 6 July) Species Acrobasis vaccinii - Cranberry Fruitworm. BugGuide. Department of Plant Pathology, Entomology and Microbiology, Iowa State University. https://bugguide.net/node/view/1196116.

Australian Department of Agriculture, Fisheries and Forestry (2019) Final pest risk analysis for brown marmorated stink bug (Halyomorpha halys). https://www.dcceew.gov.au/sites/default/files/documents/final-bmsb-pra-report.pdf

Bagadia, P. G., Polashock, J. J., Bottner-Parker, K. D., Zhao, Y., Davis, R. E., & Lee, I. (2013). Characterization and molecular differentiation of 16SrI-E and 16SrIX-E phytoplasmas associated with blueberry stunt disease in New Jersey. Molecular and Cellular Probes, 27(2), 90–97. https://doi.org/10.1016/j.mcp.2012.11.002

Baino, O., Ramallo, A.C., Hongn, S. & Ramallo, J.C. (2007) First Report of Dothichiza caroliniana Causing Double Spot on Highbush Blueberry in South America. Plant Disease. The American Phytopathological Society 91 (12). doi: https://doi.org/10.1094/PDIS-91-12-1685A

Bartlett, C. R., Deitz, L. L., Dmitriev, D. A., Sanborn, A. F., Soulier-Perkins, A., & Wallace, M. S. (2018). The diversity of the true hoppers (Hemiptera: Auchenorrhyncha). Insect biodiversity: science and society, 2, 501-590.

Beers, E.H. (2007) Apple Mealybug. Phenacoccus aceris Signoret (Homoptera: Pseudococcidae). Washington State University. https://treefruit.wsu.edu/crop-protection/opm/apple-mealybug/#:~:text=The%20host%20range%20is%20very%20broad%2C%20including%20all,ash%29%20and%20various%20ornamentals%20%28cotoneaster%2C%20hawthorn%2C%20quince%2C%20spirea%29.

Bell, H. T. (1977). Life history of the Obscure Root Weevil, Sciopithes obscurus (Horn), on rhododendron. https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/rn301504p

Biedermann, P. H., & Nuotclà, J. A. (2020). Social beetles. In Encyclopedia of social insects (pp. 85-156). Academic Press. https://www.researchgate.net/profile/Peter-Biedermann/publication/339939841_Social_Beetles/links/5e6df2c6299bf12e23c75447/Social-Beetles.pdf

Bolda, M. P., & Bettiga, L. J. (2009). Root Weevils. Agriculture: Caneberries Pest Management Guidelines, UC IPM. Avalaible online at: https://ipm.ucanr.edu/agriculture/caneberries/root-weevils/

Bradbury, J. F. (1987). Nocardia vaccinii.[Descriptions of Fungi and Bacteria]. Descriptions of Fungi and Bacteria, (90), Sheet-891. https://doi.org/10.1079/DFB/20056400891

Bragard, C., Baptista, P., Chatzivassiliou, E., Di Serio, F., Gonthier, P., Miret, J. a. J., Justesen, A. F., Magnusson, C. S., Milonas, P., Navas-Cortés, J. A., Parnell, S., Potting, R., Reignault, P. L., Stefani, E., Thulke, H., Van Der Werf, W., Civera, A. V., Yuen, J., Zappalà, L., Grégoire, J-C., Malumphy, C., Kertesz, V.,

Maiorano, A., MacLeod, A. (2022). Pest categorisation of Zaprionus indianus. EFSA Journal, 20(3). https://doi.org/10.2903/j.efsa.2022.7144

Braman, S. K., Beshear, R. J., Payne, J. A., Amisi, A. A., & Department of Entomology, College of Agriculture and. Environmental Sciences, University of Georgia, Georgia Experiment Station Griffin, GA 30223-1797. (1996). Population dynamics of thrips (Thysanoptera: thripidae: Phlaeothripidae) inhabiting vaccinium (Ericales: Ericaceae) galls in Georgia. In Environ. Entomol. (Vols. 25–25, Issue 2, pp. 327–332). https://ent.uga.edu/content/dam/caes-subsite/entomology/documents/publications/braman-publications/Population%20Dynamics%20of%20Thrips%20(Thysanoptera-%20Thripidae-%20Phlaeothripidae)%20Inhabiting%20Vaccinium%20(Ericales-%20Ericaceae)%20Galls%20in%20Georgia.pdf

Braman, S.K., M. Chappell, J.-H. Chong, A. Fulcher, N.W. Gauthier, W.E. Klingeman, G. Knox, A. LeBude, J. Neal, S.A. White, C. Adkins, J. Derr, S. Frank, F. Hale, F.P Hand, C. Marble, J. Williams-Woodward, & A. Windham. (2015). Pest management strategic plan for container and field-produced nursery crops: revision 2015. A.V. LeBude and A. Fulcher, eds. Southern Region IPM Center, Raleigh, NC. 236 p. http://www.go.ncsu.edu/NurseryCropsIPM2015

Brandt, J. P., Smith, S. M., & Hubbes, M. (1995). Bionomics of strawberry root weevil adults, Otiorhynchus ovatus (L.)(Coleoptera: Curculionidae), on young ornamental conifer trees in southern Ontario. The Canadian Entomologist, 127(4), 595-604. http://www.smithlab.ca/uploads/1/2/0/5/120564888/1995_brandt_et_al._can_ent.pdf

Breaker, E. P. (1965). The Woods Weevil - A New Pest of Rhododendrons And Azaleas. The Quarterly Bulletin of the American Rhododendron Society, 19(2). https://scholar.lib.vt.edu/ejournals/JARS/v19n2/v19n2-breaker.htm

Brewer, M.T., Turner, A.N., Brannen, P.M., Cline, W.O. & Richardson, E.A. (2014) Exobasidium maculosum, a new species causing leaf and fruit spots on blueberry in the southeastern USA and its relationship with other Exobasidium spp. parasitic to blueberry and cranberry. Mycologia 106 (3) 415-423. doi: 10.3852/13-202

Bristow P.R., Martin R.R., Windom G.E. (2000). Transmission, field spread, cultivar response, and impact on yield in highbush blueberry infected with blueberry scorch virus. Phytopathology. 90:474–479. doi: 10.1094/PHYTO.2000.90.5.474.

British Colombia Ministry of Agriculture (2016) Leaf Feeding Caterpillars - Eye-spotted Budmoth. A Field Guide to Identification of Insect Pests, Diseases and other Disorders in Blueberries. https://fieldguide.bcblueberry.com/caterpillars-leaf-feeding/.

Brochu, A., Dionne, A., Fall, M., & Pérez-López, E. (2023). A decade of hidden phytoplasmas unveiled through citizen science. Plant Disease. https://doi.org/10.1094/pdis-02-23-0227-sc

Brumley, C., Scanlon, P., & Szito, A. (2020). Scarab Pests to Australia. Lucidcentral.org, Identic Pty Ltd, Queensland, Australia. Available online at: https://keys.lucidcentral.org/keys/v3/exotic_scarab_pests/key/lucid_key_to_scarabs/Media/Html/entities/costelytra_zealandica.htm

Burgess, L. (1977). Flea beetles (Coleoptera: Chrysomelidae) attacking rape crops in the Canadian prairie provinces. Canadian Entomologist, 109(1), 21-32. https://doi.org/10.4039/Ent10921-1

Burrows, M. (2012). Jumping mechanisms of treehopper insects (Hemiptera, Auchenorrhyncha, Membracidae). Journal of Experimental Biology. https://doi.org/10.1242/jeb.078741

Byrne, C.J., & Moyle, D.I. (2019). The Caterpillar Key Fact Sheet: Noctuidae. Available online at: https://keys.lucidcentral.org/keys/v3/the-caterpillar-key/key/caterpillar_key/Media/Html/entities/noctuidae.htm

Byrne, C.J., & Moyle, D.I. (2019). The Caterpillar Key Fact Sheet: Papilionidae. Available online at: https://keys.lucidcentral.org/keys/v3/the-caterpillar-key/key/caterpillar_key/Media/Html/entities/papilionidae.htm

Byrne, C.J., & Moyle, D.I. (2019). The Caterpillar Key Fact Sheet: Pyralidae. Available online at: https://keys.lucidcentral.org/keys/v3/the-caterpillar-key/key/caterpillar_key/Media/Html/entities/pyralidae.htm

Cabrera, N., & Rocca, M. (2012). Primeros registros de Chrysomelidae (Insecta, Coleoptera) sobre arándanos en Argentina: nuevas asociaciones entre crisomélidos nativos y un cultivo exótico. Revista de la Sociedad Entomológica Argentina, 71(1-2), 45-55. http://www.scielo.org.ar/pdf/rsea/v71n1-2/v71n1-2a05.pdf

Caglayan, K., Akkan, R., Gazel, M. & Tok, F.M. (2021) First report of the Olpidium virulents-mediated transmission of blueberry mosaic-associated virus in blueberries in Turkey. Journal of Plant Pathology 103: 1349. doi: https://doi.org/10.1007/s42161-021-00918-x.

Calvert, D.J. & Van Den Bosch, R. (1972). Host Range and Specificity of Monoctonus paulensis (Hymenoptera: Braconidae) a Parasite of Certain Dactynotine Aphids. Annals of the Entomological Society of America, 65(2), 422-432.

Campbell, J. M., Sarazin, M. J., & Lyons, D. B. (1989). Canadian beetles (Coleoptera) injurious to crops, ornamentals, stored products, and buildings. Agricultural Canada. https://publications.gc.ca/collections/collection_2016/aac-aafc/agrhist/A43-1826-1989-eng.pdf

Canadian Food Inspection Agency (2023) Blueberry fruit drop-associated virus - categorisation. European Plant Protection Organisation (EPPO) Platform on Pest Risk Analyses (PRAs). https://pra.eppo.int/pra/938f0803-1799-427c-847e-a177b199c7b5.

Canadian Food Inspection Agency (2023) Pest categorization Gloeosporium minus Shear Gloeosporium leaf spot and stem canker. https://pra.eppo.int/getfile/1a82b659-3bc4-4210-ab58-744de5bd9e6a

Canadian Food Inspection Agency. (2023). Pest categorization Hemadas nubilipennis (Ashmead) (Hymenoptera: Pteromalidae) Blueberry stem gall wasp Available online at: https://pra.eppo.int/pra/2a5f84bc-6796-49a1-b38a-f0401c005a81

Canadian Food Inspection Agency. (2023). Pest categorization Pyrrhalta vaccinii (Fall) and Neochlamisus cribripennis (LeConte) (Coleoptera: Chrysomelidae) Blueberry beetles. Available online at: https://pra.eppo.int/pra/6cb796f8-9a47-4dae-823a-e4513e8f531e

Canovas, M., Guay, J., Fournier, V., & Cloutier, C. (2023). Pest thrips do not set field margins aside: preferred wildflowers sustain pest Frankliniella spp. (Thysanoptera: Thripidae) and their migration in commercial strawberry. Anthropod-plant Interactions (Online), 17(3), 327–340. https://doi.org/10.1007/s11829-023-09955-y

Capinera, J.L. (1999) Southern armyworm Spodoptera eridania. Featured Creatures. University of Florida. https://entnemdept.ufl.edu/creatures/veg/leaf/southern_armyworm.htm.

Cepeda, D.E. & Cubillos, G.E. (2011) Description of the last larval stage and compilation of host records of seven species of Tortricidae of economic importance in Chile (Lepidoptera: Tortricidae). Gayana 75 (1): 39-70. ISSN 0717-652X.https://www.scielo.cl/pdf/gayana/v75n1/art04.pdf

Chen, C., Zhang, B., & Gao, J. (2010). Leaf spot disease of lowbush blueberry (Vaccinium angustifolium) caused by Pestalotiopsis photiniae newly reported in China. New Disease Reports, 22(1), 31. https://doi.org/10.5197/j.2044-0588.2010.022.031

Chen, G., Sheng, M., Li, T., Millar, J.G. & Zhang, Q. (2010) Synergistic sex pheromone components of the grey-spotted tussock moth, Orgyia ericae. Entomologia Experimentalis et Applicata 136: 227–234. doi: 10.1111/j.1570-7458.2010.01011.x

Chen, Y., Pahadi, P., Calderwood, L., Annis, S., Drummond, F., & Zhang, Y. (2022). Will climate warming alter biotic stresses in wild lowbush blueberries? Agronomy, 12(2), 371. https://doi.org/10.3390/agronomy12020371

Chiykowski, L. (2011) Scaphytopius acutus (Say), A newly discovered vector of celery-infecting Aster-Yellows Virus. Canadian Journal of Botany 40(6):799-801. doi: 10.1139/b62-073.

Clark, S. M., LeDoux, D. G., Seeno, T. N., Riley, E. G., Gilbert, A. J., & Sullivan, J. M. (2004). Host plants of leaf beetle species occurring in the United States and Canada (Coleoptera: Megalopodidae, Orsodacnidae, Chrysomelidae, excluding Bruchinae). The Coleopterists Society, Special Publication No. 2. https://www.coleopsoc.org/publications/special-publications/special-publication-no-2/

Cline, B. (2014) Leaf Diseases of Blueberry: Fruit Disease Information. North Carolina State University Extension. https://content.ces.ncsu.edu/leaf-diseases-of-blueberry.

Cline, W.O (1998). An Exobasidium disease of fruit and leaves of highbush blueberry. Plant Disease. The American Phytopathological Society. 82:1064, doi:10.1094/PDIS.1998.82.9.1064B

Collins, J. A., & Forsythe Jr, H. Y. (1992). Blueberry Thrips Control, 1991. Insecticide and Acaricide Tests, 17(1), 61-62.

Coscaron, M.D.C. & Pall (2015) The Tribe Anisoscelini (Hemiptera: Heteroptera, Coreidae) in Argentina. Zootaxa 4033(3): 411-426. doi:10.11646/zootaxa.4033.3.6.

Crabo, L., Zack, R., Petersonm M. et. al (2009) Pacific Northwest Moths: Peridroma saucia (Hübner, [1808]) Variegated Cutworm Moth. Washingston State University and Western Washington University. http://pnwmoths.biol.wwu.edu/browse/family-noctuidae/subfamily-noctuinae/tribe-noctuini/peridroma/peridroma-saucia/.

Craemer, C. (2018). First record, current status, symptoms, infested cultivars and potential impact of the blueberry bud mite, Acalitus vaccinii (Keifer) (Prostigmata: Eriophyidae) in South Africa. Acarologia, 58(3), 735–745. https://doi.org/10.24349/acarologia/20184267

Craemer, C. (2018). First record, current status, symptoms, infested cultivars and potential impact of the blueberry bud mite, Acalitus vaccinii (Keifer) (Prostigmata: Eriophyidae) in South Africa. Acarologia, 58(3), 735–745. https://doi.org/10.24349/acarologia/20184267

Crozier, L. (1993). The Blueberry Case Beetle. Lowbush Blueberry Fact Sheet, Province of Nova Scotia. Available online at: https://cdn.dal.ca/content/dam/dalhousie/images/sites/wild-blueberry/pdfs/Blueberry_Case_%20Beetle.pdf

Crozier, L. (1995) The Blueberry Spanworm. Lowbush blueberry Fact Sheet. https://cdn.dal.ca/content/dam/dalhousie/images/sites/wild-blueberry/pdfs/Blueberry_Spanworm.pdf.

Csóka, G., Stone, G. N., & Melika, G. (2005). Biology, ecology and evolution of gall-inducing Cynipidae. Biology, ecology and evolution of gall-Inducing arthropods. Science Publishers, USA, 573-642. https://www.researchgate.net/publication/284775519_The_biology_ecology_and_evolution_of_gall_wasps

Da Mata, R. A., Tidon, R., Côrtes, L. G., De Marco Júnior, P., & Diniz-Filho, J. a. F. (2009). Invasive and flexible: niche shift in the drosophilid Zaprionus indianus (Insecta, Diptera). Biological Invasions, 12(5), 1231–1241. https://doi.org/10.1007/s10530-009-9542-0

DAFF Biosecurity. (2013). Final pest risk analysis report for Drosophila suzukii, Department of Agriculture, Fisheries and Forestry, Canberra. Avalaible online at: https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/ba/plant/2013/drosophila-suzukii-pra/Final-PRA-report-Drosophila-suzukii.pdf

Davey (N.D.) Botryosphaeria Canker & Dieback. Available online at: https://www.davey.com/insect-disease-resource-center/botryosphaeria-canker-and-dieback/

DAWR. (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 online at: https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/biosecurity/risk-analysis/plant-reviews/final-report-thrips-orthotospoviruses.pdf

De Lillo, E., & Duso, C. (1996). 3.2.6 Currants and berries. In World crop pests (pp. 583–591). https://doi.org/10.1016/s1572-4379(96)80037-6

De Lillo, E., & Skoracka, A. (2009). What's "cool" on eriophyoid mites? Experimental and Applied Acarology, 51(1–3), 3–30. https://doi.org/10.1007/s10493-009-9297-4

De Oliveira, M. C., Bitencourt, J. D. A., & Silva Junior, J. C. (2023). Genetic diversity calibration in species of the genus Frankliniella: new cases of cryptic species. Bulletin of Insectology, 76(1). http://www.bulletinofinsectology.org/pdfarticles/vol76-2023-045-056oliveira.pdf

Demchak, K. & Swett, C. (2023) Blueberry Disease - Powdery Mildew, Not Symptoms You'd Expect. Pennsylvania State University College of Agricultural Sciences Extension. https://extension.psu.edu/blueberry-disease-powdery-mildew-not-symptoms-youd-expect

Demchak, K. (2023) Blueberry Disease - Blueberry Disease - Mummy Berry. Pennsylvania State University College of Agricultural Sciences Extension. https://extension.psu.edu/blueberry-disease-mummy-berry

Denman, S., Kirk, S., Moralejo, E., & Webber, J. (2009). Phytophthora ramorum and Phytophthora kernoviae on naturally infected asymptomatic foliage. Bulletin OEPP, 39(1), 105–111. https://doi.org/10.1111/j.1365-2338.2009.02243.x

Department of Agriculture, Fisheries and Forestry (DAFF) (2024) Australian Biosecurity Import Conditions: Case: Vaccinium spp. for use as nursery stock Effective 09 May 2024. Available online: https://bicon.agriculture.gov.au/BiconWeb4.0/ImportConditions/Conditions?EvaluatableElementId=755641&Path=UNDEFINED&UserContext=External&EvaluationStateId=e91ec9f6-0641-4427-8100-63c6a3fc2ce1&CaseElementPk=2203320&EvaluationPhase=ImportDefinition&HasAlerts=False&HasChangeNotices=True&IsAEP=False.

Department of Biodiversity, Conservations and Attractions (DBCA). (2022). Phytophthora dieback. Available online at: https://www.dbca.wa.gov.au/management/threat-management/plant-diseases/phytophthora-dieback

DeVisser, A. K., Vandervoort, C., Isaacs, R., & Wise, J. C. (2023). Systemic insecticides for control of stem gall wasp in highbush blueberry. Journal of Economic Entomology, 116(5), 1737–1749. https://doi.org/10.1093/jee/toad162

Dias, N. P., Montoya, P., & Nava, D. E. (2022). A 30-year systematic review reveals success in tephritid fruit fly biological control research. Entomologia Experimentalis Et Applicata, 170(5), 370–384. https://doi.org/10.1111/eea.13157

Diaz-Lara, A. & Martin, R.R. (2016) Blueberry fruit drop-associated virus: A new member of the family Caulimoviridae isolated from blueberry exhibiting fruit-drop symptoms. Plant Disease, 100 (11), 2211-2214.

Dickey, A. M., Kumar, V., Hoddle, M. S., Funderburk, J. E., Morgan, J. K., Jara-Cavieres, A., Shatters, R. G. J., Osborne, L. S., & McKenzie, C. L. (2015). The Scirtothrips dorsalis Species Complex: Endemism and Invasion in a Global Pest. PLoS ONE, 10(4), e0123747. https://doi.org/10.1371/journal.pone.0123747

Dossett, M., & Finn, C. E. (2010). Identification of Resistance to the Large Raspberry Aphid in Black Raspberry. Journal of the American Society for Horticultural Science J. Amer. Soc. Hort. Sci., 135(5), 438-444. Retrieved Mar 18, 2024. doi: https://doi.org/10.21273/JASHS.135.5.438.

Dransfield, B. & Brightwell, B. (2021) Ericaphis scammelli = Ericaphis fimbriata ssp. pernettyae Blueberry aphid. https://influentialpoints.com/Gallery/Ericaphis_scammelli_blueberry_aphid.htm.

Drummond, F., Ballman, E., & Collins, J. A. (2019). Population Dynamics of Spotted Wing Drosophila (Drosophila suzukii (Matsumura)) in Maine Wild Blueberry (Vaccinium angustifolium Aiton). Insects, 10(7), 205. https://doi.org/10.3390/insects10070205

Drumond, F. & Annis, S. University of Maine, University of Maine, School of Biology and Ecology, & Dept. of Plant, Soil and Environmental Sciences. (2009). Organic production of wild blueberries i. Insects and diseases. In Proc. IX Th IS on Vaccinium. https://d1wqtxts1xzle7.cloudfront.net/95239411/actahortic.2009.810.3520221204-1-1c28im-libre.pdf?1670157846=&response-content-disposition=inline%3B+filename%3DOrganic_Production_of_Wild_Blueberries_I.pdf&Expires=1716445967&Signature=P-Z44UgJJ9UYg0HQWG7YNAorkvhVDFmc28xOlyau-ANcOo0fTT-6q18cOhdV6DjhmCsoHJnXbPMpeO7gKsVYO26RJgFNFqefcQhV8brW6fOLEk1CfhB~4DUPu1AeG6HUEnuPb8GhJ6384rjg-girXBioIAZuy-zBkmOezVtZmFR74PSFclrqDU41aFMJ6R7j6PR9DFUv4NMNqw682KjBalff4wXI08KmJ9f2uJ480-BvEu-I5zvRMluU5bHs9WO8zj4EOK4lajlDqsMiDxRr3xiKFGzuqg5nmLKKDjYtruM0lyG6VDbmm8OkbwJN0f6PAYU70dpTqt267nvEj8Z5~Q__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

East, R. A., Willoughby, B., & Koller, M. (1983). Defoliation by grass grub beetles in waikato orchards. New Zealand Plant Protection, 36, 151–155. https://doi.org/10.30843/nzpp.1983.36.9634

Edland T. (1971) Wind dispersal of the winter moth larvae Operophtera brumata and its relevance to control measures. Norsk Entomologisk Tidsskrift, 18(2):103-107.

EFSA. EFSA Panel on Plant Health (2019) Pest categorisation of non-EU Margarodidae. EFSA Journal 17(4). doi: https://doi.org/10.2903/j.efsa.2019.5672.

Egan, S. P., Hood, G. R., Martinson, E. O., & Ott, J. R. (2018). Cynipid gall wasps. Current Biology, 28(24), R1370–R1374. https://doi.org/10.1016/j.cub.2018.10.028

Elfar, K., Torres, R., Diaz, G.A. & Latorre, B.A. (July 8, 2013) Characterization of Diaporthe australafricana and Diaporthe spp. Associated with Stem Canker of Blueberry in Chile. doi: https://doi.org/10.1094/PDIS-11-12-1030-RE

Elliott, L. (2005) Species Chrysoteuchia topiarius - Cranberry Girdler. BugGuide. Department of Plant Pathology, Entomology and Microbiology, Iowa State University. https://bugguide.net/node/view/23064.

Ellis, W.N. (2021) Erysiphe penicillata. Plant Parasites of Europe. https://bladmineerders.nl/parasites/fungi/dikarya/ascomycota/pezizomycotina/leotiomycetes/leotiomycetidae/helotiales/erysiphaceae/erysiphe/erysiphe-penicillata/

Ellis, W.N. (2022) Pestalotia photiniae. Plant Parasites of Europe. https://bladmineerders.nl/parasites/fungi/dikarya/ascomycota/pezizomycotina/sordariomycetes/xylariomycetidae/amphisphaeriales/amphisphaeriaceae/pestalotia/pestalotia-photiniae/

El-Wahab, A. S. E.-D. A., El-Sheikh, M. A.-K., & Elnagar, S. (2011). First record of Frankliniella occidentalis and Impatiens necrotic spot virus in Egypt. JLS, 5, 690-696. https://www.researchgate.net/profile/Michael-Korostishevsky/publication/257654776_CCR5-CCR2_Gene_Polymorphisms_in_Ethiopian_Jews_Population_Divergence_and_Its_Relevance_to_HIV-1_Infection_Resistance/links/00b7d525a8b2326d8b000000/CCR5-CCR2-Gene-Polymorphisms-in-Ethiopian-Jews-Population-Divergence-and-Its-Relevance-to-HIV-1-Infection-Resistance.pdf#page=18

EPPO. (2003). Anthonomus signatus. Data Sheets on Quarantine Pests. Available online at: https://gd.eppo.int/taxon/ANTHSI/documents

EPPO. (2020). Anoplophora chinensis. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/ANOLCN/datasheet

EPPO. (2020). Drosophila suzukii. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/DROSSU/datasheet

EPPO. (2020). Phytophthora ramorum. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/PHYTRA/datasheet

EPPO. (2020). Popillia japonica. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/POPIJA/datasheet

EPPO. (2021). 'Candidatus Phytoplasma solani'. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/PHYPSO/datasheet

EPPO. (2021). Conotrachelus nenuphar. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/CONHNE/datasheet

EPPO. (2021). Oemona hirta. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/OEMOHI/datasheet

EPPO. (2022). Dasineura oxycoccana (DASYVA). EPPO Global Database. Available online at: https://gd.eppo.int/taxon/DASYVA/distribution

EPPO. (2022). Longidorus diadecturus. EPPO datasheets on pests recommended for regulation. Available online at:

https://gd.eppo.int/taxon/LONGDI/datasheet

EPPO. (2022). Phytophthora kernoviae. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/PHYTKE/datasheet

EPPO. (2022). Scirtothrips citri. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/SCITCI/datasheet

European and Mediterranean Plant Protection Organisation (EPPO) (1996) Eurhizococcus brasiliensis(EURHBR) Hosts. https://gd.eppo.int/taxon/EURHBR/hosts.

European and Mediterranean Plant Protection Organisation (EPPO) (2001) Aporia crataegi(APORCR). https://gd.eppo.int/taxon/APORCR

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Adoxophyes orana(CAPURE). https://gd.eppo.int/taxon/CAPURE

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Archips argyrospilus(ARCHAR). https://gd.eppo.int/taxon/ARCHAR

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Archips podana(CACOPO). https://gd.eppo.int/taxon/CACOPO

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Archips rosana(CACORO). https://gd.eppo.int/taxon/CACORO

European and Mediterranean Plant Protection Organisation (EPPO) (2024) Argyrotaenia ljungiana(ARGTPU) (ARGTVE). https://gd.eppo.int/taxon/ARGTPU/categorization

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Argyrotaenia velutinana(ARGTVE). https://gd.eppo.int/taxon/ARGTVE

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Choristoneura rosaceana(CHONRO). https://gd.eppo.int/taxon/CHONRO

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Crambus hortuellus(CRAMHO). https://gd.eppo.int/taxon/CRAMHO

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Grapholita packardi(LASPPA). https://gd.eppo.int/taxon/LASPPA/hosts

European and Mediterranean Plant Protection Organisation (EPPO) (2016) DROPSA project. Strategies to develop effective, innovative and practical approaches to protect major European fruit crops from pests and pathogens (grant agreement no. 613678). https://gd.eppo.int/download/doc/1240_minids_TORTEX.pdf.

European and Mediterranean Plant Protection Organisation (EPPO) (2018) Pest categorisation of Grapholita packardi. https://pra.eppo.int/pra/33e15d0f-d1dc-4a23-80b1-5734170dd91d

European and Mediterranean Plant Protection Organisation (EPPO) (2015) Godronia cassandrae. https://gd.eppo.int/taxon/GODRCA

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Nepovirus nicotianae(TRSV00). https://gd.eppo.int/taxon/TRSV00

European and Mediterranean Plant Protection Organisation (EPPO) (2002) Nepovirus persicae(PRMV00). https://gd.eppo.int/taxon/PRMV00

European and Mediterranean Plant Protection Organisation (EPPO) (2013) Blunervirus vaccinii(BNRBV0). https://gd.eppo.int/taxon/BNRBV0

European and Mediterranean Plant Protection Organisation (EPPO) (2022) Nepovirus nicotianae(TRSV00) Data Sheet. https://gd.eppo.int/taxon/TRSV00/datasheet

European and Mediterranean Plant Protection Organisation (EPPO) (2023) Nepovirus myrtilli (BLMOV0) Data Sheet. https://gd.eppo.int/taxon/BLMOV0/datasheet

EPPO. (2023). Scirtothrips dorsalis. EPPO datasheets on pests recommended for regulation. Available online at: https://gd.eppo.int/taxon/SCITDO/datasheet

European and Mediterranean Plant Protection Organization (EPPO) (2002) Erysiphe penicillata. https://gd.eppo.int/taxon/MCRSPE.

Evans, D. (1970) Life History and Immature Stages of Pandemis cerasana (Lepidoptera: Tortricidae). The Canadian Entomologist. 102: 1597-1603.

Eyre, C. A., Kozanitas, M., & Garbelotto, M. (2013). Population Dynamics of Aerial and Terrestrial Populations of Phytophthora ramorum in a California Forest Under Different Climatic Conditions. Phytopathology, 103(11), 1141–1152. https://doi.org/10.1094/phyto-11-12-0290-r

Eyre, D., & Haack, R. (2017). Invasive cerambycid pests and biosecurity measures. ResearchGate. https://www.researchgate.net/publication/318921103_Invasive_cerambycid_pests_and_biosecurity_measures

Feng, B., Li, P., Chen, D. & Ding, C. (2024) First Report of the Occurrence of Diaporthe nobilis Causing Postharvest Fruit Rot on 'Shine Muscat' Grape in Yuncheng, China. Plant Disease. The American Phytopathological Society. doi: https://doi.org/10.1094/PDIS-07-23-1312-PDN

Finn, E. (2003). Developing integrated pest management (IPM) techniques for managing key insect pests of blueberries in the southeastern united states (Doctoral dissertation, University of Florida).

Fisher, J. R. (2006). Fecundity, longevity and establishment of Otiorhynchus sulcatus (Fabricius) and Otiorhynchus ovatus (Linnaeus) (Coleoptera: Curculionidae) from the Pacific North-west of the United States of America on selected host plants. Agricultural and Forest Entomology, 8(4), 281–287. https://doi.org/10.1111/j.1461-9563.2006.00309.x

Fitzpatrick, S. M. (2008, July). Insect life histories in fruit, shoot and root environments of cranberry and blueberry. Acta Horticulturae, 810, 231–250. https://doi.org/10.17660/actahortic.2009.810.31

Fitzpatrick, S. M. (2008, July). Insect life histories in fruit, shoot and root environments of cranberry and blueberry. In IX International Vaccinium Symposium 810 (pp. 231-250).

Fitzpatrick, S.M. & Troubridge, J.T. (1992) Relative Efficacies of Two Commercial Pheromone Blends for Monitoring the Blackheaded Fireworm (Lepidoptera: Tortricidae) of Cranberries. Journal of Economic Entomology, 85(3), 947–949. doi:10.1093/jee/85.3.947.

Fitzpatrick, S.M. (2006) Delayed mating reduces fecundity of blackheaded fireworm, Rhopobota naevana, on cranberry. Entomologia Experimentalis et Applicata 120 (3): 245-250. doi: https://doi.org/10.1111/j.1570-7458.2006.00452.x.

Flores, R., Hernández, C., De Alba, Á. E. M., Daròs, J., & Di Serio, F. (2005). Viroids and Viroid-Host interactions. Annual Review of Phytopathology, 43(1), 117–139. https://doi.org/10.1146/annurev.phyto.43.040204.140243

Flores-Felix, J.D., Menendez, E., Peix, A., Garcia-Fraile, P. & Velazquez, E. (2020) History and current taxonomic status of genus Agrobacterium. Systemic and Applied Microbiology 43. doi: https://doi.org/10.1016/j.syapm.2019.126046.

Foundation for Arable Research (FAR). (2002). Grass grub lifecycle and control. Cereals, No. 109. Avalaible online at:

https://assets.far.org.nz/uploads/C109.pdf

Froeschner, R. C. (2023). Heteropteran. Encyclopedia Britannica. Available online at: https://www.britannica.com/animal/heteropteran

Fulcher, A., Gauthier, N. W., Klingeman, W. E., Hale, F. A., & White, S. W. (2015). Blueberry Culture and Pest, Disease, and Abiotic Disorder Management during Nursery Production in the Southeastern U.S.: A Review. Journal of Environmental Horticulture, 33(1), 33–47. https://doi.org/10.24266/0738-2898-33.1.33

Fulcher, A., Gauthier, N. W., Klingeman, W. E., Hale, F., & White, S. A. (2015). Blueberry Culture and Pest, Disease, and Abiotic Disorder Management during Nursery Production in the Southeastern U.S.: A Review. Journal of Environmental Horticulture, 33(1), 33–47. https://doi.org/10.24266/0738-2898-33.1.33

Galbreath, R.A., Benn, M.H., Young, H., Holt, H. & Naturforsch, Z. (1985) Sex Pheromone Components in the New Zealand Greenheaded Leafroller Planotortrix excessana (Lepidoptera: Tortricidae). Zeitschrift für Naturforschung C 40.3-4 (1985): 266-271.

Galetto, L., Pegoraro, M., Marzachì, C., Rossi, E., Lucchi, A., & Bosco, D. (2019). Potential role of the alien planthopper Ricania speculum as vector of Flavescence dorée phytoplasma. European Journal of Plant Pathology, 154(4), 1103-1110.

Gambaro, P.I., 1962. Observations on the bionomics of Argyrotaenia pulchellana and Adoxophyes orana in the Verona district. (Observations on the biology of Argyrotaenia pulchellana Hw. (=Eulia politana Auct.) and Adoxophyes reticulana Hb. (Capua reticulana Auct.) in the Verona area.) Bulletin of Agricultural Zoology and Silkworm Farming, 41-20.

GBIF (2023a) "015372749_112451_1092729_157832_NoStatus" - Amphorophora rubitoxica Knowlton, 1954 collected in Mexico by The Trustees of the Natural History Museum, London (licensed under http://creativecommons.org/licenses/by/4.0/)

GBIF (2023b) "015372750_112451_1092729_157832_NoStatus" - Amphorophora rubitoxica Knowlton, 1954 collected in Mexico by The Trustees of the Natural History Museum, London (licensed under http://creativecommons.org/licenses/by/4.0/).

Gibson, I. (2012) Monilinia oxycocci Sclerotiniaceae. In Klinkenberg, Brian. (Editor) 2020. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver.

Gillespie, D.R. (1985) Impact of feeding by Lepidoptera larvae on the production of highbush blueberry in the Lower Fraser Valley, British Colombia. The Canadian Entomologist 117 (8): 949-953. doi: 10.4039/Ent117949-8.

Gilligan, T.M. & Epstein, M.E. (2014) Archips argyrospila. Tortricids of Agricultural Importance. https://idtools.org/id/tortai/Archips_argyrospila.htm

Gilligan, T.M. & Epstein, M.E. (2014) Archips rosana. Tortricids of Agricultural Importance. https://idtools.org/id/leps/tortai/Archips_rosana.htm

Gilligan, T.M. & Epstein, M.E. (2014) Argyrotaenia ljungiana. Tortricids of Agricultural Importance. https://idtools.org/id/leps/tortai/Argyrotaenia_ljungiana.htm

Gilligan, T.M. & Epstein, M.E. (2014) Argyrotaenia velutinana. Tortricids of Agricultural Importance. https://idtools.org/id/tortai/Argyrotaenia_velutinana.htm

Gilligan, T.M. & Epstein, M.E. (2014) Choristoneura rosaceana. Tortricids of Agricultural Importance. https://idtools.org/id/leps/tortai/Choristoneura_rosaceana.htm

Gilligan, T.M. & Epstein, M.E. (2014) Clepsis persicana. Tortricids of Agricultural Importance. https://idtools.org/id/leps/tortai/Clepsis_persicana.htm

Gilligan, T.M. & Epstein, M.E. (2014) Ctenopseustis obliquana. Tortricids of Agricultural Importance. https://idtools.org/id/leps/tortai/Ctenopseustis_obliquana.htm

Gilligan, T.M., Epstein, M. (2014) Tortricids of Agricultural Importance. Interactive Keys developed in

Lucid 3.5. http://idtools.org/id/leps/tortai/index.html.

Glawe, D. (2006) Synopsis of genera of Erysiphales (powdery mildew fungi) occurring in the Pacific Northwest. Pacific Northwest Fungi 1(12): 1-27. Available: https://www.researchgate.net/publication/228656219_Synopsis_of_genera_of_Erysiphales_powdery_mildew_fungi_occurring_in_the_Pacific_Northwest

Glover, D., & McAllister, D. (1960). Transmission Studies of Alfalfa Witches' Broom Virus in Utah1. Agronomy Journal, 52(2), 63-65.

Government of Canada. (2019). Rhagoletis mendax (Blueberry Maggot) - Fact sheet. Canadian Food Inspection Agency. Avalaible online at: https://inspection.canada.ca/plant-health/invasive-species/insects/blueberry-maggot/fact-sheet/eng/1328330175586/1328330543631

Government of Canada. (2020). D-02-04: The Blueberry Certification Program and Domestic Phytosanitary Requirements to Prevent the Spread of Blueberry Maggot (Rhagoletis mendax) within Canada. https://inspection.canada.ca/plant-health/invasive-species/directives/horticulture/d-02-04/eng/1320046578973/1320046655958#ch2_1

Grabowski, M. (2019) Blueberry witches' broom. University of Minnesota Extension. https://extension.umn.edu/plant-diseases/blueberry-witches-broom

Grousset, F., Wilstermann, A., Steffen, K., Petter, F., Schrader, G., & Suffert, M. (2016). DROPSA Deliverable 1.3 Report for Vaccinium – Fruit pathway and Alert List. EPPO. Available online at: https://pra.eppo.int/pra/37f27052-7eb4-478b-aa55-961904e1316e

Gullan, P. J., & Martin, J. H. (2009). Sternorrhyncha. In Elsevier eBooks (pp. 957–967). https://doi.org/10.1016/b978-0-12-374144-8.00253-8

Gyeltshen, K., Hodges, A., & Bania, C. (2019). Japanese beetle. Featured Creatures, Publication Number: EENY-350. Available online at: https://entnemdept.ufl.edu/creatures/orn/beetles/japanese_beetle.htm

Hall, D.W., Buss, L. & Butler, J.F. (2014) Fir tussock moth (Orgyia detrita), Whitemarked tussock moth (Orgyia leucostigma) and Definite tussock moth (Orgyia definita). Featured Creatures. University of Florida. https://entnemdept.ufl.edu/creatures/URBAN/MEDICAL/tussock_moths.htm

Hall, K. (2009) Rhopobota naevana - Holly Tortrix. Bug Guide. Iowa State University Department of Plant Pathology, Entomology and Microbiology. https://bugguide.net/node/view/316107.

Hall, L. (2012) Blueberry Thrips - Cooperative extension: Maine Wild Blueberries - University of Maine Cooperative Extension. Available online: https://extension.umaine.edu/blueberries/factsheets/insects/202-blueberry-thrips/

Hammond, C. J., Pérez-López, E., Town, J. R., Vincent, C., Moreau, D. L., & Dumonceaux, T. (2021). Detection of blueberry stunt phytoplasma in Eastern

Canada using cpn60-based molecular diagnostic assays. Scientific Reports, 11(1). https://doi.org/10.1038/s41598-021-01439-4

Harman, S. W. (1940). Bulletin: Number 692: The Cranberry Rootworm as an Apple Pest. Cornell University. https://ecommons.cornell.edu/server/api/core/bitstreams/1e6a26eb-ae88-4b02-b1d3-f31e02f61fa7/content

Haviland, D. R. (2014). Masked Chafer (White Grub). Agriculture: Blueberry Pest Management Guidelines, UC IPM. Available online at: https://ipm.ucanr.edu/agriculture/blueberry/masked-chafer-white-grub/

Haviland, D. R., & Hernandez, N. M. (2012). Development of management programs for white grubs in California blueberries. International journal of fruit science, 12(1-3), 114-123. https://doi.org/10.1080/15538362.2011.619355

Haviland, D. R., Rill, S. M., & Morse, J. G. (2009). Southern highbush blueberries are a new host for Scirtothrips citri (Thysanoptera: Thripidae) in California. Florida Entomologist, 92(1), 147–149. https://doi.org/10.1653/024.092.0122

Haviland, D. R., Rill, S. M., & Morse, J. G. (2016). Impact of citrus thrips (Thysanoptera: thripidae) on the growth and productivity of southern highbush blueberries in California. Journal of Economic Entomology, 109(6), 2454–2462. https://doi.org/10.1093/jee/tow203

Havill, N.P., Elkinton, J., Andersen, J.C., Hagen, S.B., Broadley, H.J., Boettner, G.J. & Caccone, A. (2017) Asymmetric hybridization between non-native winter moth, Operophtera brumata (Lepidoptera: Geometridae), and native Bruce spanworm, Operophtera bruceata, in the Northeastern United States, assessed with novel microsatellites and SNPs. Bulletin of Entomological Research 107: 241-250. doi: 10.1017/S0007485316000857.

Hayden, K. J., Hardy, G. E. S. J., & Garbelotto, M. (2013). Oomycete diseases. In Infectious forest diseases (pp. 519-546). Wallingford UK: CABI. https://nature.berkeley.edu/garbelotto/downloads/Gonthier_Ch25.pdf

Hebert, C. & St-Antoine, L. (2012) Oviposition trap to sample eggs of Operophthera bruceata (Lepidoptera: Geometridae) and other wingless geometrid species. The Canadian Entomologist. 131 (4). pp. 557 - 565. doi: https://doi.org/10.4039/Ent131557-4.

Helvacı, M. (2021). Characteristics of dipteran insects. In IntechOpen eBooks. https://doi.org/10.5772/intechopen.96448

Heppner, J. B., Heppner, J. B., Capinera, J. L., Ellis, J., Alekseev, A. N., Weintraub, P. G., … Shirk, P. D. (2008). Variegated Cutworm, Peridroma saucia (Hübner) (Lepidoptera: Noctuidae). Encyclopedia of Entomology, 4038–4041. doi:10.1007/978-1-4020-6359-6_3936.

Hilario, S., Lopes, A., Santos, L. & Alves, A. (2019) Botryosphaeriaceae species associated with blueberry stem blight and dieback in the Centre Region of Portugal. European Journal of Plant Pathology, doi:10.1007/s10658-019-01860-6

Hogenhout, S. A., Oshima, K., Ammar, E., Kakizawa, S., Kingdom, H. N., & Namba, S. (2008). Phytoplasmas: bacteria that manipulate plants and insects. Molecular Plant Pathology, 9(4), 403–423. https://doi.org/10.1111/j.1364-3703.2008.00472.x

Horst, R.K. (2013) Leaf Spots. Westcott's Plant Disease Handbook, 201–236.doi:10.1007/978-94-007-2141-8_33

Howell, J.F. (1979) Phenology of the adult spotted cutworm in the Yakima Valley. Environ. Entomol. 8, 1065–1069. doi: https://doi.org/10.1093/ee/8.6.1065

Hulbert, D., Jackson, M. D., Hood, G. R., & Smith, J. J. (2018). Description of a New Rhagoletis (Diptera: tephritidae) species in The tabellaria Species group. Insect Systematics and Diversity, 2(6). https://doi.org/10.1093/isd/ixy016

Hutchinson, M. (1955). An Ecological Study of the Leafhopper Vectors of Blueberry-Stunt. Journal of Economic Entomology, 48(1), 1-8. cabidigitallibrary.org/doi/full/10.5555/19560500063

Iglesias, L. E. (2013). Integrated Management Strategies for Spotted Wing Drosophila, Drosophila Suzukii, in Southern Highbush Blueberries (Doctoral dissertation, University of Florida). https://www.researchgate.net/profile/Lindsy-Iglesias/publication/310749366_Integrated_management_strategies_for_spotted_wing_drosophila_Drosophila_suzukii_in_southern_highbush_blueberries/links/5835b59b08ae102f073d616e/Integrated-management-strategies-for-spotted-wing-drosophila-Drosophila-suzukii-in-southern-highbush-blueberries.pdf

Ilyukhin, E. & Ellouze, W. (2024) First Report of Neofusicoccum ribis Causing Cankers and Dieback Diseases on Apricot Trees in Canada and Worldwide. Plant Disease. The American Phytopathological Society 108 (1). doi: https://doi.org/10.1094/PDIS-08-23-1588-PDN

Ioriatti, C., Lucchi, A., Varela, L.G., 2012. Grape berry moths in western European vineyards and their recent movement into the new world. In: Arthropod management in vineyards: pests, approaches and future directions, [ed. by Bostanian, N.J., Vincent C., Isaac R.]. Dordrecht, Netherlands: Springer. 339-359.

Isaacs, R. & Van Timmeren, S. (2009) Monitoring and Temperature-Based Prediction of the Whitemarked

Tussock Moth (Lepidoptera: Lymantriidae) in Blueberry. Horticultural Entomology 102(2): 637-645.

Isaacs, R., Fanning, P., Van Timmeren, S., Perkins, J., & Garcia-Salazar, C. (2020). Biology and management of stem gall wasp in highbush blueberries. MSU Extension Bulletin E3443. Avalaible online at: https://www.canr.msu.edu/blueberries/uploads/files/BlueberryStemGallWasp-WEB-final.pdf

Isaacs, R., Fanning, P., Van Timmeren, S., Perkins, J., & Garcia-Salazar, C. (2020). Biology and management of stem gall wasp in highbush blueberries. MSU Extension Bulletin E3443. Avalaible online at: https://www.canr.msu.edu/blueberries/uploads/files/BlueberryStemGallWasp-WEB-final.pdf

Isogai, M., Miyoshi, K., Watanabe, M., & Yoshikawa, N. (2020). Characterization of horizontal transmission of blueberry latent spherical virus by pollen. Archives of Virology, 165(12), 2807–2815. https://doi.org/10.1007/s00705-020-04818-w

Isogai, M., Tatuto, N., Ujiie, C., Watanabe, M., & Yoshikawa, N. (2011). Identification and characterization of blueberry latent spherical virus, a new member of subgroup C in the genus Nepovirus. Archives of Virology, 157(2), 297–303. https://doi.org/10.1007/s00705-011-1177-7

Jackson, T. A. (2009). Scarabs as pests: a continuing problem. ResearchGate. https://doi.org/10.1649/0010-065X(2006)60

Jagdale, G. B., Holladay, T., Brannen, P. M., Cline, W. O., Agudelo, P., Nyczepir, A. P., & Noe, J. P. (2013, June 1). Incidence and Pathogenicity of Plant-Parasitic Nematodes Associated with Blueberry (Vaccinium spp.) Replant Disease in Georgia and North Carolina. PubMed Central (PMC). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3700742/

Jeger, M., Bragard, C., Caffier, D., Candresse, T., Chatzivassiliou, E., Dehnen-Schmutz, K., Gilioli, G., Grégoire, J., Miret, J. a. J., Navarro, M. N., Niere, B., Parnell, S., Potting, R., Rafoss, T., Rossi, V., Urek, G., Van Bruggen, A., Van Der Werf, W., West, J., Winter, S., Czwienczek, E., Aukhojee, M., & MacLeod, A. (2017). Pest categorisation of Anthonomus signatus. EFSA Journal, 15(7). https://doi.org/10.2903/j.efsa.2017.4882

Jeger, M., Bragard, C., Caffier, D., Candresse, T., Chatzivassiliou, E., Dehnen-Schmutz, K., Gilioli, G., Grégoire, J., Miret, J. a. J., Navarro, M. N., Niere, B., Parnell, S., Potting, R., Rafoss, T., Rossi, V., Urek, G., Van Bruggen, A., Van Der Werf, W., West, J., Winter, S., Gardi,C., & MacLeod, A. (2018). Pest

categorisation of Scirtothrips citri. EFSA Journal, 16(3). https://doi.org/10.2903/j.efsa.2018.5189

Jeger, M., Bragard, C., Caffier, D., Candresse, T., Chatzivassiliou, E., Dehnen-Schmutz, K., Gilioli, G., Grégoire, J., Miret, J. a. J., MacLeod, A., Navarro, M. N., Parnell, S., Potting, R., Rafoss, T., Rossi, V., Van Bruggen, A., Van Der Werf, W., West, J. S., Winter, S., Urek, G., Kaluski, T., & Niere, B. (2017). Pest categorisation of Longidorus diadecturus. EFSA Journal, 15(12). https://doi.org/10.2903/j.efsa.2017.5112

Jonko, C. (2024) Acleris laterana (Fabricus, 1794). Lepidoptera Mundi. https://lepidoptera.eu/species/2777.

Jung, T. S., Pérez-Sierra, A., Durán, Á., Jung, M. H., Balcì, Y., & Scanu, B. (2018). Canker and decline diseases caused by soil- and airborne Phytophthora species in forests and woodlands. Persoonia, 40(1), 182–220. https://doi.org/10.3767/persoonia.2018.40.08

Kado, C. I. (2016). CHAPTER 4: Symptoms caused by Plant-Pathogenic bacteria. In The American Phytopathological Society eBooks (pp. 63–77). https://doi.org/10.1094/9780890545034.004

Kawahara, A. Y., Plotkin, D., Hamilton, C. A., Gough, H. M., St Laurent, R. A., Owens, H. L., Homziak, N. T., & Barber, J. R. (2017). Diel behavior in moths and butterflies: a synthesis of data illuminates the evolution of temporal activity. Organisms Diversity & Evolution, 18(1), 13–27. https://doi.org/10.1007/s13127-017-0350-6

Kenis, M., Tonina, L., Eschen, R., Van Der Sluis, B., Sancassani, M., Mori, N., Haye, T., & Helsen, H. (2016). Non-crop plants used as hosts by Drosophila suzukii in Europe. Journal of Pest Science, 89(3), 735–748. https://doi.org/10.1007/s10340-016-0755-6

Klem, C.C. & Zaspel, J. (2019) Pest Injury Guilds, Lepidoptera, and Placing Fruit-Piercing

Moths in Context: A Review. Annals of the Entomological Society of America. doi: 10.1093/aesa/saz031.

Koetter, R. & Grabowski, M. (2019) Sirococcus blight of conifers. University of Minnesota Extension. https://extension.umn.edu/plant-diseases/sirococcus-blight-conifers

Konjevic, A. (2022). Importance of Monitoring of Brown Marmorated Stink Bug (HalyomorphaH halys) in Blueberry Orchards. Biodiversity Online J. 2(3). BOJ. 000539. doi: 10.31031/BOJ.2022.02.000539.

Kuzmanović, N., Behrens, P., Idczak, E., Wagner, Ş., Götz, M., Spröer, C., Bunk, B., Overmann, J., & Smalla, K. (2019). A Novel Group of Rhizobium tumorigenes-Like Agrobacteria Associated with Crown Gall Disease of Rhododendron and Blueberry. Phytopathology, 109(11), 1840–1848. https://doi.org/10.1094/phyto-05-19-0167-r

Lahiri, S., Kaur, G., & Busuulwa, A. (2024). Field efficacy of a biopesticide and a predatory mite for suppression of Scirtothrips dorsalis (Thysanoptera: Thripidae) in strawberry. Journal of Economic Entomology, 117(4), 1623–1627. https://doi.org/10.1093/jee/toae144

Lampasona, T. P., Rodriguez-Saona, C., Leskey, T. C., & Nielsen, A. L. (2020). A Review of the biology, ecology, and management of plum curculio (Coleoptera: Curculionidae). Journal of Integrated Pest Management, 11(1), 22. https://doi.org/10.1093/jipm/pmaa018

Landolt, P.J. (2000) New Chemical Attractants for Trapping Lacanobia subjuncta, Mamestra configurata, and Xestia c-nigrum (Lepidoptera: Noctuidae). Journal of Economic Entomology, 93(1), 101–106. doi:10.1603/0022-0493-93.1.101

Landolt, P.J., Guedot, C. & Zack, R.S. (2010) Spotted cutworm, Xestia c-nigrum (L.) (Lepidoptera: Noctuidae)

responses to sex pheromone and blacklight. Journal of Applied Entomology. 135: 593-500. Available:https://www.researchgate.net/profile/Christelle-Guedot/publication/230218299_Spotted_cutworm_Xestia_c-nigrum_L_Lepidoptera_Noctuidae_responses_to_sex_pheromone_and_blacklight/links/5a58cec6a6fdccbec10a35e4/Spotted-cutworm-Xestia-c-nigrum-L-Lepidoptera-Noctuidae-responses-to-sex-pheromone-and-blacklight.pdf

Langille RH, Forsythe HY. BIOLOGY OF THE BLUEBERRY THRIPS FRANKLINIELLA VACCINII AND CATINATHRIPS KAINOS IN MAINE (THYSANOPTERA: THRIPIDAE). The Canadian Entomologist. 1972;104(11):1781-1786. doi:10.4039/Ent1041781-11

Lee, D., Park, Y., & Leskey, T. C. (2019). A review of biology and management of Lycorma delicatula (Hemiptera: Fulgoridae), an emerging global invasive species. Journal of Asia-Pacific Entomology/Journal of Asia Pacific Entomology, 22(2), 589–596. https://doi.org/10.1016/j.aspen.2019.03.004

Lewis, T. & Institute of Arable Crops Research. (1990). FEEDING, FLIGHT AND DISPERSAL IN THRIPS. In Proceedings [Conference-proceeding]. https://www.nrs.fs.usda.gov/pubs/gtr/gtr_ne147/gtr_ne147_063.pdf

Li, Y., Tan, P. & Zhao, D. (2017) Diaporthe nobilis, a new record on Camellia sinensis in Guizhou Province, China. Mycosphere 8(1): 1-8. doi: 10.5943/mycosphere/8/1/1

Liburd, O. E., Arevalo, H. A., & Rhodes, E. M. (2005). Integrated strategies for controlling flower thrips in southern highbush blueberries. Publication IPM-140. University of Florida, Institute of Food and Agricultural Sciences, Extension, Gainesville, Florida.

Lightle, D. & Lee, J. (2013) Large Raspberry Aphid Amphorophora agathonica. PNW 648. A Pacific Northwest Extension Publication. Oregon State University, University of Idaho and Washington State University. https://extension.oregonstate.edu/sites/default/files/documents/pnw648.pdf

Lopez, L., & Liburd, O. E. (2020). Injury to southern highbush blueberries by southern red mites and management using various miticides. Insects, 11(4), 233. https://doi.org/10.3390/insects11040233

Louzada, R.S., Muller, F.A., da Silva Goncalves, R. & Nava, D.E. (2011) Occurrence and biology of Tolype innocens (Burmeister) on blueberry. Plant Protection. Rev. Bras. Frutic. 33(1). doi: https://doi.org/10.1590/S0100-29452011005000031

Lowery, D.T., French, C.J. & Bernardy, M. (2007) Nicotiana occidentalis: A New Herbaceous Host for Blueberry scorch virus. Disease Notes 19 Feb 2007. doi: https://doi.org/10.1094/PD-89-0205A.

MacPhee, A., Gaul, S., & Ragab, M. T. H. (1982). Control of blueberry thrips, frankliniella vaccinii morgan, with permethrin and effect on yield and residue in fruit. Journal of Environmental Science and Health, Part B, 17(2), 183–193. https://doi.org/10.1080/03601238209372311

Madeiras, A. & Schloemann, S. (2020) Blueberry IPM - Botrytis Blight/Grey Mold (Botrytis cinerea and B. pseudocinerea). University of Massachusetts Amherst Centre for Agriculture, Food and the Environment Umass Extension Fruit Program. https://ag.umass.edu/sites/ag.umass.edu/files/fact-sheets/pdf/blueberry_ipm_-_botrytis_blight_final_0.pdf

Madeiras, A. & Schloemann, S. (2020) Blueberry IPM - Witches' Broom. University of Massachusetts Amherst Centre for Agriculture, Food and the Environment Umass Extension Fruit Program. https://ag.umass.edu/fruit/fact-sheets/blueberry-ipm-witches-broom-0

Mahr, D.L. (2005) Cranberry Girdler Chrysoteuchia topiaria. University of Wisconsin-Madison.

Maier, C. (1988) Life Cycle of Coptodisca negligens (Lepidoptera: Heliozelidae) on Cranberry. Journal of Economic Entomology 81 (2): 497-500. doi: 10.1093/jee/81.2.497.

Maramorosch, K. (1955) Transmission of Blueberry-stunt Virus by Scaphytopius magdalensis. Journal of Economic Entomology,Vol. 48, No. 1, 106. cabidigitallibrary.org/doi/full/10.5555/19560500810.

Martin, R., Polashock, J.J. & Tzanetakis, I.E. (2012) New and emerging viruses of blueberry and cranberry. Viruses 4(11):2831-52. doi: 10.3390/v4112831.

Martin, R.R. & Tzanetakis, I.E. (2018) High Risk Blueberry Viruses by Region in North America; Implications for Certification, Nurseries, and Fruit Production. Viruses 10 (7): 342. doi: 10.3390/v10070342.

McCleod, R. (2005) SSpecies Clepsis persicana - White Triangle Tortrix. BugGuide. Department of Plant Pathology, Entomology and Microbiology, Iowa State University. https://bugguide.net/node/view/25189.

McClure, M.S. (1980) Role of Wild Host Plants in the Feeding, Oviposition, and Dispersal of Scaphytopius acutus (Homoptera: Cicadellidae), a Vector of Peach X-Disease , Environmental Entomology, Volume 9, Issue 3, 1 June, Pages 283–292, https://doi.org/10.1093/ee/9.3.283

Mehle, N., Kavčič, S., Mermal, S., Vidmar, S., Pompe Novak, M., Riedle-Bauer, M., Brader, G., Kladnik, A., & Dermastia, M. (2022). Geographical and Temporal Diversity of 'Candidatus Phytoplasma solani'in Wine-Growing Regions in Slovenia and Austria. Frontiers in Plant Science, 13, 889675. https://doi.org/10.3389%2Ffpls.2022.889675

Michigan State University, (N.D.)Disease Management: Powdery mildew Microsphaera vaccinii (fungus). Michigan State University College of Agriculture and Natural Resources. https://www.canr.msu.edu/uploads/files/Powdery%20mildew.pdf.

Michigan State University, (N.D.)Disease Management: Witches' broom Pucciniastrum goeppertianum (fungus). Michigan State University College of Agriculture and Natural Resources. https://www.canr.msu.edu/uploads/files/Witches%20broom.pdf.

Mitchell, P. L. (2004). Heteroptera as vectors of plant pathogens. Neotropical Entomology/Neotropical Entomology, 33(5), 519–545. https://doi.org/10.1590/s1519-566x2004000500001

Mitrović, M., Marinković, S., Cvrković, T., Jović, J., Krstić, O., & Jakovljević, M. (2020).A toolkit for risk assessment integration in modeling a management strategy for stolbur phytoplasma associated diseases in sustainable agriculture. The Institute for Plant Protection and Environment (IPPE). https://izbis.bg.ac.rs/eng/stolbur-phytoplasma-compendium.php

Mitrović, M., Marinković, S., Cvrković, T., Jović, J., Krstić, O., & Jakovljević, M. (2022). Framework for risk assessment of 'Candidatus Phytoplasma solani' associated diseases outbreaks in agroecosystems in Serbia. Journal of Plant Pathology, 104(2), 537–552. https://doi.org/10.1007/s42161-022-01055-9

Morse, J. G., & Hoddle, M. S. (2006). INVASION BIOLOGY OF THRIPS. Annual Review of Entomology, 51(1), 67–89. https://doi.org/10.1146/annurev.ento.51.110104.151044

Moths and Butterflies of New Zealand (N.D.) Liothula omnivora (Common bag-moth). https://www.nzbutterflies.org.nz/species-info/liothula-omnivora/. Viewed 29/04/2024.

Mound, L. A., Wang, Z., Lima, É. F. B., & Marullo, R. (2022). Problems with the Concept of "Pest" among the Diversity of Pestiferous Thrips. Insects, 13(1), 61. https://doi.org/10.3390/insects13010061

Mound, L.A., Hoddle, M.S. & Hastings, A. (2019). Thysanoptera Californica - Thrips of California. Lucidcentral.org, Identic Pty Ltd, Queensland, Australia. https://keys.lucidcentral.org/keys/v3/thrips_of_california_2019/the_key/key/california_thysanoptera_2019/Media/Html/entities/frankliniella_minuta.htm

Munda, A. (2011) Monilinia pathogens of cultivated and native Vaccinium species in Slovenia. Acta Agriculturae Slovenica, 97(2). doi: https://doi.org/10.2478/v10014-011-0005-9

Munitz, M.S., Garrido, C.E., Gonzalez, H.H.L., Resnik, S.L., Salas, P.M. & Montti, M.I.T. (2013). Mycoflora and Potential Mycotoxin Production of Freshly Harvested Blueberry in Concordia, Entre Ríos Province, Argentina. International Journal Of Fruit Science, Volume 13 (3): 14.

Nazarov, P. A., Балеев, Д. Н., Ivanova, M., Соколова, Л. М., & Karakozova, M. (2020). Infectious plant diseases: etiology, current status, problems and prospects in plant protection. Acta Naturae, 12(3), 46–59. https://doi.org/10.32607/actanaturae.11026

Nemaplex.UCDavis.edu; Revision Date: 22/02/24; Accessed 07/06/24. Avalaible online at: http://nemaplex.ucdavis.edu/Taxadata/G059s3.aspx

Netherlands Food and Consumer Product Safety Authority (2012) Pest Risk Analysis for Blueberry scorch virus, including an inventory of highbush blueberry pests and diseases present in North America and absent in the Netherlands. Ministry of Economic Affairs, Agriculture & Innovation. https://english.nvwa.nl/binaries/nvwa-en/documenten/plant/plant-health/pest-risk-analysis/documents/pest-risk-analysis-for-blueberry-scorch-virus/PRA+blueberry+scorch+virus+oktober+2012.pdf.

New South Wales Department of Primary Industries (2007) Ricania speculum (Walker). Biosecurity threat, not present in Australia. https://idtools.dpi.nsw.gov.au/keys/cicadell/species/rspeculum.htm

Newell, A.D., Sial, A.A. & Brewer, M.T. (2023) Evidence for Vector Transmission of the Blueberry Pathogen Exobasidium maculosum, Cause of Exobasidium Leaf and Fruit Spot. PhytoFrontiers 3(2) 347-354. doi: https://doi.org/10.1094/PHYTOFR-10-22-0107-R

Ngubane, N. P. (2018). Distribution of pests of blueberries in South Africa and re-description and behaviour of the blueberry bud mite Acalitus vaccinii (Eriophyidae) (Doctoral dissertation, Stellenbosch: Stellenbosch University). https://core.ac.uk/download/pdf/188221745.pdf

Ngubane, N. P. (2018). Distribution of pests of blueberries in South Africa and re-description and behaviour of the blueberry bud mite Acalitus vaccinii (Eriophyidae) (Doctoral dissertation, Stellenbosch: Stellenbosch University). https://core.ac.uk/download/pdf/188221745.pdf

Ngugi, H. & Scherm, H. (2006) Mimicry in plant-parasitic fungi. FEMS Microbiology Letters, 257(2), 171-176. doi: https://doi.org/10.1111/j.1574-6968.2006.00168.x

Nondillo, A., Sganzerla, V.M.A., Bueno, O.C. & Botton, M. (2013). Interaction Between Linepithema micans (Hymenoptera: Formicidae) and Eurhizococcus brasiliensis (Hemiptera: Margarodidae) in Vineyards, Environmental Entomology, Volume 42, Issue 3, 1 June 2013, Pages 460–466. doi: https://doi.org/10.1603/EN13004.

Nouioui, I., Ha, S. M., Baek, I., Chun, J., & Goodfellow, M. (2022). Genome insights into the pharmaceutical and plant growth promoting features of the

novel species Nocardia alni sp. nov. BMC Genomics, 23(1). https://doi.org/10.1186/s12864-021-08257-y

Nutall, M.J. (1982) Bag moth, Liothula omnivora. Pests and Diseases of Forestry in New Zealand. https://www.nzffa.org.nz/farm-forestry-model/the-essentials/forest-health-pests-and-diseases/Pests/Liothula-omnivora/bag-moth-liothula-omnivora/

Nyaka Ngobisa, A., Zainal Abidin, M., Wong, M., & Wan Noordin, M. (2013). Neofusicoccum ribis Associated with Leaf Blight on Rubber (Hevea brasiliensis) in Peninsular Malaysia. The Plant Pathology Journal, 29(1), 10-16.

Oberprieler, R., Marvaldi, A., & Anderson, R. S. (2007). Weevils, weevils, weevils everywhere. In: Zhang, Z.-Q. & Shear, W.A. (Eds) (2007) Linnaeus Tercentenary: Progress in Invertebrate Taxonomy. Zootaxa, 1668, 491-520. https://www.mapress.com/zootaxa/2007f/z01668p520f.pdf

Ooi, T.C. (1967) The Casemoth: Liothula omnivora (Psychidae: Lepidoptera). A thesis presentedin partial fulfilment of the requirements for the degree of Master of Science in Zoology at Massey University. Available: https://mro.massey.ac.nz/bitstreams/168843ad-8a8c-4110-a278-e37c2059bffa/download.

Oregon State University (2024) Cranberry (Vaccinium macrocarpon)-Cottonball. Pacific Northwest Pest Management Handbooks. https://pnwhandbooks.org/plantdisease/host-disease/cranberry-vaccinium-macrocarpon-cottonball

Oregon State University Extension Service (2022) Blueberry bacterial and fungal diseases in the Pacific Northwest. https://www.freshfruitportal.com/news/2022/04/20/blueberry-bacterial-and-fungal-diseases-in-the-pacific-northwest/

Palmiter, D.H., Coxeter, W.J., & Adams, J.A. (1960). Seasonal History and Rearing of Scaphytopius Acutus (Say) (Homoptera: Cicadellidae). Annals of the Entomological Society of America, 53(6), 843-846.

Panizzi, A. R., Lucini, T., & Mitchell, P. L. (2021). Feeding sites of true bugs and resulting damage to plants. In Entomology in focus (pp. 47–64). https://doi.org/10.1007/978-3-030-64674-5_3

Pantoja, A., Hagerty, A., Emmert, S., & Munyaneza, J. (2008). Leafhoppers (Homoptera: Cicadellidae) Associated with Potatoes in Alaska: Species Composition, Seasonal Abundance, and Potential Phytoplasma Vectors. American Journal of Potato Research, 86(1), 68-75.

Parker, P.E. & Ramsdell, D.C. (1977) Epidemiology and Chemical Control of Godronia (Fusicoccum) Canker of Highbush Blueberry. Ecology and Epidemiology. 7963 1475-1480.

Panthi, B. R., Renkema, J. M., Lahiri, S., & Liburd, O. E. (2021). Spatio-Temporal Distribution and Fixed-Precision Sampling Plan of Scirtothrips dorsalis (Thysanoptera: Thripidae) in Florida Blueberry. Insects, 12(3), 256. https://doi.org/10.3390/insects12030256

Paulaviciute, B. (2010) New data on seven rare species of Tortricidae (Lepidoptera) found in Lithuania. New and rare for Lithuanina insect species, Volume 21. https://www.researchgate.net/profile/Brigita-Paulaviciute/publication/310467216_NEW_DATA_ON_SEVEN_RARE_SPECIES_OF_TORTRICIDAE_LEPIDOPTERA_FOUND_IN_LITHUANIA/links/582f0e1308aef19cb8155961/NEW-DATA-ON-SEVEN-RARE-SPECIES-OF-TORTRICIDAE-LEPIDOPTERA-FOUND-IN-LITHUANIA.pdf.

Payne, J. A., Horton, D. J., & Amis, A. (1988). Entomology of Rabbiteye Blueberries, Vaccinium ashei Reade, in Southeastern United States. In (eds.) M. K. Harris, C. E. Rogers, & C. Shanks. (2019). The entomology of indigenous and naturalized Systems in Agriculture. CRC Press.

Penca, C. & Hodges, A. (2019). Bbrown marmorated stink bug (Halyomorpha halys) (Insecta: Hemiptera: Pentatomidae). Featured Creatures. Entomology and Nematology Department, University of Florida. https://entnemdept.ufl.edu/creatures/veg/bean/brown_marmorated_stink_bug.htm.

Pérez-López, E., Rodríguez-Martínez, D., Olivier, C., Luna-Rodríguez, M., & Dumonceaux, T. (2017). Molecular diagnostic assays based on cpn60 UT sequences reveal the geographic distribution of subgroup 16SrXIII-(A/I)I phytoplasma in Mexico. Scientific Reports, 7(1). https://doi.org/10.1038/s41598-017-00895-1

Pérez-López, E., Vincent, C., Moreau, D. L., Hammond, C. J., Town, J. R., & Dumonceaux, T. (2019). A novel 'Candidatus Phytoplasma asteris' subgroup 16SrI-(E/AI)AI associated with blueberry stunt disease in eastern Canada. International Journal of Systematic and Evolutionary Microbiology, 69(2), 322–332. https://doi.org/10.1099/ijsem.0.003100

Perveen, F., & Khan, A. (2021). Introductory chapter: Diptera. In IntechOpen eBooks. https://doi.org/10.5772/intechopen.99440

Pfeiffer, D. G. (n.d.). Strawberry root weevil complex. The Virginia Fruit Page. Avalaible online at: https://www.virginiafruit.ento.vt.edu/StrwRootW.html

Pfeiffer, D.G. (N.D.) Sharpnosed leafhopper, Scaphytopius magdalensis Provancher. Department of Entomology Virginia Tech Blacksburg. https://www.virginiafruit.ento.vt.edu/sharpnosed.html.

Plant Biosecurity and Product Integrity (2016) Nun moth. New South Wales Department of Primary Industries. https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/nun-moth.

Plant Biosecurity and Product Integrity (2017) Blueberry aphid and blueberry scorch virus. New South Wales Department of Primary Industries. https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/blueberry-aphid.

Plant Biosecurity and Product Integrity (2017) Blueberry leaftier. New South Wales Department of Primary Industries. https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/blueberry-leaftier.

Plant Biosecurity and Product Integrity (2017) Brown rot. New South Wales Department of Primary Industries. https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/brown-rot

Plant Biosecurity and Product Integrity (2018) Mummy berry disease. New South Wales Department of Primary Industries. https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/mummy-berry

Plant Health and Pest Prevention Services Division (2024). Japanese Beetle Detections. Available online at: https://www.cdfa.ca.gov/plant/jb/

Plant Health Australia (2013) Fact Sheet: Brown rot. Available: https://planthealthaustralia.com.au/wp-content/uploads/2013/03/Brown-rot-FS-Summerfruit.pdf.

Plant Health Australia (2016) Bacterial leaf scorch and the glassy winged sharpshooter. Factsheet. https://planthealthaustralia.com.au/wp-content/uploads/2016/05/Bacterial-leaf-scorch-sharpshooter-FS-Blueberries.pdf

Plesken, C., Weber, R.W.S., Rupp, S., Leroch, M. & Hahn, M. (2015) Botrytis pseudocinerea Is a Significant Pathogen of Several Crop Plants but Susceptible to Displacement by Fungicide-Resistant B. cinerea Strains. Applied and Environmental Microbiology 81 (20) 7048-7056. https://journals.asm.org/doi/pdf/10.1128/aem.01719-15

Polashock, J.J. (2017) Diseases of Blueberry (Vaccinium spp.). The American Phytopathological Society. https://www.apsnet.org/edcenter/resources/commonnames/Pages/Blueberry.aspx

Pritts, M. (2017) Berry Diagnostic Tool: Red Ringspot Virus. College of Agriculture and Life Sciences, Cornell University. https://blogs.cornell.edu/berrytool/berry-pests/blueberry-viruses/.

Provancher, L. (1889) Deuxième sous-ordre les Homoptères. Petite Faune Entomologique du Canada, précédée d'un Traité elémentaire d'Entomologie., 3, 207–292. Available on National Museum Wales Insect Vectors of Plant Disease: https://insectvectors.science/vector/scaphytopius-magdalensis.

Pulawska, J. (2010). Crown gall of stone fruits and nuts, economic significance and diversity of its causal agents: tumorigenic Agrobacterium spp. Journal of Plant Pathology, S87-S98. https://www.cabidigitallibrary.org/doi/pdf/10.5555/20113231670

Pupavkina, D.M. (1985) The heath vapourer - a pest of bilbery. Zashchita Rasteniĭ, 1985, No. No. 12, 36. CABI Record Number: 19881108416. ABSTRACT ONLY AVAILABLE.

Rahimloo, T. & Ghosta, Y. (2015) The occurrence of Alternaria species on cabbage in Iran. Zemdirbyste-Agriculture, 102 (2) 343–350. DOI: 10.13080/z-a.2015.102.044

Ramachandran, S., Funderburk, J., Stavisky, J., & Olson, S. M. (2001). Population abundance and movement ofFrankliniellaspecies andOrius insidiosusin field pepper. Agricultural and Forest Entomology, 3(2), 129–137. https://doi.org/10.1046/j.1461-9563.2001.00097.x

Ramanaidu, K. (2010) Blueberry Spanworm, Itame argillacearia and bumble bee, Bombus impatiens, susceptibility to new biorational insecticides. Master of Science. Dalhousie University Halifax, Nova Scotia. https://dalspace.library.dal.ca/bitstream/handle/10222/13190/Ramanaid_Thesis_Final_Jan_14_2011.pdf?isAllowed=y&sequence=3.

Ramanaidu, K., Hardman, J.M., Percival, D.C. & Culer, G.C. (2011) Laboratory and field susceptibility of blueberry spanworm (Lepidoptera: Geometridae) to conventional and reduced-risk insecticides. Crop Protection 30 (12): 1643-1648. DOI: https://doi.org/10.1016/j.cropro.2011.08.005.

Reddy, P. P. (2016). Thrips and their management. In: Sustainable Crop Protection under Protected Cultivation. Springer, Singapore, pp. 213–220. https://doi.org/10.1007/978-981-287-952-3_18

Rendon, D., Hamby, K. A., Arsenault-Benoit, A. L., Taylor, C. M., Evans, R. K., Roubos, C. R., Sial, A. A., Rogers, M., Petran, A., Van Timmeren, S., & Walton, V. (2020). Mulching as a cultural control strategy for Drosophila suzukii in blueberry. Pest management science, 76(1), 55-66. https://onlinelibrary.wiley.com/doi/am-pdf/10.1002/ps.5512

Rhainds, M., Davis, D. R., Price, P. W., & Annual Reviews. (2009). Bionomics of bagworms (Lepidoptera: psychidae). Annu. Rev. Entomol., 209–226. https://repository.si.edu/bitstream/handle/10088/7712/ent_Bionomics_Psychidae.pdf?sequence=1&isAllowed=y

Robinson, T.S., Scherm, H., Brannen, P.M., Allen, R. & Deom, C.M. (2016) Blueberry necrotic ring blotch virus in Southern Highbush Blueberry: Insights into In Planta and In-Field Movement. Plant Disease 100 (8). doi: https://doi.org/10.1094/PDIS-09-15-1035-RE

Rodriguez-Saona, C., Alborn, H. T., Oehlschlager, C., Calvo, C., Kyryczenko-Roth, V., Tewari, S., Sylvia, M., & Averill, A. L. (2020). Fine-tuning the composition of the cranberry weevil (Coleoptera: Curculionidae) aggregation pheromone. Journal of Applied Entomology, 144(5), 417–421. https://doi.org/10.1111/jen.12752

Rodriguez-Saona, C., Polavarapu, S., Barry, J. D., Polk, D., Jörnsten, R., Oudemans, P. V., & Liburd, O. E. (2010). Color preference, seasonality, spatial distribution and species composition of thrips (Thysanoptera: Thripidae) in northern highbush blueberries. Crop Protection, 29(11), 1331–1340. https://doi.org/10.1016/j.cropro.2010.07.006

Rodriguez-Saona, C., Vincent, C., Polk, D., & Drummond, F. A. (2015). A review of the Blueberry Maggot Fly (Diptera: Tephritidae). Journal of Integrated Pest Management, 6(1), 11. https://doi.org/10.1093/jipm/pmv010

Roland, J. (1990) Use of Alternative Plant Species as a Monitoring Tool for the Cranberry Girdler (Lepidoptera: Pyralidae). Environmental Entomology, Volume 19, Issue 3, Pages 721-724. doi: https://doi.org/10.1093/ee/19.3.721.

Rosetta, R. (2017). Obscure root weevil. Pacific Northwest Nursery IPM, Oregon State University. Avalaible online at: https://agsci.oregonstate.edu/nurspest/insects/obscure-root-weevil

Rossi, E., & Lucchi, A. (2015). The Asian planthopper Ricania speculum (Walker) (Homoptera: Ricaniidae) on several crops in Italy: a potential threat to the EPPO region?. EPPO Bulletin, 45(1), 119-122.

Saad, N., Alcala-Briseno, R.I., Polston, J.E., Olmstead, J.W., Varsani, A. & Harmon, P.F. (2020) Blueberry red ringspot virus genomes from Florida inferred through analysis of blueberry root transcriptomes. Sci Rep 10: 12043. doi: 10.1038/s41598-020-68654-3.

Saad, N., Olmstead, J. W., Jones, J. B., Varsani, A., & Harmon, P. F. (2021). Known and new emerging viruses infecting Blueberry. Plants, 10(10), 2172. https://doi.org/10.3390/plants10102172

Saad, N., Olmstead, J. W., Jones, J. B., Varsani, A., & Harmon, P. F. (2021). Known and new emerging viruses infecting Blueberry. Plants, 10(10), 2172. https://doi.org/10.3390/plants10102172

Sabaratnam, S. (2012) Godronia (Fusicoccum) Canker of Blueberry. Abbotsford Agriculture Centre Ministry of Agriculture. https://fieldguide.bcblueberry.com/wp-content/uploads/2016/12/Godronia-Canker-Factsheet-English-Aug-2012.pdf

Sabaratnam, S., Fitzpatrick, S. & Forge, T.A. (2009) CRANBERRY DIEBACK DISORDER: A NEW AND EMERGING THREAT TO CRANBERRY PRODUCTION IN BRITISH COLUMBIA. Acta Horticulturae. doi: 10.17660/ActaHortic.2009.810.54.

Saccardo, F., Martini, M., Palmano, S., Ermacora, P., Scortichini, M., Loi, N., & Firrao, G. (2012). Genome drafts of four phytoplasma strains of the ribosomal group 16SrIII. Microbiology, 158(11), 2805–2814. https://doi.org/10.1099/mic.0.061432-0

Santos, A. A., Jacques, J., Plante, N., Fournier, V., & Pérez-López, E. (2023). Leafhoppers as vectors of phytoplasma diseases in Canadian berry crops: a review in the face of climate change. Annals of the Entomological Society of America. https://doi.org/10.1093/aesa/saad038

Say, T. (1830) Descriptions of new North American hemipterous insects belonging to the first family of the section Homoptera of Latreille. (Continued). Journal of the Academy of Natural Sciences of Philadelphia, 6, 299–314. Available on National Museum Wales Insect Vectors of Plant Disease: https://insectvectors.science/vector/scaphytopius-acutus.

Schaefers, G.A. (1962) Life History of the Blueberry Tip Borer, Hendecaneura shawiana (Kearfott) (Lepidoptera: Tortricidae), a New Pest. Annals of the

Entomological Society of America, 55(1), 119–123. doi: doi:10.1093/aesa/55.1.119.

Scherm, H., Savelle, A. T., Tertuliano, M., & Krewer, G. (2011). Fish product trials for leaf disease management in organic blueberries in Georgia, 2009-2010. Dixie Blueberry News 11(4):10-23. https://www.researchgate.net/profile/Moukaram-Tertuliano/publication/260943828_Fish_Product_Trials_for_Leaf_Disease_Management_in_Organic_Blueberries_in_Georgia_2009-2010/links/02e7e532b438eacf1c000000/Fish-Product-Trials-for-Leaf-Disease-Management-in-Organic-Blueberries-in-Georgia-2009-2010.pdf

Schilder, A.C. & Miles, T.D. (2008) Michagan Blueberry Facts. Virus and Viruslike Diseases of Blueberries. Michagan State University. Extension Bulletin E-3048. https://www.canr.msu.edu/blueberries/uploads/files/E3048.pdf.

Schowalter, T.D. (2018) Biology and Management of the Whitemarked Tussock Moth (Lepidoptera: Erebidae). Journal of Integrated Pest Management, Volume 9, Issue 1, 2018, 26. doi: https://doi.org/10.1093/jipm/pmy016.

Scoble, M. J., Wahlberg, N., Powell, J. A., Grimaldi, D. A., Engel, M. S., Goldstein, P. Z., Systematic Entomology Laboratory, Plant Science Institute, Agriculture Research Service, US Department of Agriculture, c/o Smithsonian Institution, Weed, A. S., Casagrande, R. A., & Nazari, V. (2017). Insect Biodiversity: Science and Society, Volume I, Second edition (By Smithsonian Institution; R. G. Foottit & P. H. Adler, Eds.). https://edisciplinas.usp.br/pluginfile.php/5789038/course/section/6073095/goldstein2017.pdf

Scott-Dupree, C.D., Harris, C.R., Moineddin, M. & LeBoeff, J. (2008) Flight activity and susceptibility to insecticides of variegated cutworm, Peridroma saucia attacking field tomatoes in southwestern Ontario. JESO 139: 19-25. https://atrium.lib.uoguelph.ca/server/api/core/bitstreams/c524e9ed-7452-4dab-8d25-7273b854f683/content

Scudder, G.G.E., & Cannings R.A. (2007). The Lepidoptera Families and Associated Orders of British Columbia. Government of British Columbia. Available online at: https://a100.gov.bc.ca/pub/eirs/viewDocumentDetail.do?fromStatic=true&repository=BDP&documentId=14739

Sforza, R., Boudon-Padieu, E., & Greif, C. (2004). New Mealybug Species Vectoring Grapevine Leafroll-Associated Viruses-1 and -3 (GLRaV-1 and -3). European Journal of Plant Pathology, 109(9), 975-981.

Showler, A. T. (2006). Short-Range dispersal and overwintering habitats of boll weevils (Coleoptera: curculionidae) during and after harvest in the subtropics. Journal of Economic Entomology, 99(4), 1152–1160. https://doi.org/10.1093/jee/99.4.1152

Sial, A. (2021). Monitoring and Management of flower thrips in blueberries | UGA Blueberry Blog. (2021, February 27). https://site.caes.uga.edu/blueberry/2021/02/monitoring-and-management-of-flower-thrips-in-blueberries/

Sial, A. (2022). Identification and Management of Blueberry Bud Mite. UGA Extension. Available online at: https://ipm.uga.edu/2022/11/03/identification-and-management-of-blueberry-bud-mite/

Silva, D. a. S., Salamanca, J., Kyryczenko-Roth, V., Alborn, H. T., & Rodriguez-Saona, C. (2018). Comparison of Trap Types, Placement, and Colors for Monitoring Anthonomus musculus (Coleoptera: Curculionidae) Adults in Highbush Blueberries. Journal of Insect Science, 18(2). https://doi.org/10.1093/jisesa/iey005

Sinkevičienė, J., Sinkevičiūtė, A., Česonienė, L. & Daubaras, r. (2023) Fungi Present in the Clones and Cultivars of European Cranberry (Vaccinium oxycoccos) Grown in Lithuania. Current Soil-Health Status of Our Soils and Near-Term Trends on Potential Food Productivity - Plants 12(12) 2360. doi: https://doi.org/10.3390/plants12122360

Skinner, R. K., Dietrich, C. H., Walden, K. K. O., Gordon, E. R. L., Sweet, A. D., Podsiadłowski, L., Petersen, M., Simon, C., Takiya, D. M., & Johnson, K. P. (2019). Phylogenomics of Auchenorrhyncha (Insecta: Hemiptera) using transcriptomes: examining controversial relationships via degeneracy coding and interrogation of gene conflict. Systematic Entomology, 45(1), 85–113. https://doi.org/10.1111/syen.12381

Slessor, K.N., Raine, J., King, G.G.S, Clements, S.J. & Allan, S.A. (1987). Sex pheromone of blackheaded fireworm, Rhopobota naevana (Lepidoptera: Tortricidae), a pest of cranberry. Journal of Chemical Ecology 13 (5). 1163-1170.

Soumyojit, D. (2017). Dispersal of Plant Pathogens: 2 modes | Botany. Botany Library. https://www.botanylibrary.com/plant-pathogens/dispersal-of-plant-pathogens-2-modes-botany/15333

Sprague, D., Funderburk, J. E., & Lucky, A. (2019). Flower thrips, Frankliniella tritici (Fitch)(Insecta: Thysanoptera: Thripidae): EENY-720/IN1236, 1/2019. EDIS, 2019(2). https://edis.ifas.ufl.edu/publication/IN1236#TOP

Srivastava, V., Griess, V.C. & Keena, M.A. (2020). Assessing the potential distribution of Asian Gypsy Moth in Canada: A comparison of two methodological approaches. Scientific Reports 10, 22. doi: https://doi.org/10.1038/s41598-019-57020-7.

Stace-Smith, R. (1954) Chlorotic Spotting of Black Raspberry Induced by the Feeding of Amphorophora rubitoxica. Knowlton. The Canadian Entomologist, 86(5), 232–235. doi: doi:10.4039/ent86232-5.

Starović, M., Kojić, S., Kuzmanović, S., Stojanović, S., Pavlović, S., & Jošić, D. (2013). First Report of Blueberry Reddening Disease in Serbia Associated with 16SrXII-A (Stolbur) Phytoplasma. Plant Disease, 97(12), 1653. https://doi.org/10.1094/pdis-05-13-0521-pdn

Steck, G. J., & Payne, J. A. (2020). Blueberry Maggot, Rhagoletis Mendax. Featured Creatures, Publication Number: EENY-041. Available online at: https://edis.ifas.ufl.edu/publication/IN198

Steck, G.J., Lyrene, P.M., & Payne, J.A. (2020). Blueberry gall midge. Featured Creatures, Publication Number: EENY-136. Available online at: https://entnemdept.ufl.edu/creatures/fruit/blueberry_gall_midge.htm

Stewart, J.E., Brooks, K., Brannen, P.M., Cline, W.O. & Brewer, M.T. (2015) Elevated Genetic Diversity in the Emerging Blueberry Pathogen Exobasidium maculosum. PLoS ONE 10(7): e0132545. doi: https://doi.org/10.1371/journal.pone.0132545

Strauss, S. Y. (1988). The Chrysomelidae: A useful group for investigating Herbivore-Herbivore interactions. In Springer eBooks (pp. 91–105). https://doi.org/10.1007/978-94-009-3105-3_6

Sun, C., Huang, Y., Liu, J., Zhang, Q. & Wang, C. (2019) First Report of Shoot Dieback on Apple Caused by Diaporthe nobilis in China. Plant Disease. The American Phytopathological Society. doi: https://doi.org/10.1094/PDIS-06-19-1244-PDN

Survilienė, E., & Kazlauskaitė, S. (2019). First report of Dasineura oxycoccana in Lithuania-short communication. Plant Protect. Sci., 55, 218–221. https://www.cabidigitallibrary.org/doi/pdf/10.5555/20203248689

Sylvia, M.M. & Averill, A.L. (2005) Black-headed fireworm. University of Massachusetts Amherst Cranberry Station. https://www.umass.edu/cranberry/downloads/Black-Headed%20Fireworm.pdf.

Szendrei, Z., & Rodriguez-Saona, C. (2009). Cranberry Weevil in Blueberries. Rutgers NJAES Cooperative Extension, Fact Sheet FS1087. Available online at: https://njaes.rutgers.edu/pubs/publication.php?pid=FS1087

Tait, G., Mermer, S., Stockton, D. G., Lee, J. C., Avosani, S., Abrieux, A., Anfora, G., Beers, E. H., Biondi, A., Burrack, H. J., Cha, D., Chiu, J. C., Choi, M., Cloonan, K. R., Crava, C. M., Daane, K. M., Dalton, D. A., Diepenbrock, L. M., Fanning, P., . . . Walton, V. M. (2021). Drosophila suzukii (Diptera: Drosophilidae): A Decade of Research Towards a Sustainable Integrated Pest Management Program. Journal of Economic Entomology, 114(5), 1950–1974. https://doi.org/10.1093/jee/toab158

Teerink, J. & Carlson, R.B. (1988) Sparganothis sulfureana as a possible model

for introduced biological control agents. Proceedings of Leafy Spurge Annual Meeting.

Rapid City, SD. July 13-14, 1988. pp. 54-55. https://library.ndsu.edu/ir/bitstream/handle/10365/3940/1411TE88.PDF?sequence=1.

Tertuliano, M., Srinivasan, R., & Scherm, H. (2012) Settling behavior of the glassy-winged sharpshooter, Homalodisca vitripennis, vector of Xylella fastidiosa, on southern highbush blueberry cultivars. Entomologia Experimentalis Et Applicata, 143(1), 67-73.

Thanuja Thekke-Veetil, Thien Ho, Karen E. Keller, Robert R. Martin, Ioannis E. Tzanetakis, A new ophiovirus is associated with blueberry mosaic disease, Virus Research, Volume 189, 30 August 2014, Pages 92-96, ISSN 0168-1702, http://dx.doi.org/10.1016/j.virusres.2014.05.019.

Thekke-Veetil, T., & Ho, T. (2019). Molecular characterization of a new vitivirus discovered in a blueberry plant with green mosaic symptoms. Archives of Virology, 164(10), 2609–2611. https://doi.org/10.1007/s00705-019-04344-4

Thekke-Veetil, T., Polashock, J.J., Marn, M.V., Plesko, I.M., Schilder, A.C., Keller, K.E., Martin, R.R. & Taanetakis, I.E. (2015) Population structure of blueberry mosaic associated virus: Evidence of reassortment in geographically distinct isolates. Virus Research Volume 201, Pages 79-84. doi: https://doi.org/10.1016/j.virusres.2015.02.022.

Thomas-Sharma, S., Wells-Hansen, L. D., Page, R., Kartanos, V., Saalau-Rojas, E., Lockhart, B. E., & McManus, P. S. (2018). Characterization of Blueberry shock virus, an Emerging Ilarvirus in Cranberry. Plant Disease, 102(1), 91–97. https://doi.org/10.1094/pdis-04-17-0551-re

Tokuda, M., & Yukawa, J. (2021). Taxonomy, phylogeny, and larval feeding habits. In Entomology monographs (pp. 3–8). https://doi.org/10.1007/978-981-33-6534-6_1

Tomkins, A.R. & Koller, M.S. (1985). A preliminary investigation of highbush blueberry pest and disease control. New Zealand Weed and Pest Control Conference 38: 232-235. https://journal.nzpps.org/index.php/pnzwpcc/article/view/9496/9328.

Topičová, B., & Kapitola, P. (2016). Preliminary PRA Dasineura oxycoccana CZ 2016. Central Institute for Supervising and Testing in Agriculture. Available online at: https://pra.eppo.int/pra/2f07e72b-fbe9-409a-9b71-d4de45033978

Tozzp, D., Ramsdell, D., Taboada, O., Lee, I. & Davis, R. (1993) Epidemiological studies on the stunt disease of highbush blueberry. Annals of Applied Biology, 123(3), 579-599.

Traugott, M., Benefer, C. M., Blackshaw, R. P., Van Herk, W. G., & Vernon, R. S. (2015). Biology, ecology, and control of elaterid beetles in agricultural land. Annual Review of Entomology, 60(1), 313–334. https://doi.org/10.1146/annurev-ento-010814-021035

UK Plant Health Risk Register (2022) UK Risk Register Details for Eurhizococcus brasiliensis. https://planthealthportal.defra.gov.uk/pests-and-diseases/uk-plant-health-risk-register/viewPestRisks.cfm?cslref=15348&riskId=27962.

UkrBIN. (2024). Otiorhynchus (Pendragon) ovatus. In: UkrBIN, Database on Biodiversity Information. Available online at: https://ukrbin.com/index.php?id=1600&action=info

UMass Extension. (2023). Otiorhynchus ovatus. Professional Insect & Mite Management Guide for Woody Plants. Available online at: https://ag.umass.edu/landscape/publications-resources/insect-mite-guide/otiorhynchus-ovatus

University of Maryland Extension. (2023). Virus Diseases on Flowers. College of Agriculture and Natural Resources. Available online at: https://extension.umd.edu/resource/virus-diseases-flowers/

Urban, J. M., Leach, H., & Department of Entomology, Pennsylvania State University. (2023). Biology and Management of the Spotted Lanternfly, Lycorma delicatula (Hemiptera: Fulgoridae), in the United States. Annual Review of Entomology, 151–167. https://www.annualreviews.org/docserver/fulltext/ento/68/1/annurev-ento-120220-111140.pdf?expires=1716433614&id=id&accname=guest&checksum=3EF3C12F37FF3EC74AB6CBA1DA60BBFE

USDA (2008) Pathway-Initiated Risk Analysis of the Importation of Vaccinium spp. Fruit from Countries in Central and South America into the Continental United States. February 5, 2008. Revision 003. USDA-APHIS

Valiunas, D., Alminaite, A., Jomantiene, R., & Maas, J. L. (2004). Possible cause of European blueberry disease is related to North American milkweed yellows phytoplasma. ResearchGate. https://www.researchgate.net/publication/242757092_Possible_cause_of_European_blueberry_disease_is_related_to_North_American_milkweed_yellows_phytoplasma

Velez-Gavilan, J. (2022). Heteroderes rufangulus (red-angled click beetle) [Dataset]. In CABI Compendium. https://doi.org/10.1079/cabicompendium.84155565

Vincent, C., Martel, P., Gagnon, J., & Morin, O. (2022). First record of blueberry maggot in Lac Saint-Jean, Quebec. Canadian Journal of Plant Science, 102(4), 940–943. https://doi.org/10.1139/cjps-2022-0031

Virteiu, A. M., Grozea, I., Stef, R., Carabet, A., Molnar, L., Florian, T., & Mazare, V. (2015). Analysis of the thrips fauna (Insecta: Thysanoptera) on flowers of roses in western part of Romania. Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Agriculture, 72(2), 608-609. https://www.researchgate.net/profile/Ioana-Grozea/publication/287205005_11487-46564-1-PB/links/567306d608aee7a427436b5c/11487-46564-1-PB.pdf

Walker, A.S., Gautier, A.L., Confais, J., Martinho, D., Viaud, M., Le Pecheur, P., Dupont, J. & Fournier, E. (2011). Botrytis pseudocinerea, a new cryptic species causing gray mold in French vineyards in sympatry with Botrytis cinerea. Phytopathology 101, 1433-45. doi: 10.1094/PHYTO-04-11-0104

Walter, D., & Proctor, H. C. (2013). Mites on plants. In Springer eBooks (pp. 281–339). https://doi.org/10.1007/978-94-007-7164-2_8

Wang, Q. (Ed.). (2017). Cerambycidae of the world: biology and pest management. CRC press.

Wang, Y., Chen, X. & He, J. (2012) A new species of Bracon (Hymenoptera: Braconidae) Parasitic on Larvae of the Pest Orgyia Ericae Germar (Lepidoptera: Lymantriidae) in Northern China. Entomological News 122 (1): 74-78. doi: 10.3157/021.122.0110

Warner, F. (2022). Nematodes on Blueberries. Michigan State University. Available online at: https://www.canr.msu.edu/resources/nematodes-on-blueberries

Webber, J. (2024). Phytophthora kernoviae. Pest and disease resources, Forest Research UK. Available online at: https://www.forestresearch.gov.uk/tools-and-resources/fthr/pest-and-disease-resources/phytophthora-kernoviae/

Werle, C. T., Chong, J., Sampson, B. J., Reding, M. E., & Adamczyk, J. J. (2015). Seasonal and Spatial Dispersal Patterns of Select Ambrosia Beetles (Coleoptera: Curculionidae) from Forest Habitats into Production Nurseries. Florida Entomologist, 98(3), 884–891. https://doi.org/10.1653/024.098.0311

West, A. S., & Shorthouse, J. D. (1989). Initiation and development of the stem gall induced by Hemadas nubilipennis (Hymenoptera: Pteromalidae) on lowbush blueberry, Vaccinium angustifolium (Ericaceae). Canadian Journal of Botany, 67(7), 2187–2198. https://doi.org/10.1139/b89-278

Whitney, S.P. & Meyer, J.R. (1988) Seasonal dispersal and host preference by adult sharpnosed leafhoppers (Homoptera: Cicadellidae) in North Carolina woodlands. Journal of Entomological Science 23.1 (1988): 59-74.

Whitney, S.P. (1987) Dispersal and host preference of woodland sharpnosed leafhoppers, scaphytopius magdalensis (provancher) and s. Verecundus (van duzee) in relation to spread of blueberry stunt disease (homoptera, movement, cicadellidae, vectors, migration). North Carolina State University. https://www.elibrary.ru/item.asp?id=7502882

Wildlife Insight (N.D.) The Vapourer caterpillar and moth, Orgyia antiqua. Wildlife Insight. http://www.wildlifeinsight.com/british-moths/the-vapourer-caterpillar-and-moth-orgyia-antiqua/.

Williams, S., D., Boehm, M., B., & Hand, F., P. (2017). Bacterial Diseases of Plants. OSU Extension, Pl Path, Gen 6. Available online at: https://ohioline.osu.edu/factsheet/plpath-gen-6

Williams, S., D., Boehm, M., B., & Lopez-Nicora, H. (2017). Nematode Diseases of Plants. OSU Extension, Pl Path, Gen 8. Available online at: https://ohioline.osu.edu/factsheet/plpath-gen-8

Williams, S., D., Boehm, M., B., & Qu, F. (2017). Viral Diseases of Plants. OSU Extension, Pl Path, Gen 5. Available online at: https://ohioline.osu.edu/factsheet/plpath-gen-5

Williamson, J. (2018). Cranberry Rootworm Beetle. Clemson University Cooperative Extension, Factsheet | HGIC 2014. Available online at: https://www.se-ars.org/uploads/3/9/7/2/39727246/hgic2014.pdf

Wilson M. R., & Turner J. A. (2021). Scaphytopius acutus. Insect Vectors of Plant Disease. Available online at: https://insectvectors.science/vector/scaphytopius-acutus

Wiman, N.G., Parker, J.E., Rodriguez-Saona, C. & Walton, V.M. (2015) Characterizing Damage of Brown Marmorated Stink Bug (Hemiptera: Pentatomidae) in Blueberries. J Econ Entomol . 2015 Jun;108(3):1156-63. doi: 10.1093/jee/tov036.

Worrall, J.J. (2019) Armillaria Root Disease. Forest Pathology. https://forestpathology.org/root-diseases/armillaria/

Wurster, J. & Timms, L. (2010) Peridroma saucia. Bugwood. Integrated Pest Management. https://wiki.bugwood.org/Peridroma_saucia.

Xu, Y., Chen. Y., Hou, J. & Yin, T. (2022) First Report of Diaporthe cercidis and D. nobilis Causing Leaf Blotch on Populus davidiana × P. bolleana in China. Plant Disease. The American Phytopathological Society. doi: https://doi.org/10.1094/pdis-05-21-1040-pdn

Yee, W. L., Forbes, A. A., & Feder, J. L. (2020). Eclosion and adult longevity traits ofRhagoletis tabellaria(Diptera: Tephritidae) andUtetes tabellariae(Hymenoptera: Braconidae) in the laboratory. The Canadian Entomologist, 1–14. https://doi.org/10.4039/tce.2019.74

Yee, W. L., Lawrence, T. W., Hood, G. R., & Feder, J. L. (2015). New records of Rhagoletis Loew, 1862 (Diptera: Tephritidae) and their host plants in western Montana, U.S.A. Pan-pacific Entomologist, 91(1), 39–57. https://doi.org/10.3956/2014-91.1.039

Yu, C., Wu, C., Li, G., & Wang, C. (2018). First Report of Diaporthe nobilis Causing Postharvest Rot of Blueberry in Shandong Province, China. Plant Disease, 102(9), 1856. https://doi.org/10.1094/pdis-11-17-1816-pdn

Zasada, I. A., Pinkerton, J. N., & Forge, T. A. (2010). Plant-Parasitic Nematodes Associated with Highbush Blueberries (Vaccinium corymbosum) in the Pacific Northwest of North America. International Journal of Fruit Science, 10(2), 123–133. https://doi.org/10.1080/15538362.2010.492328

Zeng, Y., Ye, W., Tredway, L., Martin, S., & Martin, M. (2012). Taxonomy and morphology of plant-parasitic nematodes associated with turfgrasses in North and South Carolina, USA. Zootaxa, 3452–3452, 1–46. https://www.mapress.com/zootaxa/2012/f/zt03452p046.pdf

Zhang, C., Zhang, W.Z., Diao, Y.Z. & Liu, X.L. (2016) First Report of Diaporthe nobilis Causing Fruit Decay of Pepper in China. Plant Disease. The American Phytopathological Society. doi: https://doi.org/10.1094/PDIS-03-16-0264-PDN

Zhao, L., Cai, J., He, W. & Zhang, Y. (2019) Macrophominavaccinii sp. nov. causing blueberry stem blight in China. MycoKeys 55: 1-14. doi: 10.3897/mycokeys.55.35015

Zhao, L., Wang, Y., He, W. & Zhang, Y. (2019) Stem Blight of Blueberry Caused by Lasiodiplodia vaccinii sp. nov. in China. Plant Disease. The American Phytopathological Society 103 (8) doi: https://doi.org/10.1094/PDIS-01-19-0079-RE.

Rubus and Strawberry TST References

Alcock J (2019). The behaviour of *Cotinis nitida* Linnaeus, the green June beetle on mowed lawns makes them especially vulnerable to bird predators. *Journal of natural history*, **53**, 23-24.

Alford DV (2012). *Pests of Ornamental Trees, Shrubs and Flowers*, Second edition, pp. 196. Manson Publishing Ltd, London, UK.

Alston D (2015). Rose stem girdler [*Agrilus cuprescens*]. Utah State University Extension. *Entomology,* 178-15.

AQIS (1998). The AQIS import risk analysis process handbook. Online version: aqis.gov.au [assessed August 2019].

Arthurs S, Kok-Yokomi ML and Smith HA (2015). Florida flower thrips (suggested common name) *Frankliniella bispinosa* Morgan (Insecta: Thysanoptera: Thripidae). Online version: edis.ifas.ufl.edu/in1110 [assessed July 2019].

Bagadia PG, Polashock J, Bottner-Parker KD, Zhao Y, Davis RE and Lee IM (2013). Characterization and molecular differentiation of 16SrI-E and 16SrIX-E phytoplasmas associated with blueberry stunt disease in New Jersey, *Molecular and Cellular Probes*, **27**, 90-97.

Baino O, Ramallo AC, Hongn S and Ramallo JC (2007). First Report of *Dothichiza caroliniana* causing double spot on highbush blueberry in South America. *Plant Disease*, **91**, 1685.

Baker JR (1994). Insect and related pests of flowers and foliage plants. Some important, common and potential pests in the southeastern United States. North Carolina Cooperative Extension Service, US, 106 pp.

Baum S, Sieber T, Schwarze F and Fink S (2003). Latent infections of *Fomes fomentarius* in the xylem of European beech (*Fagus sylvatica*). *Mycological Progress,* **2**, 141-148.

Beard JJ (2018). *Oligonychus ilicis* (McGregor, 1917) Spider mite species of Australia (including key exotic southeast Asian pest species), Online version: keys.lucidcentral.org/keys/v3/spider_mites_australia/ key/spider_mites_of_australia/Media/Html/entities/Oligonychus_ilicis_McGregor_1917.htm [assessed September 2020].

Ben-David T, Gerson U and Morin S (2009). Asymmetric reproductive interference between closely related spider mites: *Tetranychus urticae* and *T. turkestani* (Acari: Tetranychidae). *Experimental and Applied Acarology*, **48**, 213-227.

Ben-Dov Y (1994). *A systematic catalogue of the mealybugs of the world (Insecta: Homoptera: Coccoidea: Pseudococcidae and Putoidae) with data on geographical distribution, host plants, biology and economic importance*. Intercept Limited, Andover, UK, 686 pp.

Bennett CW and Costa AS (1961). Sowbane mosaic caused by a seed-transmitted virus. *Phytopathology*, **51**, 546-550.

Blackman RL, Eastop VF (1984). Aphids on the world's crops: an identification and information guide. Wiley, New York, 466 pp.

Boetel MA, Glogoza PA and Knott J (2005). Lygus bugs in sugarbeet. Online version: agresearch.montana.edu/ [accessed September 2019].

Brewer MT, Turner AN and Brannen PM (2014). *Exobasidium maculosum*, a new species causing leaf and fruit spots on blueberry in the south-eastern USA and its relationship with other *Exobasidium* spp. parasitic to blueberry and cranberry, *Mycologia*, **106**, 41524-23.

Briones CRS (1992). Movement of *blueberry leaf mottle virus* (BBLMV) within and between cultivated and wild *Vaccinium* spp. Ph.D. Thesis, Michigan State University, East Lansing, USA.

Bristow PR and Martin RR (1999). Transmission and the role of honeybees in field spread of *Blueberry shock ilarvirus*, a pollen borne virus of highbush blueberry. *Phytopathology*, **89**, 124–130.

Bristow PR, Martin RR and Windom GE (2000). Transmission, field spread, cultivar response, and impact on yield in highbush blueberry infected with *Blueberry scorch virus*. *Phytopathology*. 90 474–479.

Brown AV and Brasier CM (2007). Colonization of tree xylem by *Phytophthora ramorum, P. kernoviae* and other *Phytophthora* species. *Plant Pathology*, **56**, 227–241.

Brunt AA, Crabtree K, Dallwitz MJ, Gibbs AJ, Watson L and Zurcher EJ (eds.) (1996 onwards). `Plant Viruses Online: Descriptions and Lists from the VIDE Database. Version: 20th August 1996'. biology.anu.edu.au/Groups/MES/vide/ [accessed September 2019].

Buxton JH and Easterbrook MA (1988). Thrips as a probable cause of severe fruit distortion in late-season strawberries. *British Society for Plant Pathology,* **37**, 278-280.

CABI (2019). Crop Protection Compendium. CAB International, UK. Online version: cabi.org/cpc [assessed August 2019].

Campanile G, Schena L and Luisi N (2008). Real-time PCR identification and detection of *Fuscoporia torulosa* in *Quercus ilex*. *Plant Pathology*, **57**, 76-83.

Capinera JL (2014). Yellow striped army worm *Spodoptera ornithogalli* (Guenée) (Insecta: Lepidoptera: Noctuidae). University of Florida IFAS Extension Publication. Online version: entnemdeptufl.edu/creatures/veg/leaf/yellowstriped_armyworm.htm, [assessed July 2019].

Caruso FL and Ramsdell DCE (1995). *Compendium of blueberry and cranberry diseases*. American Phytopathological Society. St. Paul, Minnesota, USA.

Chang C-J, Donaldson R, Brannen P, Krewer G and Boland R (2009). Bacterial Leaf Scorch, a New Blueberry Disease Caused by *Xylella fastidiosa*. *HortScience*, **44**, 413-417.

Clark SM, LeDoux DG, Seeno TN, Riley EG, Gilbert AJ and Sullivan JM (2004). Host List of Leaf Beetle Species Occurring in the United States and Canada: Coleoptera: Megalopodidae, Orsodacnidae, Chrysomelidae, Excluding Bruchinae. The Coleopterists Society, USA.

Converse RH (1987) *Virus diseases of small fruits*. United States Department of Agriculture, Agricultural Research Service, Agriculture Handbook Number 631, Corvallis, Oregon, USA.

Cornara, D, Morente M, Markheiser A, Bodino N, Tsai CW, Fereres A, Redak RA, Perring TM & Lopes JRS (2019). An overview on the worldwide vectors of *Xylella fastidiosa*. *Entomologia Generalis*, **39**, 157–181.

Costa AS, de Silva DM and Duffus JE (1958). Plant virus transmission by a leaf-miner fly. *Virology*, **5**, 145-149.

Dallwitz MJ (1980). A general system for coding taxonomic descriptions. *Taxon*, **29**, 41-46.

Dallwitz MJ, Paine TA and Zurcher EJ (1993). *User's Guide to the DELTA System: a general system for processing taxonomic descriptions*. 4th edition. CSIRO Division of Entomology, Canberra.

Daubeny HA, Freeman JA and Stace-Smith R (1975). Effects of tomato ringspot virus in drupelet set of red raspberry cultivars, *Canadian Journal of Plant Sciences,* **55**, 755-759.

De Meyer M, Robertson MP, Peterson AT and Mansell MW (2008). Ecological niches and potential geographical distributions of Mediterranean fruit fly (*Ceratitis capitata*) and natal fruit fly (*Ceratitis rosa*). *Journal of Biogeography,* **35**, 270-281.

Eisenback JD (1982). Description of the blueberry root-knot nematode, *Meloidogyne carolinensis n.sp*. *The Journal of Nematology,* **14**, 303-317.

Erper I and Celi KH (2011). First report of *Pestalotiopsis guepinii* on *Vaccinium corymbosum* in Turkey. *Journal of Plant Pathology*, **93**, 84-87.

Eveleigh ES and Allen WR (1982). Description of *Longidorus diadecturus n. sp.* (Nematoda: Longidoridae), a vector of the peach rosette mosaic virus in peach orchards in southwestern Ontario, Canada. *Canadian Journal of Zoology,* **60**, 112-115.

Farr DF and Rossman AY (2015). Fungal Databases, U.S. National Fungus Collections, ARS, USDA. Online version: nt.ars-grin.gov/fungaldatabases/ [accessed September 2019].

Ferrante P and Scortichini M (2018). *Xanthomonas arboricola* pv. *fragariae*: a confirmation of the pathogenicity of the pathotype strain. *European Journal of Plant Pathology*, **150**, 825-829.

Fletcher MJ (2018). National Diagnostic Protocol for Glassy Winged Sharpshooter, *Homalodisca vitripennis* (Germar) NDP23. Online version: plantbiosecuritydiagnostics.net.au/app/uploads/2018/11/NDP-23-Glassy-winged-sharpshooter-Homalodisca-vitripennis-V1.2.pdf [assessed January 2020]

Foottit RG, Maw HEL, von Dohlen CD, Hebert PDN (2008). Species identification of aphids (Insecta: Hemiptera: Aphididae) through DNA barcodes. *Molecular Ecology Resources*, **8**, 1189–1201.

Fornazier M, Martins D, Cristina G De Willink M, Pirovani V, Ferreira PS and Zanuncio J (2017). Scale insects (Hemiptera: Coccoidea) associated with Arabica coffee and geographical distribution in the neotropical region. *Anais da Academia Brasileira de Ciencias,* 89.

Freeman JA, Stace-Smith R and Daubeny HA (1975). Effects of tomato ringspot virus on the growth and yield of red raspberry, *Canadian Journal of Plant Sciences*, **55**, 749-754.

García Morales M, Denno BD, Miller DR, Miller GL, Ben-Dov Y and Hardy NB (2016). ScaleNet: A literature-based model of scale insect biology and systematics. Database. Online version: scalenet.info [accessed August 2019]

Gibb KS and Randles JW (1988). Studies on the transmission of velvet tobacco mottle virus by the mirid, *Cyrtopeltis nicotianae*. *Annals of Applied Biology*, **112,** :427-437.

Gilligan TM and Epstein ME (2014) Tortricids of agricultural Importance (Adults). Online version: idtools.org/id/leps/tortai/keys/TortAIAdults.html [assessed July 2019].

Gillings MR, Fahy RC, and Bradley J (1998). Identification of *Xanthomonas fragariae*, the cause of an outbreak of angular leaf spot on strawberry in South Australia, and comparison with the cause of previous outbreaks in New South Wales and New Zealand. *Australasian Plant Pathology* **27**, 97–103.

Glavendekic M (2006). *Epichoristodes acerbella* (Walker) (Lepidoptera: Tortricidae): a new species in the fauna of Serbia. *Acta Entomologica Serbica,* **11**, 77-81.

González P, Alaniz S, Montelongo MJ, Rauduviniche L, Rebellato J, Silvera-Pérez E and Mondino P (2012). First Report of *Pestalotiopsis clavispora* causing Dieback on Blueberry in Uruguay. *Plant Disease,* **96**, 914.

Gordon S, McKinlay RG, Riley AM and Osborne P (1989). Observations on the biology and distribution of the double dart moth (*Graphiphora augur* Fabricius) in Scotland, damage caused by the larvae to raspberry. *Crop Research,* **28**, 157-167.

Gratwick M (1992). Wingless weevils. Crop pests in the UK, 210-215. Online version: springer.com/gp/book/9789401046541 [accessed August, 2019]

Hagle SK (2010). Management guide for Armillaria root disease. A disease of the site. Forest Health Protection and State Forestry Organisations. Online version: fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5187208.pdf [assessed July 2019].

Hardy VG, Teakle DS, (1992). Transmission of sowbane mosaic virus by *Thrips tabaci* in the presence and absence of virus-carrying pollen. *Annals of Applied Biology*, **121**, 315-320

Hendricks J, Vera MT, De Meyer M and Clarke AR (2015). Resolving cryptic species complexes of major tephritid pests. *Zookeys,* **540**, 5-39.

Holopainen JK and Varis AL (1991). Host plants of the European tarnished plant bug *Lygus rugulipennis* Poppius (Heteroptera: Miridae). *Journal of Applied entomology,* **111**, 484-498.

Isogai M, Muramatu S, Watanabe M and Yoshikawa N (2013). Complete nucleotide sequence and latency of a novel blueberry-infecting closterovirus. *Journal of General Plant Pathology*, **79**, 123-127.

Isogai M, Tatuto N, Ujiie C, Watanabe M and Yoshikawa N (2012). Identification and characterization of blueberry latent spherical virus, a new member of subgroup C in the genus Nepovirus. Arch. *Virology*, **157**, 297–303.

Jung T, Vannini A and Brasier CM (2009). Progress in understanding *Phytophthora* diseases of trees in Europe 2004–2007. In: Goheen, E.M. and Frankel, S.J. (eds) Phytophthoras in Forests and Natural Ecosystems, General Technical Report PSW-GTR-221. United States Department of Agriculture Forest Service, Albany, California, pp. 3–24.

Kado, C. I. (1971). CMI/AAB Descr. *Plant Viruses – Sowbane mosaic virus.* No. 64. p. 4.

Kennedy DM and Duncan JM (1995). A papillate *Phytophthora* species with specificity to *Rubus*, *Mycological Research*, **99**, 57-68.

Kikoku Y, Tagashira N and Nakano H (2008). Heat resistance of fungi Isolated from frozen blueberries. *Journal of Food Protection*, **71,** 2030-2035.

Kong CS, Qiu XL, Yi KS, Yu XF and Yu L (2010). First Report of *Neofusicoccum vitifusiforme* causing blueberry blight of blueberry in China. *Plant Disease*, **94**, 1373.

Larum D (2019). Boysenberry Problems: Learn about common Boysenberry Pests and diseases. *Gardening know how*. Online version gardeningknow.com [assessed July 2019].

Louzada RS, Muller FA, Gonçalves RDS and Nava DE (2011). Occurrence and biology of *Tolype innocens* (Burmeister) on blueberry. *Revista Brasileira de Fruticultura,* **33**, 161-165.

MacDonald SG, Martin RR, Bristow PR (1991). Characterization of an ilarvirus associated with a necrotic shock reaction in blueberry. *Phytopathology,* **81**, 210–214.

Mailloux G and Bostanian NJ, (1993). Development of the strawberry bud weevil (Coleoptera: Curculionidae) in strawberry fields. *Annals of the Entomological Society of America*, **86**, 384–393.

Martin RR, Polashock JJ and Tzanetakis IE (2012). New and emerging viruses of blueberry and cranberry. *Viruses*, **4,** 2831–2852.

Marucci P (1966). Insects and their control. pp. 199-235. In P. Eck and N.F. Childers (eds.) *Blueberry Culture*, Rutgers University Press, New Brunswick, N.J.

McCoy CE and Brindley TA (1961). Biology of the four spotted fungus beetle, *Glischrochilus quadrisignatus* and its effect on European corn borer populations. *Journal of Economic Entomology,* **54**. 713–717.

McGechan JK and Fahy PC (1976). Angular leaf spot of strawberry, *Xanthomonas Fragariae:* First record of its occurrence in Australia, and attempts to eradicate the disease. *Australian Plant Pathology Society Newsletter* **5,** 57–59.

McKeen WE (1959). *Rhizoctonia rubi* sp. associated with dry better disease of loganberry. *Canadian Journal of Plant Science,* **39**, 82-85.

McQuate GT and Jameson ML (2011). Control of Chinese rose beetle through the use of solar powered night time illumination, *Entomologia Experimentalis et Applicata*, **141**, 187-196.

Millholland RD and Meyer JR (1984). Diseases and arthropod pests of blueberries. North Carolina Agricultural Research Service Technical Bulletin #468.

Mircetich SM (1973). Recent developments in the etilogy and control of peach stem pitting, *Virginia Fruit,* **61**, 59-64.

Morimoto KM, Ramsdell DC, Gillett JM and Chaney WG (1985). Acquisition and transmission of blueberry shoestring virus by its aphid vector *Illinoia pepperi*. *Phytopathology,* **75**, 709-712.

Morin L and Evans KJ (2010). *Rubus fruticosus* L. aggregate – European blackberry in *Biological Control of Weeds in Australia 1960 to 2010*, Eds M. Julien, R. Cruttwell McFadyen, J.M. Cullen. CSIRO Publishing, Collingwood, Australia.

Nondillo A, Ferrari L, Lerin S, Bueno OC and Botton M (2014). Foraging activity and seasonal food preference of *Linepithema micans* (Hymenoptera: Formicidae), a species associated with the spread of *Eurhizococcus brasiliensis* (Hemiptera: Margarodidae). *Journal of Economic Entomology*, **107**, 1385-1391.

Norton DC and Hoffman JK (1975). *Longidorus breviannulatus* n.sp (Nematoda: Longidoridae). Associated with stunted corn in Iowa. *Journal of Nematology*, **7**, 168-171.

Paltrinieri S, Caprara L, Pondrelli M, Carraro L and Bertaccini A (2000). Differenziazione molecolare di fitoplasmi appartenential gruppo 16SrIII. *Petria*, **10**, 103-104.

Petrović A, Čkrkić J, Jamhour A, Petrović-Obradović O, Mitrović M, Starý P, Nedstam B, Tomanović Ž (2017). First record of *Aphidius ericaphidis* (Hymenoptera, Braconidae) in Europe: North American hitchhiker or overlooked Holarctic citizen? *Journal of Hymenoptera Research*, **57**, 143-153.

Pfeiffer DG (2016). Rednecked cane borer, *Agrilus ruficollis.* Online version: hdl.handle.net/10919/73737 [assessed September 2019].

Polashock JJ, Ehlenfeldt MK and Crouch JA (2009). Molecular detection and discrimination of *Blueberry red ringspot virus* strains causing disease in cultivated blueberry and cranberry. *Plant Disease*, **93**, 727-733.

Prodorutti D, Vanblaere T, Gobbin D, Pellegrini A, Gessler C and Pertot I (2009). Genetic diversity of *Armillaria* spp. infecting highbush blueberry in Northern Italy (Trentino Region). *Phytopathology*, **99**, 651-658.

Queensland Department of Agriculture and Nursery and Garden Industry Australia (2019). Contingency Plan for Southern Red Mite, *Oligonychus ilicis* Online version: planthealthaustralia.com.au/wp-content/uploads/2019/12/Southern-red-mite-CP.pdf [assessed September 2020].

Ramsdell DC and Gillett JM (1981). *Peach rosette mosaic virus* in highbush blueberry. *Plant Disease*, **65**, 757-758.

Schuh RT (2002-2013). On-line systematic catalog of plant bugs (Insecta: Heteroptera: Miridae). Online version: research.amnh.org/pbi/catalog/ [assessed September 2019]

Smith KM (1972). *A textbook of plant virus diseases,* Edition 3, pp. 541-544, Longman, London, UK.

Stanaway MA, Zalucki MP, Gillespie PS, Rodriguez CM and Maynard GV (2001). Pest risk assessment of insects in sea cargo containers. *Australian Journal of Entomology,* **40**, 180-192.

Starović M, Kojic S, Kuzmanovic ST, Stojanovic SD, Pavlovic S and Josic D (2013). First report of blueberry reddening disease in Serbia associated with 16SrXII-A (Stolbur) Phytoplasma. *Plant Disease*, **97**, 1653-1653.

Staverlokk A (2010). *Otiorhynchus armadillo* (Rossi, 1792) (Coleoptera, Curculioidae) a weevil new to Norway. *Norwegian Journal of Entomology*, **57**, 9-11.

Steck GJ and Payne JA (2014). Blueberry maggot, *Rhagoletis mendax* Curran. In. Entomology and Nematology Department, UF/IFAS Extension Report. (EENY-041).

Sweeney J, Anderson RS, Webster RP and Neville R (2012). First records of *Orchester fagi* (L) (Coleoptera: Curculionidae) in North America, with a checklist of the North American Rhamphini. *The Coleopterists' Bulletin,* **66**, 297-304.

Szegedi E (1985). Host range and specific L(+)tartrate utilization of biotype 3 of *Agrobacterium tumefaciens*. *Acta Phytopathologica Academiae Scientiarum Hungaricae*, **20**, 17-22.

Tertuliano M, Srinivasan R and Scherm H (2012). Settling behaviour of the glassy-winged sharpshooter, *Homalodisca vitripennis,* vector of *Xylella fastidiosa*, on southern highbush blueberry cultivars. *Entomologia Experimentalis et Applicata*, **143**, 67-73.

Thekke-Veetil T, Ho T, Keller KE, Martin RR and Tzanetakis IE (2014). A new ophiovirus is associated with blueberry mosaic disease. *Virus Research*, **189**, 92-96.

Tozzp DCM, Ramsdell DC, Taboada O, Lee IM and Davis RE (1993). Epidemiological studies on the stunt disease of highbush blueberry. *Annals of Applied Biology,* **123**, 579–599.

Troubridge JT and Fitzpatrick SM (1993). A revision of the north American Operophtera (Lepidoptera: Geometridae). *The Canadian Entomologist,* **125**, 379-397.

United States Department of Agriculture (2016). Pest Alert. Asian gypsy moth. Animal and Plant Health Inspection Service Plant Protection and Quarantine. Online version: aphis.usda.gov [assessed August 2019].

USDA ARS (2013). Nomenclature Fact Sheets: Cline, E (2005). *Monilinia fructigena* and related brown fruit rots. Retrieved (25/02/2021) from: https://nt.ars-grin.gov/sbmlweb/onlineresources/nomenfactsheets/rptBuildFactSheet_onLine.cfm?thisName=Monilinia%20fructigena%20and%20related%20brown%20fruit%20rots&currentDS=specimens

Valiunas D, Alminaite A, Jomantiene R, Davis RE and Maas JL (2004). Possible cause of European Blueberry disease is related to North American milkweed yellows phytoplasma. *Journal of Plant Pathology,* **86**, 135-140.

Vives JM (1980). An important pest of Spanish carnations the South African carnation miner, *Epichoristodes acerbella* walk. *Agricultura Spain*, **49**, 688-691.

Walker AS, Gautier AL, Confais J, Martinho D, Viaud M, Cheur, P, Dupont J and Fournier E (2011). *Botrytis pseudocinerea*, a new cryptic species causing gray mold in French vineyards in sympatry with *Botrytis cinerea*. *Phytopathology*, **101**, 1433-1445.

Wang CL (1982). Insect pests and their injury on rose. *Journal of Agricultural Research of China*, **31**, 97-101.

West A and Shorthouse JD (1989). Initiation and development of the stem gall induced by *Hemadas nubilipennis* (Hymenoptera: Pteromalidae) on lowbush blueberry, *Vaccinium angustifolium* (Ericaceae). *Canadian Journal of Botany,* **67**, 2187-2198.

Westcott RL, Wyatt W and Grotta A (2019). The exotic *Agrilus cyanescens* (Ratzeburg) (Coleoptera: Buprestidae) is discovered in Oregon. Centre for Systematic Entomology, Gainesville, Florida. *Insecta mundi,* 1205.

Woo ENY, Ward LI and Pearson MN (2013). First Report of *Cherry leaf roll virus* in *Vaccinium darrowii. New Disease Reports*, **27**, 16.

Woo ENY, Clover GRG and Pearson MN (2012). First report of *Cherry leaf roll virus* (CLRV) in *Mallus domestica. Australasian Plant Disease Notes,* **7**, 151-156.

Yurtsever S (2000). Inheritance of the two dorsal colour/pattern phenotypes in New Zealand populations of the polymorphic meadow spittlebug *Philaenus spumarius* (L) (Homoptera: Cercopidae). *Journal of the Royal Society of New Zealand,* **30**, 411-418.

Young OP (1986). Host plants of the tarnished plant bug, *Lygus lineolaris* (Heteroptera: Miridae). *Annals of the entomological society of America*, **79**, 747-762.

ENDNOTES

[1] Including *Acer* spp. *(A. palmatum, A. platanoides), Actinidia* spp.*, Aesculus hippocastanum, Alcea rosea, Alnus* spp. *(A. glutinosa, A. japonica), Althaea officinalis, Ampelopsis japonica, Asparagus officinalis, Berchemia racemosa, Betula populifolia, Castanea* spp. *(C. crenata, C. dentata), Clethra alnifolia, Corylus avellana, Cyperaceae, Dioscorea esculenta, Fallopia* spp. *(F. convolvulus, F. japonica), Filipendula kamtschatica, Fragaria x ananassa, Glycine max, Hibiscus* spp. *(H. palustris, H. syriacus), Humulus lupulus, Hypericum japonicum, Juglans nigra, Kerria japonica, Lagerstroemia indica, Malus* spp. *(M. baccata, M. domestica, M. floribunda), Malva pusilla, Medicago sativa, Melia azedarach, Ocimum basilicum, Oenothera biennis, Parthenocissus quinquefolia, Persicaria* spp. *(P. lapathifolia, P. orientalis, P. pensylvanica), Phaseolus vulgaris, Platanus*spp. *(P. orientalis, P. x hispanica), Poaceae, Populus* spp. *(P. maximowiczii, P. nigra var. italica), Prunus* spp. *(P. armeniaca, P. avium, P. cerasifera var. pissardii, P. cerasus, P. domestica, P. japonica, P. persica var. nucipersica, P. persica, P. salicina, P. serotina, P. serrulata, P. spinosa), Pteridium aquilinum, Quercus* spp. *(Q. acutissima, Q. variabilis, Rheum rhaponticum, Robinia pseudoacacia, Rosa multiflora, Rubus crataegifolius, Rumex* spp.*, Salix* spp. *(S. discolor, S. viminalis), Sassafras albidum, Smilax china, Solanum* spp. *(S. lycopersicum, S. melongena), Sorbus americana, Tilia* spp. *(T. americana, T. cordata, T. japonica, T. miqueliana), Toxicodendron pubescens, Trifolium pratense, Ulmus* spp. *(U. americana, U. parvifolia, U. procera), Urtica, Vaccinium corymbosum, Vitis* spp. *(V. aestivalis, V. ficifolia var. lobata, V. labrusca, V. vinifera), Wisteria floribunda, Zea mays, Zelkova serrata* (EPPO, 2020).

[2] The odour and the location in direct sun play a pivotal role in the selection of host plants, in Japan the host range is smaller than in introduced countries (EPPO, 2020).

[3] The movement of *P. japonica* to other countries is thought to have been from nursery plants with larvae in soil. Adults have also been intercepted on agricultural produce and packaging (EPPO, 2020). *P. japonica* has been intercepted via aircrafts, and new populations traced back to airports frequently on a global scale (TRP, 2024). CFDA records interception data of *P. japonica* annually (Plant Health and Pest Prevention Services Division, 2024).

[4] *P. japonica* is highly polyphagous, and larvae can feed on roots of whatever host is available. Typically, the lifecycle is completed in one year. Adult females lay 1-3 eggs at a time, burrowed in soil, they will re-emerge, feed and remate to lay between 40-60 eggs in their life (Gyeltshen et al., 2019). Limiting factors for populations surviving and establishing are the environment itself temperature and soil moisture can impact survival (EPPO, 2020).

[5] Adults can fly up to 8km, however most adults will stay in the area where hosts are available. In colder temperatures and cloudy days adults will fly less. In areas where populations are high adults are more likely to move via hitchhiking on vehicles (EPPO, 2020). This pest is considered a hitchhiker with one of the main transmission pathways being on aircraft.

[6] Costs due to larvae were estimated to be 234 million USD per year for the control and replacement of damaged plants in 2015 (EPPO, 2020). Adults cause damage on foliage and flowers of a wide range of hosts and are most active on warm sunny days. The feeding on the upper leaf surface usually results in skeletonization. Larvae primarily feed on roots of grasses and cause large dead patches of turf, they also feed on other small root systems of nursery plants (Gyeltshen et al., 2019).

[7] Over time this has resulted in some species being added and removed from host lists, however a recent study in Europe that hosts which are considered "unsuitable" may still allow for larvae development, these hosts are detailed in the same study (Kenis et al., 2016).

[8] Hosts with varying suitability include: *Acca sellowiana*, *Actinidia arguta* (tara vine), *Actinidia chinensis* (Chinese gooseberry), *Amelanchier lamarckii* (snowy mespilus), *Amelanchier ovalis* (juneberry), *Ampelopsis brevipedunculata* (Amur amelopsis), *Arbutus unedo* (arbutus), *Arum italicum* (Italian arum), *Aucuba japonica* (Japanese aucuba), *Basella alba* (malabar spinach), *Citrus sinensis* (sweet orange), *Cornus alba* (red-barked dogwood), *Cornus canadensis* (creeping dogwood), *Cornus controversa* (giant dogwood), *Cornus kousa* (Kousa dogwood), *Cornus mas* (cornelian cherry), *Cornus sanguinea* (dogwood), *Cotoneaster coriaceus*, *Cotoneaster franchetii* (orange cotoneaster), *Cotoneaster rehder*i, *Crataegus chrysocarpa*, *Crataegus monogyna* (hawthorn), *Daphne mezereum* (mezereon), *Diospyros kaki* (persimmon), *Diospyros virginiana* (persimmon (common)), *Duchesnea indica* (India mockstrawberry), *Elaeagnus multiflora* (cherry silverberry), *Elaeagnus umbellata* (autumn olive), *Eriobotrya japonica* (loquat), *Eugenia uniflora* (Surinam cherry), *Festuca arundinacea* (tall fescue), F*icus carica* (common fig), *Fragaria* spp. (strawberry), *Fragaria ananassa* (strawberry), *Fragaria vesca* (wild strawberry), *Frangula alnus* (alder buckthorn), *Gaultheria adenothrix, Hippophae rhamnoides* (sea buckthorn*), Ilex mucronata*, *Lindera benzoin* (spicebush), *Lonicera* spp. (honeysuckles), *Lonicera alpigena*, *Lonicera caerulea*, *Lonicera caprifolium*, *Lonicera ferdinandii*, *Lonicera japonica* (Japanese honeysuckle), *Lonicera nigra*, *Lonicera nitida*, *Lonicera xylosteum* (Fly honeysuckle), *Lycium barbarum* (Matrimonyvine), *Mahonia aquifolium* (Oregongrape), *Malpighia emarginata*, *Malus baccata* (siberian crab apple), *Malus domestica* (apple), *Morus alba* (mora), *Morus bombycis* (Japanese mulberry), *Morus rubra* (red mulberrytree), *Murraya paniculata* (orange jessamine), *Myrica rubra*, *Paris quadrifolia*, *Parthenocissus quinquefolia* (Virginia creeper), *Photinia beauverdiana*, *Photinia prunifolia*, *Photinia villosa, Phytolacca acinosa* (Indian pokeweed), *Phytolacca americana* (pokeweed), *Polygonatum multiflorum*, *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus cerasifera* (myrobalan plum), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus japonica* (Japanese bush cherry tree), *Prunus laurocerasus* (cherry laurel), *Prunus lusitanica*, *Prunus mahaleb* (mahaleb cherry), *Prunus mume* (Japanese apricot tree), *Prunus nipponica*, *Prunus padus (*bird cherry), *Prunus persica* (peach), Prunus persica var. nucipersica (nectarine), Prunus sargentii (sargent's cherry), *Prunus serotina* (black cherry), *Prunus spinosa* (blackthorn), *Psidium guajava* (guava), *Pyracantha* spp. (Firethorn), *Pyrus communis* (European pear), *Rhamnus cathartica* (buckthorn), *Ribes rubrum* (red currant), *Rosa acicularis* (Prickly rose), *Rosa canina* (Dog rose), *Rosa glauca* (red-leaved rose*), Rosa pimpinellifolia* (Burnet rose), *Rosa rugosa* (rugosa rose), *Rubus* spp. (blackberry, raspberry), *Rubus armeniacus* (Himalayan blackberry), *Rubus caesius* (dewberry), *Rubus fruticosus* (blackberry), *Rubus hirsutus*, *Rubus idaeus* (raspberry), *Rubus laciniatus* (cutleaf blackberry), *Rubus loganobaccus* (loganberry), *Rubus phoenicolasius*, *Rubus saxatilis*, *Rubus spectabilis* (salmonberry), *Rubus triphyllus*, *Rubus ursinus* (boysenberry), *Sambucus ebulus*, *Sambucus nigra* (elder), *Sambucus racemosa* (red-berried elder), *Solanum americanum*, *Solanum dulcamara* (bittersweet nightshade), *Solanum luteum*, Sorbus aria (whitebeam), Sorbus aucuparia (mountain ash), Symphoricarpos albus (common snowberry), Tamus communis, Taxus baccata (English yew), Triticum aestivum (wheat), *Vaccinium angustifolium* (Lowbush blueberry*), Vaccinium corymbosum* (blueberry), *Vaccinium myrtilloides*, *Vaccinium myrtillus* (blueberry), *Vaccinium oldhamii*, *Vaccinium vitis-idaea* (cowberry), *Viburnum lantana* (Wayfaring tree), *Viburnum rhytidophyllum*, *Viscum album* (mistletoe), *Vitis labrusca* (fox grape), *Vitis vinifera* (grapevine).

[9] *D. suzukii* shows sexual dimorphism with males displaying a dark spot on the top edge of each wing and females having a large, serrated ovipositor. The serrated ovipositor allows females to pierce fruit skin, a female can lay between 350-400 eggs in their lifetime with 3-13 generations produced depending on temperature (EPPO, 2020).
[10] This species is often found on cut flowers (BRP, 2024).
[11] Algeria, Comoros, Georgia, Kenya, Mayotte, Morocco, Réunion, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Finland, France, Germany, Greece, Hungary, Ireland, Italy Montenegro, Morocco, Netherlands, Poland, Portugal (including Azores, Madeira), Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, China, India, Iran, Israel, Japan, Korea, Myanmar, Pakistan, Taiwan, Thailand, Canada, Mexico (transient), United States of America (including Hawaii), Argentina, Brazil, Chile, Uruguay, French Polynesia (EPPO, 2020).
[12] Global trade of fruit has been attributed to the spread of *D. sukukii*, females prefer to lay eggs in fruit just prior to harvest or just after in some cases making the risk of larvae being transported in fruit higher (Tait et al., 2021). The ovipositor injuries are small and may not be detected on inspection post-harvest. Larvae and adults can overwinter in soil and may be imported in soil with plant material (DAFF Biosecurity, 2013).
[13] All *D. suzukii* life stages are capable of surviving different environments including some cold treatment conditions and changes in environmental conditions (EPPO, 2020). Their wide host range of both cultivated and wild plants allows a higher chance of survival and for a population to establish even through colder seasons (Tait et al., 2021).
[14] Adults can fly easily to find suitable hosts as has been seen following introduction in Europe and North America. It is also suspected that adult *D. suzukii* use passive wind currents to aid their movement and a study found that in one year an adult fly was able to spread 1400km via natural spread or trade (EPPO, 2020).
[15] Management of *D. suzukii* is costly and depending on the availability of control methods crops may be lost to infestation regardless. Studies have found that control methods with insecticides, mulching and traps are unsustainable long-term for control and ability of *D. suzukii* to survive in harsh conditions leads to populations recovering (Rendon et al., 2020). In 2012, the first year of blueberry production post introduction in Maine it was estimated that *D. suzukii* caused $1.4 million USD damage (Drummond et al., 2019). In Italy it was estimated that 30-40% of yield was lost to blueberries in 2011 (EPPO, 2020).
[16] A full host list can be found in a Pest risk analysis conducted by the Australian Department of Agriculture, Fisheries and Forestry (2019).
[17] Whilst this species has a wide host range, it exhibits strong preferences for certain species, preferring those with fruiting structures (Penca & Hodges, 2019). This species is most commonly observed to feed on fruiting structures of plants, although it is also capable of feeding on vegetative structures and of piercing through the bark of some trees to feed (Penca & Hodges, 2019).
[18] Algeria, Morocco, Armenia, China, Japan, Kazakhstan, Nepal, North Korea, South Korea, Taiwan, Turkey, Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, France, Georgia, Germany, Greece, Hungary, Italy, Liechtenstein, Malta, Moldova, North Macedonia, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Ukraine, United Kingdom, Canada, United States of America, Chile.
[19] Reported to affect fruit quality of blueberries at harvest with damage to blueberry fruits in the form of increased levels of external discolouration and internal damage (tissue necrosis) (Wiman et. al, 2015). Serious damage to blueberry fruits in the form of fruit deformation, softening, shrinkage and internal tissue necrosis has been reported in Serbia (Konjevic, 2022). Exposure of blueberries to *Halyomorpha halys* has also been reported to be associated with a decrease in berry weight and lower content of dry matter in fruits (Konjevic, 2022).
[20]Based on interception records the entry potential is considered high.
[21] *Euschistus conspersus* behaves as a hitchhiker like the Brown Marmorated Stink Bug (*Halyomorpha halys*) but has comparatively fewer hosts leading to an entry potential risk rating of MEDIUM for this species (*Euschistus conspersus*) relative to an entry potential risk rating of HIGH for the Brown Marmorated Stink Bug (*Halyomorpha halys*)(BRP, 2024). The Brown Marmorated Stink Bug (*Halyomorpha halys*) is highly polyphagous with a wider host range than *Euschistus conspersus* leading to a relatively lower economic impact risk rating of HIGH for *Euschistus conspersus* compared to EXTREME for the Brown Marmorated Stink Bug (*Halyomorpha halys*)(BRP, 2024).
[22] *S. dorsalis* is reported to be highly polyphagous, however since the separation of cryptic species, SA 1, SA 2 and EA 1 have been determined to have a wider host range compared to EA 2, EA 3 and EA 4 (Dickey et al., 2015). Hosts include *Abelia x grandiflora, Abelmoschus esculentus, Acacia, Acalypha chamaedrifolia, Acalypha hispida, Acalypha indica, Acalypha macrostachya, Actinidia chinensis, Allamanda cathartica, Allium cepa, Allium* sp.*, Almeidea rubra, Amaranthus spinosus, Anacardium occidentale, Antirrhinum majus, Apium graveolens, Arachis hypogaea, Ardisia compressa, Azadirachta indica, Barringtonia racemosa, Begonia* sp.*, Begonia tuberhybrida hybrids, Berberis bealei, Bremeria pervillei, Brexia madagascariensis, Breynia disticha, Brownea* sp.*, Bruguiera* sp.*, Caladium* sp.*, Camellia japonica, Camellia sasanqua, Camellia sinensis, Campanula carpatica, Capparis erythrocarpos, Capsicum annuum, Capsicum frutescens, Carica papaya, Catunaregam spinosa, Ceiba pentandra, Celosia argentea var. plumosa, Celosia argentea, Chrysanthemum* sp.*, Citroncirus Citrumelo hybrids, Citroncirus webberi, Citroncirus, Citrus medica, Citrus reshni, Citrus trifoliata, Citrus x aurantiifolia, Citrus x aurantium var. sinensis, Citrus x aurantium var. unshiu, Citrus x aurantium, Citrus x latifolia, Citrus x limon var. meyerii, Citrus x limon, Citrus, Clitoria javitensis, Codiaeum variegatum, Coleus scutellarioides, Colocasia esculenta, Conocarpus erectus, Coreopsis* sp.*, Coriandrum sativum, Cosmos caudatus, Crassula ovata, Crinum purpurascens, Crossandra infundibuliformis, Crossandra massaica, Cucumis sativus, Cuphea* sp.*, Dahlia* sp.*, Daucus carota, Desmanthus* sp.*, Dieffenbachia seguine, Dimocarpus longan, Dimorphotheca ecklonis, Dioscorea alata, Diospyros kaki, Diplocyclos palmatus, Dissotis rotundifolia, Duranta erecta, Echinacea purpurea, Echinochloa colonum, Eclipta prostrata, Ehretia cymosa, Embelia procumbens, Epipremnum pinnatum, Euadenia eminens, Eucalyptus deglupta, Euphorbia hypericifolia, Euphorbia pulcherrima, Eustoma russellianum, Ficus elastica, Ficus exasperata, Ficus lingua, Fittonia albivenis, Fortunella, Fragaria x ananassa, Garcinia livingstonei, Garcinia mangostana, Gardenia jasminoides, Gardenia thunbergia, Gerbera jamesonii, Gerbera* sp.*, Glandularia* sp.*, Glycine max, Gnetum costatum, Gossypium barbadense, Gossypium hirsutum, Gossypium* sp.*, Hedera helix, Heptapleurum arboricola, Hevea brasiliensis, Hevea* sp.*, Hibiscus arnottianus, Hibiscus liliiflorus, Hibiscus rosa-sinensis, Hydrangea, Iguanura geonomiformis, Illicium floridanum, Impatiens hawkeri, Impatiens walleriana, Jasminum sambac, Justicia extensa, Lagerstroemia indica, Laguncularia racemosa, Lantana camara, Lawsonia inermis, Lebronnecia kokioides, Leea guineensis, Lepidium sativum, Licuala grandis, Ligustrum japonicum, Ligustrum* sp.*, Litchi chinensis, Ludwigia hyssopifolia, Lysimachia ruhmeriana, Malpighia glabra, Mangifera indica, Manihot esculenta,*

Manilkara zapota, Markhamia zanzibarica, Mimosa pudica, Mimosa, Mitriostigma axillare, Monanthotaxis obovata, Morus alba, Murraya koenigii, Murraya paniculata, Napoleonaea vogelii, Nelumbo nucifera, Ocimum basilicum, Odontonema tubaeforme, Oenothera lindheimeri, Oncoba spinosa, Paeonia officinalis, Palisota mannii, Passiflora edulis, Passiflora foetida, Pavetta revoluta, Pelargonium graveolens, Pelargonium x hortorum, Pentas lanceolata, Persea americana, Petunia hybrids, Phaseolus vulgaris, Phyllanthus niruri, Phyllanthus urinaria, Pittosporum senacia, Pittosporum tobira, Plerandra elegantissima, Plumbago auriculata, Plumeria rubra, Polyscias ornifolia, Pouteria campechiana, Psidium guajava, Punica granatum, Pyrus communis, Quisqualis indica, Ramosmania rodriguesii, Rhaphiolepis indica, Rhaphiolepis umbellata, Rhododendron sp.*, Richardia brasiliensis, Ricinus communis, Rosa* sp.*, Rosa, Rotheca myricoides, Rubus idaeus, Rubus* sp.*, Salvia farinacea, Salvia officinalis, Sanchezia oblonga, Saraca indica, Scindapsus pictus, Selenicereus undatus, Sesbania herbacea, Solanum lycopersicum, Solanum melongena, Solanum tuberosum, Stereospermum nematocarpum, Strobilanthes auriculata var. dyeriana, Strobilanthes maculata, Synsepalum dulcificum, Syzygium* sp.*, Tabernaemontana divaricata, Tagetes erecta, Tagetes patula, Tamarindus indica, Tarenna alleizettei, Tarenna alpestris, Tecoma fulva, Tephrosia vogelii, Terminalia boivinii, Terminalia mantaly, Terminalia neotaliala, Theobroma cacao, Thunbergia erecta, Thunbergia vogeliana, Tradescantia zebrina, Trichilia havanensis, Trilepisium madagascariense, Trimezia lutea, Turraea floribunda, Vaccinium corymbosum, Vaccinium darrowii, Vaccinium myrtillus, Vaccinium, Viburnum odoratissimum, Viburnum suspensum, Vigna radiata, Viola x wittrockiana, Vitis vinifera, Zinnia elegans, Zinnia x marylandica, x Citrofortunella microcarpa* (EPPO, 2023).

[23] *S. dorsalis* can reproduce both sexually and parthenogenically and depending on temperatures can have between 4-8 generations per year. Larvae and adults feed particularly on young, developing tissue including shoots, leaves, young fruit, and flowers (EPPO, 2023).

[24] Israel, Portugal (mainland), Spain (mainland, Islas Canárias), Türkiye, Cote d'Ivoire, Kenya, Uganda, Bangladesh, Brunei Darussalam, China, Hong Kong, India, Indonesia, Iran, Israel, Japan, Malaysia, Maldives, Myanmar, Pakistan, Philippines, Sri Lanka, South Korea, Taiwan, Thailand, Vietnam, Mexico, United States of America (southern states and Hawaii), Barbados, Cuba, Guadeloupe, Jamaica, Puerto Rico, Saint Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Brazil, Colombia, French Guiana, Peru, Suriname, Venezuela, Papua New Guinea, Solomon Islands (EPPO, 2023).

[25] Based on previous tracking of cryptic species, SA 1, SA 2 and EA 1 are considered to have a higher invasion potential (Dickey et al., 2015). Long distance spread via trade is also possible as it is reported being intercepted on produce (EPPO, 2023).

[26] Depending on the cryptic species, the host range varies. Reproduction can occur parthenogenically from one adult. Based on the current distribution of Australian species, it would likely establish in northern Australia (EPPO, 2023).

[27] Movement of adults is facilitated by wind and may occur via human assisted movement (eg. Trade) (EPPO, 2023).

[28] Hot and humid summers favour rapid population growth of *S. dorsalis*, leading to a reduction of blueberry growth and this can worsen over longer periods of time. Regular insecticide application is required to control populations and add to costs (Panthi et al., 2021). *S. dorsalis* populations additionally are dominant when found in Rubus and strawberry fields and if untreated yield is negatively impacted (Lahiri et al., 2024).

[29] Symptoms reported to include concentric circles of fungal growth on rotten, infected fruit (Plant Biosecurity and Product Integrity, 2017).

[30]Egypt, Morocco, Afghanistan, Armenia, Azerbaijan, China, Georgia, India, Iran, Israel, Japan, Kazakhstan, Lebanon, Nepal, North Korea, South Korea, Taiwan, Turkey, Uzbekistan, Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom.

[31] Introduction could occur through the importation of infected fruit as well as of tree material for propagation and breeding. Infection of fruitlets during or shortly after flowering may result in latent infections that often become active again just before or after harvest (Plant Biosecurity and Product Integrity, 2017).

[32] Fungal spores can be spread by wind and rain, and the pathogen can also be spread with infected plant material (Plant Health Australia, 2013). Fruit-to-fruit contact will spread the pathogen within a single tree (Plant Health Australia, 2013).

[33] Long distance transport of brown rot is most likely to occur with the movement of infected plant material or fruit (Plant Biosecurity and Product Integrity, 2017).

[34] Commonly confused with *Ericaphis scammelli* and is likely that *Ericaphis fimbriata* and *E. scammelli* are synonymous (Blackman and Eastop 1984, Foottit et al. 2008, G. Bosio – pers. comm. 2001, V. Eastop – pers. comm. 2002 as cited by Petrovic et al 2017)

[35] While *Ericaphis fimbriata* is found on strawberry and Nootka rose, *Blueberry scorch virus* does not affect strawberries so the rating for *Ericaphis fimbriata* with *Blueberry scorch virus* is only for blueberry.

[36] Host range includes: *Vaccinium ashei*, *Vaccinium caudatifolium*, *Vaccinium stenophyllum*, *Vaccinium vitis-idaea* (Dransfield & Brightwell, 2021). Also found on *Vaccinium corymbosum* (highbush blueberry) (Plant Biosecurity and Product Integrity, 2017), *Vaccinium macrocarpon* (cranberry) (Plant Biosecurity and Product Integrity, 2017) and *Vaccinium membranaceum* (black huckleberry) (Netherlands Food and Consumer Product Safety Authority, 2012). Under laboratory conditions, *Chenopodium quinoa* (quinoa) (Plant Biosecurity and Product Integrity, 2017) and *Nicotiana occidentalis* (Lowery et. al, 2007) have been reported as hosts.

[37]Through feeding, blueberry aphid causes damage to host plants in the form of deformed leaves and reduced plant vigour (Plant Biosecurity and Product Integrity, 2017) Blueberry aphid also impacts host plant health by secreting honeydew and encouraging fungal growth (Plant Biosecurity and Product Integrity, 2017). Blueberry aphid is also the main vector of blueberry scorch virus (BIScV)(Plant Biosecurity and Product Integrity, 2017). Aphids are known to transmit BIScV locally by flying or up to a few kilometres by wind dispersal (Plant Biosecurity and Product Integrity, 2017). BIScV can also be spread via infected grafting or propagation material (Plant Biosecurity and Product Integrity, 2017). For *Vaccinium corymbosum* (highbush blueberry), productivity of infected plants declines each year, eventually leading to plant death (Plant Biosecurity and Product Integrity, 2017). Multiple strains of BIScV exist such as the New Jersey (or East Coast) strains and the Northwest (or West Coast) strains (Netherlands Food and Consumer Product Safety Authority, 2012). Molecular characterisation of BIScV isolates in Italy has also suggested the presence of a new strain in Piedmont (Netherlands Food and Consumer Product Safety Authority, 2012).

[38] Long-distance spread of blueberry aphid and blueberry scorch virus (BISCv) is possible with the transport of infected plant material (Plant Biosecurity and Product Integrity, 2017).

[39] Responsible for the spread of *Blueberry scorch virus.* Aphids can spread locally through flight or up to a few kilometres by wind dispersal. Long-distance spread of blueberry aphid and BIScV is possible with the transport of infected plant material (Plant Biosecurity and Product Integrity, 2017).

[40] Through feeding, blueberry aphid causes damage to host plants in the form of deformed leaves and reduced plant vigour. Blueberry aphid also impacts host plant health by secreting honeydew and encouraging fungal growth. Blueberry aphid is also the main vector of blueberry scorch virus (BIScV). The insect-disease complex made up of blueberry aphid and blueberry scorch virus (BISCv) is considered a serious threat to Australia's blueberry industry; with all *Vaccinium corymbosum* (highbush blueberry) varieties appearing to be susceptible with productivity of infected plants declining each year eventually leading to plant death (Plant Biosecurity and Product Integrity, 2017).

[41] Hosts list continues to grow primarily within ornamental plant species.

[42] Host range includes: *Abelmoschus esculentus* (okra), *Abrus precatorius*, *Acer rubrum*, *Albizia julibrissin*, *Alcea rosea*, *Amaranthus hybridus*, *Amaranthus spinosus*, *Amaranthus viridis*, *Ambrosia artemisiifolia*, *Ampelopsis arborea* (peppervine), *Asclepias* sp., *Asparagus officinalis*, *Baccharis halimifolia*, *Begonia sp*., *Bidens pilosa*, *Bucida buceras*, *Caesalpinia pulcherrima*, *Callicarpa americana*, *Callistemon viminalis*, *Camellia japonica*, *Campsis radicans*, *Carphephorus odoratissimus*, *Carya illinoinensis* (pecan), *Cassia sp.*, *Casuarina*, *Catalpa bignonioides*, *Catalpa sp*., *Cenchrus purpureus*, *Cephalanthus occidentalis*, *Cercis* sp., *Chenopodium album*, *Chrysanthemum x morifolium*, *Citrofortunella mitis*, *Citrus*, *Citrus x aurantium* var. *sinensis*, *Citrus limon* (lemon), *Clerodendrum indicum*, *Clusia* sp*., Codiaeum variegatum*, *Conocarpus erectus*, *Convolvulus arvensis*, *Cordyline fruticosa*, *Cotoneaster* sp., *Cycas* sp., *Dysphania ambrosioides*, *Elaeagnus* sp., *Enterolobium cyclocarpum*, *Erechtites hieraciifolius*, *Erigeron canadensis*, *Eriobotrya japonica*, *Eucalyptus*, *Eupatorium capillifolium, Eupatorium perfoliatum*, *Ficus*, *Ficus benjamina* (weeping fig), *Fortunella* (kumquats), *Fraxinus*, *Gardenia*, *Gardenia taitensis*, *Ginkgo biloba*, *Gladiolus* sp., *Glycine max, Gordonia lasianthus*, *Gossypium herbaceum*, *Helianthus*, *Helianthus annuus*, *Hemionitis arifolia*, Heptapleurum actinophyllum, Heterotheca subaxillaris, *Hibiscus rosa-sinensis* (Chinese rose), *Ilex*, *Ilex glabra*, *Ilex vomitoria*, *Indigofera hirsuta*, *Ipomoea*, *Jasminum mesnyi*, *Juglans regia* (walnut), *Lactuca canadensis*, *Lagerstroemia indica* (Indian crape myrtle), *Lantana camara*, *Laurus nobilis* (sweet bay), *Leucadendron*, *Ligustrum* sp., *Liquidambar styraciflua*, *Ludwigia peruviana*, *Macadamia* sp., *Magnolia grandiflora* (Southern magnolia), *Magnolia virginiana*, *Malus* (ornamental species apple), *Malus sylvestris*, *Mangifera indica*, *Manilkara roxburghiana*, *Medicago sativa*, *Melaleuca quinquenervia* (paperbark tree), *Melaleuca viminalis*, *Melia azedarach*, *Mimosa* (sensitive plants), *Mirabilis jalapa* (four o'clock flower), *Momordica charantia*, *Monarda fistulosa*, *Morella cerifera*, *Myrtus communis* (myrtle), *Nerium oleander*, *Nyssa sylvatica, Oenothera laciniata*, *Oenothera simulans*, Olea (olive), *Olea europaea*, *Ostrya virginiana*, *Parkinsonia aculeata* (Mexican palo-verde), *Parthenocissus quinquefolia*, *Pennisetum purpureum* (elephant grass), *Persea americana* (avocado), *Photinia*, *Phytolacca americana*, *Pinus* sp., *Pisum* sp.), *Pittosporum* sp., *Platanus* sp., *Pisum* (pea), *Populus* (poplars), *Prunus* (stone fruit), *Prunus americana* (American plum), *Prunus angustifolia*, *Prunus avium* (sweet cherry), *Prunus caroliniana*), *Prunus domestica* (plum), *Prunus dulcis* (almond), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Psidium* (guava), *Psophocarpus tetragonolobus* (winged bean), *Pteridium aquilinum*, *Pyracantha* (Firethorn), *Pyracantha coccinea*, *Pyrus* (pears), *Pyrus communis*, *Quercis*, *Quercus laevis* (Turkey oak), *Quercus virginiana* (Live oak), *Rhus* (Sumach), *Ricinus communis*, *Rosa* (roses), *Rubus fruticosus* (blackberry*), Rudbeckia laciniata*, *Salix* (willows), *Salix caroliniana*, *Sambucus canadensis*, *Sansevieria* sp., *Sassafras albidum*, *Schinus terebinthifolia*, *Senna occidentalis*, *Senna tora*, *Sida cordifolia*, *Sida rhombifolia*, *Smilax laurifolia*, *Solidago altissima, Solidago fistulosa*, *Solidago* sp., *Sonchus asper*, *Sorghum bicolor*, *Sorghum halepense*, *Spathodea campanulata*, *Swietenia mahagoni* (Cuban mahogany), *Tetragonolobus* sp., *Thuja* sp., *Urena lobata*, *Vernicia fordii*, *Viburnum* sp., *Vigna unguiculata*, *Vitis* (grape), *Vitis munsoniana*, *Vitis vinifera* (grapevine), *Wisteria*, x *Citrofortunella microcarpa*, *Xanthium* sp., *Yucca aloifolia*, *Zea mays*. Also found on *Vaccinium* spp. (blueberry) (Tertuliano et. al, 2012).

[43] The economic impact of Xylella with glassy winged sharpshooter would be extreme, potentially leading to plant death.

[44] Host range includes: *Prunus persica* (peach), *Malus* spp. (apple), *Prunus* spp. (plum), *Prunus virginiana* (chokeberry)(Palmiter et. al, 1960). Also found on *Solanum tuberosum* (potato)(Pantoja et. al, 2008). Also found on *Trifolium pratense* (red clover), *Fragaria virginiana* (strawberry) and *Rubus allegheniensis* (blackberry) (McClure, 1980). Also found on *Ceanothus velutinus* (sticky laurel), *Spiraea* spp. (spirea), *Cirsium* spp. (thistle), *Populus balsamifera* (balsam poplar), wild rose, willow, *Rhus* spp. (sumac), *Berberis* spp. (Oregon grape), peach, and sweet cherry, *Medicago* spp. (alfalfa), *Lotus* spp. (trefoil), *Trifolium* spp. (red clover), *Melilotus* (sweetclover), *Rumex acetosella* (sheep sorrel), *Stellaria* (chickweed), peach, chokecherry, wild black cherry (Say, 1830). Also found on *Vinca rosea* (periwinkle), *Callistephus chinensis* (aster) and *Trifolium repens* (ladino clover) (Chiykowski, 2011). Also found on *Fragaria virginiana* (Virginia strawberry, wild strawberry, common strawberry, or mountain strawberry) and *Apium graveolens* (celery)(McClure, 1980). Also found on Citrus, peach, common choke cherry tree, blueberries.

[45]*Scaphytopius acutus* is also capable of transmitting a celery-infecting strain of aster-yellows virus from infected periwinkle (*Vinca rosea* L.) and aster (*Callistephus chinensis* Nees) to periwinkle, aster, and ladino clover (*Trifolium repens* L.) (Chiykowski, 2011). Also reported to vector alfalfa witches' broom virus in the United States of America (Utah)(Glover & McAllister, 1960) and X-disease virus (Palmiter et. al, 1960).

[46] *S. acutus* has multiple generations a year, eggs appear to undergo diapause which can interrupt treatment timing (Wilson & Turner, 2021).

[47] Economic impact would be EXTREME if this species was vectoring pathogens such as blueberry stunt disease; a disease which is economically important to all cultivars of *Vaccinium corymbosum* (highbush blueberry) and in some lowbush cultivars (*V. angustifolium*, *V vacillans*, *V. atrococcum*, *V. stamineum*, *V. myrtilloides*) (Tozzp et. al, 1993).

[48] Hosts include: *Acer* spp. (maple), *Apocynum* spp. (dogbane), *Ilex decidua* (possumhaw), *Ambrosia trifida* (great ragweed), *Chrysanthemum* spp. *(*daisy), *Zinnia violacea* (elegant zinnia), *Alnus* spp. (alder), *Betula papyrifera* (paper birch), *Lobelia* spp. (lobelia), *Lonicera* spp. (honeysuckle), *Vaccinium* spp. *(*blueberry), *Quercus* spp. (oak), *Geranium* spp. (geranium), *Alcea rosea* (hollyhock), *Leucanthemum vulgare* (oxeye daisy), *Myrica gale* (sweetgale), *Platanthera cristata* (crested yellow orchid), *Abies balsamea* (balsam fir), *Larix* spp. (larch), *Picea glauca* (white spruce), *Picea mariana* (black spruce), *Picea rubens* (red spruce), *Pinus sylvestris* (Scots pine), *Tsuga canadensis* (eastern hemlock), *Malus* spp. (apple), *Malus domestica* (apple), *Prunus domestica* (European plum), *Prunus pensylvanica* (pin cherry), *Prunus persica* (peach), *Prunus serotina* (black cherry) *Rosa* spp. (rose), *Populus tremuloides* (quaking aspen), *Salix* spp. (willow), *Tilia americana* (American basswood), *Ulmus americana* (American elm), *Viola* spp. (violet), *Vitis vinifera* (wine grape).

[49] Including, *Abies balsamea* (balsam fir), *Acacia* spp. (wattles), *Acer* spp. (maples), *Acer negundo* (box elder), *Acer pensylvanicum* (striped maple), *Acer platanoides* (Norway maple), *Acer rubrum* (red maple), *Acer saccharinum* (silver maple), *Acer saccharum* (sugar maple), *Acer spicatum* (Mountain maple), *Acer velutinum, Alnus* spp. (alders), *Alnus alnobetula* (green alder), *Alnus glutinosa* (European alder), *Alnus incana* (grey alder), *Alnus maritima, Alnus oblongifolia, Alnus rubra* (red alder), *Alnus serrulata, Amelanchier* spp. (serviceberries), *Amelanchier canadensis* (thicket serviceberry), *Amelanchier intermedia, Aronia melanocarpa* (black chokeberry), *Azaleas, Berberis vulgaris* (European barberry), *Betula* spp. (birches), *Betula alleghaniensis* (yellow birch), *Betula davurica* (mongolian birch), *Betula lenta* (sweet birch), *Betula nigra* (river birch), *Betula occidentalis* (Water birch), *Betula papyrifera* (paper birch), *Betula pendula* (common silver birch), *Betula populifolia* (gray birch), *Betula pubescens* (Downy birch), *Betula pumila* (low birch), *Carpinus* spp. (hornbeams), *Carpinus caroliniana* (American hornbeam), *Carya* spp. (hickories), *Carya cordiformis* (bitternut hickory), *Carya glabra* (Pignut hickory), *Carya ovata* (shagbark hickory), *Carya tomentosa, Castanea* (chestnuts), *Castanea dentata* (American chestnut), *Castanea sativa* (chestnut), *Cedrus* spp. (cedars), *Cedrus libani* (cedar of Lebanon), *Celtis occidentalis* (hackberry), *Chamaecyparis thyoides* (Atlantic white cedar), *Clethra alnifolia, Comptonia peregrina* (sweetfern), *Cornus* spp. (Dogwood), *Cornus florida* (Flowering dogwood), *Cornus sericea* (redosier dogwood), *Corylus americana* (American hazel), *Corylus avellana* (hazel), *Corylus cornuta* (beaked hazel), *Corylus heterophylla* (siberian hazel), *Cotinus coggygria* (fustet), *Cotinus obovatus, Crataegus* spp. (hawthorns), *Cydonia oblonga* (quince), *Diospyros* spp. (malabar ebony), *Diospyros virginiana* (persimmon (common)), *Eubotrys racemosa, Eucalyptus camaldulensis* (red gum), *Fagus* spp. (beeches), *Fagus grandifolia* (American beech), *Fagus sylvatica* (common beech), *Fraxinus* spp. (ashes), *Fraxinus americana* (white ash), *Fraxinus nigra* (black ash), *Fraxinus pennsylvanica* (downy ash), *Fraxinus quadrangulata* (Blue ash), *Gaultheria procumbens* (Aromatic wintergreen), *Gaylussacia baccata* (black huckleberrry (USA)), *Gaylussacia frondosa* (Dangleberry), *Gleditsia triacanthos* (honey locust), *Gymnocladus dioica, Hamamelis virginiana* (Virginian witch-hazel), *Ilex laevigata, Ilex opaca* (American holly), *Iris versicolor, Juglans* spp. (walnuts), *Juglans cinerea* (butternut), *Juglans nigra* (black walnut), *Juniperus communis* (common juniper), *Juniperus virginiana* (eastern redcedar), *Kalmia angustifolia* (Sheep laurel), *Kalmia latifolia* (Mountain laurel), *Larix* spp. (larches), *Larix decidua* (common larch), *Larix gmelinii* (Dahurian larch), *Larix kaempferi* (Japanese larch), *Larix laricina* (American larch), *Larix lyallii* (subalpine larch), *Larix occidentalis* (western larch), *Lespedeza bicolor* (bicolor lespedeza), *Ligustrum vulgare* (common privet), *Liquidambar styraciflua* (Sweet gum), *Liriodendron tulipifera* (tuliptree), *Litchi chinensis* (lichi), *Lithocarpus edulis, Lyonia ligustrina, Maackia amurensis, Malus angustifolia, Malus coronaria* (sweet crab-apple), *Malus domestica* (apple), *Malus fusca, Malus ioensis* (prairie crab-apple), *Morus alba* (mora), *Myrica caroliniensis, Myrica gale* (waxberry), *Nyssa sylvatica* (tupelo), *Ostrya carpinifolia* (hop-hornbeam), *Ostrya virginiana* (American hophornbeam), *Parrotia persica* (persian ironwood), *Picea* spp. (spruces), *Picea abies* (common spruce), *Picea engelmannii* (Engelmann spruce), *Picea glauca* (white spruce), *Picea jezoensis* (Yeddo spruce), *Picea mariana* (black spruce), *Picea rubens* (red spruce), *Pinus* (pines), *Pinus armandii* (armand's pine), *Pinus brutia* (brutian pine), *Pinus contorta* (lodgepole pine), *Pinus echinata* (shortleaf pine), *Pinus monticola* (western white pine), *Pinus radiata* (radiata pine), *Pinus resinosa* (red pine), *Pinus rigida* (pitch pine), *Pinus strobus* (eastern white pine), *Pinus sylvestris* (Scots pine), *Pinus sylvestris var. mongolica, Pinus tabuliformis* (chinese pine), *Pinus taeda* (loblolly pine), *Pistacia vera* (pistachio), *Platanus acerifolia* (London planetree), *Platanus occidentalis* (sycamore), *Populus* spp. (poplars), *Populus alba* (silver-leaf poplar), *Populus angustifolia* (narrow-leaved poplar), *Populus balsamifera* (balm of Gilead), *Populus deltoides* (poplar), *Populus grandidentata* (Bigtooth aspen), *Populus heterophylla* (Swamp cottonwood), *Populus nigra* (black poplar), *Populus nigra var. italica, Populus tremuloides* (trembling aspen), *Prunus* spp. (stone fruit), *Prunus americana* (American plum), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus cerasifera* (myrobalan plum), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus maritima* (beach plum), *Prunus pensylvanica* (pin cherry), *Prunus salicina* (Japanese plum), *Prunus serotina* (black cherry), *Prunus serrulata* (Japanese flowering cherry), *Prunus virginiana* (common chokecherrytree), *Pseudotsuga menziesii* (Douglas-fir), *Pyrus calleryana* (bradford pear), *Pyrus communis* (European pear), *Pyrus ussuriensis* (amur pear), *Quercus* spp. (oaks), *Quercus alba* (white oak), *Quercus austrina, Quercus bicolor* (swamp white oak), *Quercus castaneifolia, Quercus cerris* (European Turkey oak), *Quercus coccinea* (scarlet oak), *Quercus ellipsoidalis* (Northern pin oak), *Quercus garryana* (Garry oak), *Quercus ilex* (holm oak), *Quercus ilicifolia* (bear oak), *Quercus imbricaria* (Shingle oak), *Quercus lobata* (California white oak), *Quercus macrocarpa* (mossy-cup oak), *Quercus michauxii* (Swamp chestnut oak), *Quercus mongolica* (Mongolian oak), *Quercus montana* (basket oak), *Quercus muehlenbergii* (Chinquapin oak), *Quercus palustris* (pin oak), *Quercus petraea* (durmast oak), *Quercus prinoides* (Dwarf chinquapin oak), *Quercus robur* (common oak), *Quercus rubra* (northern red oak), *Quercus stellata* (Post oak), *Quercus suber* (cork oak), *Quercus velutina* (black oak), *Rhus copallina* (Shining sumac), *Rhus copallinum, Rhus glabra* (smooth sumac), *Rhus typhina* (staghorn sumac), *Ribes rubrum* (red currant), *Robinia* (locust), *Robinia pseudoacacia* (black locust), *Rosa* spp. (roses), *Rosa rubiginosa* (sweet briar), *Rosa virginiana* (Virginia rose), *Rubus* spp. (blackberry, raspberry), *Rumex crispus* (curled dock), *Salix* spp. (willows), *Salix alba* (white willow), *Salix babylonica* (weeping willow), *Salix discolor, Salix exigua* (sandbar willow), *Salix fragilis* (crack willow), *Salix nigra* (black willow), *Sambucus canadensis* (American black elderberry), *Sassafras albidum* (common sassafras), *Sorbus americana* (American mountainash), *Sorbus aucuparia* (mountain ash), *Spiraea tomentosa* (Hardhack), *Symplocarpus foetidus, Taxodium distichum* (bald cypress), *Thuja occidentalis* (Eastern white cedar), *Tilia* spp. (limes), *Tilia americana* (basswood), *Tilia cordata* (small-leaf lime), *Toxicodendron radicans* (poison ivy), *Tsuga* spp. (hemlocks), *Tsuga canadensis* (eastern hemlock), *Ulmus* spp. (elms), *Ulmus americana* (American elm), *Ulmus glabra* (mountain elm), *Ulmus rubra* (slippery elm), *Vaccinium* spp. (blueberries), *Vaccinium angustifolium* (Lowbush blueberry), *Vaccinium corymbosum* (blueberry), *Vaccinium macrocarpon* (cranberry), *Vaccinium vacillans, Viburnum acerifolium* (Mapleleaf viburnum), *Viburnum dentatum* (Arrowwood viburnum), *Viburnum lentago* (Sheepberry), *Viburnum opulus* (Guelder rose), *Vitis labrusca* (fox grape).

[50] Note female *Lymantria dispar dispar* (the European strain) are winged but not capable of flight.

[51] Algeria, Morocco, Tunisia, Afghanistan, Armenia, Azerbaijan, China, India, Iran, Iraq, Israel, Japan, Kazakhstan, Kyrgyzstan, Lebanon, Mongolia, South Korea, Syria, Taiwan, Tajikistan, Turkey, Turkmenistan, Uzbekistan, Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, France, Germany, Greece, Hungary, Italy, Lithuania, Moldova, Montenegro, Netherlands, North Macedonia, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom (Channel Islands), Canada, United States of America.

[52] 1 generation per year, between 100 up to 1000 eggs are laid per female. Population sizes and success can vary due to temperatures, areas with higher average temperatures can't support continuous populations as low temperatures are needed for diapause (Boukouvala et al., 2022).

[53] Members of the spongy moth complex differ slightly in their physiology. L. *dispar dispar*, referred to as the European spongy moth, has flightless females. Both L. *dispar asiatica* and L. *dispar japonica* adult females can fly and often are attracted to lights (Boukouvala et al., 2022). These differences impact spread capability as L. *dispar dispar* relies more on hitchhiking as a movement option. In some literature European populations of *L. dispar* have included adult females capable of flight, however this is not commonly observed (Zahiri et al., 2019). Larvae crawl or use silk balloons to be wind dispersed several kms (Boukouvala et al., 2022).

[54] Defoliation can cause up to 70% loss in biomass and pest management is costly to maintain in suitable environments for *L. dispar* (Boukouvala et al., 2022).

[55] Larvae and eggs have been found on tree trunks, rocks and man-made materials such as boats, shipping containers and vehicles (Boukouvala et al., 2022).

[56] *Abies alba* (silver fir), *Abies concolor* (Rocky Mountain white fir), *Abies fabri* (Faber fir), *Abies firma* (momi fir), *Abies nephrolepis* (Khingan fir), *Acer platanoides* (Norway maple), *Betula ermanii* (Erman's birch), *Betula pendula* (common silver birch), *Betula populifolia* (gray birch), *Carpinus betulus* (hornbeam*), Carpinus cordata* (heart-leaved hornbeam), *Corylus avellana* (hazel), *Corylus heterophylla* (siberian hazel), *Evonymus europeus*, *Fagus longipetiolata*, *Fagus sylvatica* (common beech), *Frangula alnus* (alder buckthorn), *Fraxinus excelsior* (ash), *Juniperus chinensis* (Chinese juniper), *Juniperus communis* (common juniper), *Keteleeria fortunei* (fortune's keteleeria), *Larix decidua* (common larch), *Larix gmelinii* (Dahurian larch), *Larix kaempferi* (Japanese larch), *Malus domestica* (apple), *Picea abies* (common spruce), *Picea asperata* (dragon spruce), *Picea glauca* (white spruce), *Picea jezoensis* (Yeddo spruce), *Picea pungens* (blue spruce), *Picea sitchensis* (Sitka spruce), *Pinus armandii* (armand's pine), *Pinus banksiana* (jack pine), *Pinus contorta* (lodgepole pine), *Pinus densiflora* (Japanese umbrella pine), *Pinus koraiensis* (fruit pine), *Pinus nigra* (black pine), *Pinus strobus* (eastern white pine), *Pinus sylvestris* (Scots pine), *Pinus yunnanensis* (Yunnan pine), *Populus nigra* (black poplar), *Populus tremula* var. *davidiana*, *Prunus armeniaca* (apricot), *Prunus serotina* (black cherry), *Pseudotsuga menziesii* (Douglas-fir), *Pseudotsuga menziesii* var. *glauca*, *Pseudotsuga sinensis* (chinese douglas fir), *Pyrus communis* (European pear), *Quercus aliena* (oriental white oak), *Quercus glandulifera* (Glandbearing oak), *Quercus lobata* (California white oak), *Quercus petraea* (durmast oak), *Quercus robur* (common oak), *Quercus rubra* (northern red oak), *Quercus velutina* (black oak), *Rubus idaeus* (raspberry), *Salix babylonica* (weeping willow), *Sorbus alnifolia* (hornbeam-ash), *Sorbus aucuparia* (mountain ash), *Tilia cordata* (small-leaf lime), *Tilia platyphyllos* (large-leaved lime), *Tilia tuan*, *Tsuga canadensis* (eastern hemlock), *Tsuga chinensis* (Chinese hemlock), *Ulmus laevis* (Russian white elm), *Ulmus macrocarpa*, *Ulmus pumila* (dwarf elm), *Vaccinium myrtillus* (blueberry).

[57] Females generally produce a total of 70–300 eggs per mating event. Newly hatched larvae similar in appearance to those of *Lymantria dispar*. *Picea abies* (Norway spruce) and *Pinus sylvestris* (Scots pine) are reported to be the species most preferred -and damaged - by *Lymantria monacha*. On coniferous hosts, can cause complete defoliation. Each larva consumes about 1 square metre of leaves in its lifetime. Adult moths do not feed and live for less than a week (Plant Biosecurity and Product Integrity, 2016).

[58] May be spread on containers and ships as egg masses (2021 Berry Biosecurity Plan).

[59] Considered a serious pest of forestry industries worldwide (Plant Biosecurity and Product Integrity, 2016). *Picea abies* (Norway spruce) and *Pinus sylvestris* (Scots pine) are reported to be the species most preferred -and damaged - by *Lymantria monacha*.

[60] Host range includes: *Abies balsamea* (balsam fir), *Acer negundo* (boxelder), *Acer rubrum* (red maple), *Acer saccharinum* (silver maple), *Acer* spp. (maple), *Aesculus californica* (California buckeye), *Aesculus* spp. (buckeye), *Alnus incana* (gray alder), *Ambrosia* spp. (ragweed), *Amelanchier stolonifera* (running serviceberry), *Amorpha fruticosa* (desert false indigo), *Aster* spp. (aster), *Betula* spp. (birches), *Betula alleghaniensis* (yellow birch), *Betula papyrifera* (paper birch), *Betula populifolia* (gray birch), *Calycanthus occidentalis* (western sweetshrub), *Ceanothus integerrimus* (deerbrush), *Celtis occidentalis* (common hackberry), *Cercis canadensis* (eastern redbud), *Comandra umbellata* (bastard toadflax), *Cornus florida* (flowering dogwood), *Cornus racemosa* (gray dogwood), *Cornus* spp. (dogwood), *Corylus* spp., *Corylus avellana* (hazel, common filbert), *Crataegus* spp. (hawthorns), *Dianthus caryophyllus* (carnation), forest trees (woody plants), *Fraxinus nigra* (black ash), *Fraxinus* spp. (ash), *Geranium* spp. (geranium), *Helianthus annuus* (common sunflower), *Hypericum* spp. (St Johnswort), *Ilex* spp. (Holly), *Lonicera periclymenum* (European honeysuckle), *Lonicera* spp. (honeysuckle), *Malus domestica* (apple), *Malus pumila* (paradise apple), *Malus* spp. (apple), *Ostrya virginiana* (hophornbeam), *Phaseolus vulgaris* (kidney bean), *Physocarpus* spp., *Pistacia vera* (pistachio), *Pistacia* spp. (pistache), *Platanus occidentalis* (sycamore), *Picea glauca* (white spruce), *Populus balsamifera* (balsam poplar), *Populus* spp. (cottonwood), *Populus tremuloides* (quaking aspen, trembling aspen), *Populus* spp. (poplars), *Prunus* spp. (stone fruit), *Prunus avium* (sweet cherry), *Prunus ilicifolia* (hollyleaf cherry), *Prunus pensylvanica* (pin cherry), *Prunus persica* (peach), *Prunus virginiana* (common chokecherrytree), *Prunus* spp., *Pseudotsuga menziesii* (Douglas-fir), *Pyrus communis* (European pear), *Pyrus* spp. (pear), *Quercus agrifolia* (California live oak), *Quercus alba* (white oak), *Quercus macrocarpa* (bur oak), *Quercus rubra* (red oak), *Quercus* spp. (oak), *Rhamnus* spp. (buckthorn), *Rhododendron* spp. (rhododendron), *Rhus coriaria* (Sicilian sumac), *Rosa* spp. (roses), *Rubus flagellaris* (northern dewberry), *Rubus idaeus* (raspberry, American red raspberry), *Rubus* spp. (blackberry, raspberry), *Salix lasiolepis* (arroyo willow), *Salix* spp. (willow), *Shepherdia canadensis* (Russet buffaloberry), *Solidago* spp. (goldenrod), *Spiraea* spp. (meadowsweet), *Symphoricarpos oreophilus var. utahensis* (Utah snowberry), *Syringa vulgaris* (common lilac), *Syringa* spp. (lilac), *Tilia americana* (American basswood), *Tilia* spp. (basswood), *Trifolium pratense* (red clover), *Tsuga heterophylla (*western hemlock), *Typha latifolia* (broadleaf cattail), *Ulmus americana* (American elm), *Ulmus* spp. (elm), *Vaccinium corymbosum* (highbush blueberry), *Vaccinium* spp. (blueberry), *Verbena* spp. (vervain), *Viburnum lentago* (nannyberry), *Viburnum* spp. (viburnum).

[61] This species has a wide host range and would be likely to be able to become established.

[62] Pest outbreaks result in quality and yield losses.

[63] Host range includes: *Adenostoma fasciculatum*, *Carya illinoinensis*, *Citroncirus*, *Citrus medica*, *Citrus reticulata*, *Citrus trifoliata*, *Citrus x aurantiifolia*, *Citrus x aurantium* var. *clementina*, *Citrus x aurantium* var. *paradisi*, *Citrus x aurantium* var. *sinensis*, *Citrus x aurantium* var. *unshiu*, *Citrus x limon*, *Citrus*, *Coffea arabica*, *Dahlia imperialis*, *Fortunella*, *Gossypium hirsutum*, *Larrea tridentata*, *Magnolia tripetala*, *Magnolia*, *Mangifera indica*, *Medicago sativa*, *Myrtus*, *Phoenix dactylifera*, *Prosopis*, *Quercus*, *Rhizophora mangle*, *Rhus laurina*, *Rosa*, *Salix*, *Schinus molle*, *Simmondsia chinensis*, *Umbellularia californica*, *Vaccinium corymbosum*, *Vaccinium* hybrids, *Vitis vinifera* (EPPO, 2022).

[64] Adult females lay around 25 eggs in live plant tissue. Two of the four life stages involve feeding on plant material and in the warmer months the lifecycle is completed in 2-3 weeks (EPPO, 2022).

[65] *S. citri* feeds on actively growing leaf and fruit tissue and not grasses like other thrip species, limiting the available plant material *S. citri* may be imported on. Plants for planting, soil and young fruit may be a pathway, but not mature fruit (Jeger et al., 2018).

[66] Reported host range is likely higher than the actual host preferences, protected areas of production could allow for a population to establish. Adults live longer in warm environments and can produce up to 12 generations per year in ideal conditions. They also hide in sepals of developing fruit which may mean establishing populations aren't found (EPPO, 2022).
[67] *S. citri* adults do fly but don't move far between hosts, human assisted spread is more likely to occur (Jeger et al., 2018).
[68] *S. citri* is considered a main pest of citrus and blueberry plants, it has only recently been found to impact blueberry production and has quickly been found to be a significant pest in the USA (Haviland et al., 2009). Feeding damage causes curling and abnormal growth of new leaves and scarring of new twigs (Jeger et al., 2018). The main impact to farmers comes from the cost of IPM to control populations (Haviland et al., 2016).
[69] Specific strains infecting blueberry in the USA presenting BLS symptoms are thought to be slightly different from other *Xylella* strains found in other countries. *Xylella* strains found in elderberry, lupine, almond, blackberry and grape were transmitted to blueberry plants with different disease expression severity (Ferguson et al., 2020).
[70] Symptoms of BLS include leaf scorch, dieback, and stem yellowing which can lead to plant death (Oliver et al., 2015).
[71] There are many insect vectors of *Xylella* overseas, but glassy winged sharpshooter is identified as the greatest threat due to its large size and once GWSS acquires *Xylella*, the bacteria can survive in gut indefinitely. *Xylella* is graft transmissible.
[72] Cornara et al. (2019)
[73] Specified states in geographic distribution are where BLS has been observed in field. Research has indicated that the strains causing BLS are likely more widespread across the USA (Ferguson et al., 2020). Wider geographic distributions include: Xf subsp. *fastidiosa*: Costa Rica, Mexico, United States of America, Israel, Lebanon, Taiwan, Italy, Portugal, Spain (EPPO, 2024). *Xf* subsp. multiplex: Argentina, Brazil, Mexico, Paraguay, United States of America, France (transient), Italy, Portugal, Spain (transient) (EPPO, 2023).
[74] Introduction of *Xylella fastidiosa* to Australia could occur with human assisted movement of infected plant material or with insect vectors. The disease is not carried on or spread by seeds (Plant Biosecurity and Product Integrity, 2018).
[75] When observed in the field infected plants don't tend to rapidly increase in number. Dead plants if not removed from soil may lead to neighbouring plants becoming infected (Brannen et al., 2022).
[76] Infected hosts act as reservoirs. In the spring and early summer, insect vectors (primarily members of the Cicadellidae and Cercopoidea families) transmit the bacterium when feeding on infected plant tissues and then on healthy plants. It is also transmitted through propagation from infected plants. Root grafting may also serve as a potential transmission mechanism (Brannen et al., 2022). *Homalodisca vitripennis*, the main vector of Xylella in the USA, has been attributed to spread and will feed on different blueberry cultivars (Tertuliano et al., 2012). The current knowledge of potential Australian vectors is limited, new research may impact establishment and spread ratings.
[77] Studies have found that infection of BLS leads to a decline in yield and growth of fruit, as time progresses in future growing seasons plants show further signs of decline (Ferguson et al., 2017).
[78] Endemic on native blueberry in the Eastern United States, so it is not possible for us to exclude from the environment here (Blueberry BP 2016).
[79] *Botrytis pseudocinerea* unable to be distinguished from the endemic species, *B.cinerea*, based on morphology or field symptoms alone (Walker et al., 2011).
[80] *Godronia cassandrae* is now the preferred name of this pathogen with *Fusicoccum putrefaciens* now recognised as a synonym (Sabaratnam, 2012). *Godronia cassandrae* previously described the ascospore-producing sexual stage of the pathogen, whilst *Fusicoccum putrefaciens* described the conidia-producing asexual stage; the latter was historically described as responsible for the development of canker and spread of the disease (Sabaratnam, 2012).
[81] Symptoms reported to include cankers which can kill affected branches (Sabaratnam, 2012).
[82] Reported as a common and serious disease of highbush blueberry in the Lower Mainland of the Fraser Valley in British Colombia (Sabaratnam, 2012). Cankers can kill affected branches resulting in reduced yields and weakening of host plants (Sabaratnam, 2012). In severe cases, affected plants may eventually die (Sabaratnam, 2012).
[83] Symptoms reported to include mature infected berries that turn pink to light brown and develop a wrinkled appearance (Plant Biosecurity and Product Integrity, 2018). Diseased berries eventually shrivel and harden before dropping to the ground (Plant Biosecurity and Product Integrity, 2018).
[84] Unlikely to enter on commercial fruit (Plant Biosecurity and Product Integrity, 2018).
[85] Restricted host range. Considerable evidence exists that pointing insects play a major role in vectoring the conidia from blighted leaves to flowers (Ngugi & Scherm, 2006).
[86] Spread by pollinators. Fungal spores are spread by wind and rain and can be transported longer distances on plant material, equipment, vehicles and people (Plant Biosecurity and Product Integrity, 2018). Spores can also be spread in soil that becomes infected by mummified berries that have dropped to the ground (Plant Biosecurity and Product Integrity, 2018). Spores within berries infected by this pathogen can remain viable in or on the soil for several years (Demchak, 2023; Plant Biosecurity and Product Integrity, 2018).
[87] Economic impact is likely to be lower in drier areas. Reported to be one of the most serious diseases affecting blueberry plants (Plant Biosecurity and Product Integrity, 2018). Crop losses can be severe, depending on environmental conditions and variety susceptibility (Demchak, 2023; Plant Biosecurity and Product Integrity, 2018).
[88] Host range includes: *Aesculus hippocastanum* (horse chestnut), *Agathis australis*, *Annona cherimola* (cherimoya), *Berberis*, *Castanea sativa* (chestnut), *Drimys winteri*, *Fagus grandifolia* (American beech), *Fagus sylvatica* (common beech), *Gevuina avellana* (gevuina nut), *Hedera helix* (ivy), *Ilex aquifolium* (holly), *Leucothoe fontanesiana*, *Leucothoe walteri*, *Liriodendron tulipifera* (tuliptree), *Lomatia myricoides*, *Magnolia* spp., *Magnolia amoena*, *Magnolia campbellii*, *Magno ia cylindrica* (yellow mountain magnolia), *Magnolia delavayi*, *Magnolia doltsopa*, *Magnolia liliiflora* (Lily magnolia), *Magnolia salicifolia*, *Magnolia sargentiana* (Sargent's magnolia), *Magnolia kobus*, *Magnolia sprengeri*, *Magnolia wilsonii*, *Magnolia x brooklynensis*, *Magnolia x soulangeana*, *Magnolia stellata* (Star magnolia), *Magnolia x brooklynensis* (evamaria cucumber tree), *Mahonia* spp. (holly grape), *Michelia* spp., *Michelia doltsopa* (champ), *Nothofagus obliqua* (roble), *Photinia* spp., *Pieris* spp. (Ericaceae), *Pieris formosa*, *Pieris japonica* (Lily-of-the-valley shrub), *Pinus radiata* (radiata pine), *Podocarpus salignus*, *Prunus laurocerasus* (cherry laurel), *Quercus ilex* (holm oak), *Quercus robur* (common oak), *Sequoiadendron giganteum*,

Vaccinium myrtillus, *Rhododendron* spp. (Azalea), *Rhododendron catawbiense*, *Rhododendron ponticum* (rhododendron), *Rhododendron ponticum* (rhododendron), *Rhododendron yakushimanum*, *Sequoiadendron giganteum* (giant sequoia), *Vaccinium* spp. (blueberries), *Vaccinium myrtillus* (blueberry).

[89] Infected shoots and leaves of plants become necrotic. Areas of foliage often wilt at the end of the shoots. Leaf necrosis occurs in many infected species, and this leads to plant death (Webber, 2024).

[90] Dispersal methods include moving infected ornamental and nursery plants, contaminated soil on machinery, tools and footwear, leaf litter and infected wood with bark attached (EPPO, 2022). Certified nursery plants may still harbour the pathogen due to lack of disease expression and latent foliar symptoms, soil containing oospores/sporangia and sporulation without necrosis (Denman et al., 2009).

[91] *P. kernoviae* has a wide host range and many ways to disperse to hosts. Oospores of *P. kernoviae* persisted in infested sand for 1 year at various temperatures, up to 30°C. Field studies on the longevity of *P. kernoviae* in the natural environment have shown the pathogen to survive for at least 3 years in leaf litter and soil (EPPO, 2022).

[92] The principal hosts of *P. kernoviae* in UK woodland and heathland are rhododendron, especially *Rhododendron ponticum*, and *Vaccinium myrtillus*. Hundreds of rhododendron plants in woodlands have been heavily diseased or killed by it, as have areas of *V. myrtillus* in south-west England and Scotland. Control of *P. kernoviae* in *V. myrtillus* has proven difficult without impacting the surrounding environment and the potential impact on commercial blueberry farms is likely to be major (Webber, 2024).

[93] The known host range continues to expand with more research. Host range includes: *Abies* spp. (*A. alba* (silver fir), *A. concolor* (Rocky Mountain white fir), *A. grandis* (grand fir), *A. magnifica* (red fir), *A. procera* (noble fir)), *Acer* spp. (*A. circinatum*, *A. davidii*, *A. laevigatum*, *A. macrophyllum* (broadleaf maple), *A. pseudoplatanus* (sycamore)), *Adiantum* spp. (*A. aleuticum, A. jordanii* (California maidenhair fern)), *Aesculus* spp. (*A. californica* (California buckeye), *A. hippocastanum* (horse chestnut)), *Alnus* spp. (*A. cordata* (Italian alder), *A. glutinosa* (European alder), *A. incana* (grey alder)), *Arbutus* spp. (*A. menziesii* (Pacific madrone), *A. unedo* (arbutus)), *Arctostaphylos* spp. (*A. canescens*, *A. columbiana* (Hairy manzanita), *A. glandulosa*, *A. glauca* (Bigberry manzanita), *A. manzanita*, *A. nummularia*, *A. pumila*, *A. sensitiva*, *A. uva-ursi*, *A. virgata*, *A. viridissima*), *Ardisia japonica*, *Artemisia tridentata* (big sagebrush), Azaleas, *Berberis aquifolium*, *Betula pendula* (common silver birch), *Calluna vulgaris* (heather), *Calycanthus occidentalis*, *Camellia* spp. (*C. japonica* (camellia), *C. sasanqua* (Sasanqua*), C. sinensis* (tea)), *Castanea sativa* (chestnut), *Castanopsis* spp. (*C. chrysophylla* (Golden chestnut), *C. orthacantha*), *Ceanothus thyrsiflorus* (Blueblossom ceanothus), *Cercis chinensis*, *Chamaecyparis lawsoniana* (Port Orford cedar), *Chamerion angustifolium*, *Choisya ternata* (mexican orange-blossom), *Chrysolepis chrysophylla*, *Cinnamomum camphora* (camphor laurel), *Clintonia andrewsiana*, *Cotoneaster pannosus*, *Corylopsis spicata*, *Cornus* spp. (*C. capitata, C. kousa*), *Corylus cornuta* (beaked hazel), *Cryptantha torreyana*, *Cytisus scoparius* (Scotch broom), *Daphniphyllum glaucescens*, *Distylium myricoides*, *Drimys winteri*, *Dryopteris arguta*, *Epilobium ciliatum*, *Eucalyptus haemastoma*, *Euonymus kiautschovicus*, *Fagus sylvatica* (common beech), *Frangula* spp. (*F. californica, F. purshiana*), *Fraxinus* spp. (*F. excelsior* (ash), *F. latifolia*), *Garrya elliptica*, *Gaultheria* spp. (*G. procumbens* (Aromatic wintergreen), *G. shallon* (salal)), *Griselinia littoralis*, *Hamamelis* spp. (witchhazel) (*H. mollis*, *H.* x *intermedia*, *H. virginiana* (Virginian witch-hazel)), *Heteromeles* spp. (*H. salicifolia* (toyon), *H. arbutifolia*), *Ilex* spp. (*I. aquifolium*, *I. chinensis, I. latifolia*), *Kalmia* spp. (laurel) (*K. angustifolia*, *K. latifolia* (Mountain laurel)), *Larix* spp. (larches) (*L. decidua* (common larch), *L.* x *eurolepis*, *L. kaempferi* (Japanese larch), *L. marschlinsii* (hybrid larch)), *Laurus nobilis* (sweet bay), *Leucothoe* spp. (*L. axillaris*, *L. fontanesiana*, *L. walteri*), *Lilium* spp. (lily*), Lithocarpus glaber*, *Lonicera hispidula*, *Lophostemon confertus*, *Loropetalum chinense*, *Magnolia* spp. (*M. acuminata*, *M. cavaleriei*, *M. delavayi*, *M. denudata*, *M. doltsopa, M. figo, M. foveolata, M. grandiflora, M. insignis, M. kobus, M. liliiflora, M. lotungensis, M. maudiae, M. salicifolia, M. stellata* (Star magnolia), *M. wilsonii*, *M.* x *loebneri*, *M.* x *soulangeana*, *M.* x *thompsoniana*), *Maianthemum racemosum*, *Marah fabacea*, *Michelia doltsopa* (champ), *Myristica fragrans* (nutmeg), *Nerium oleander* (oleander), *Nothofagus obliqua* (roble), *Notholithocarpus densiflorus* (Tanoak), *Osmanthus* spp. (*O. decorus, O. delavayi, O. fragrans, O. heterophyllus* (holly olive)), *Osmorhiza berteroi, Oxalis* spp. (wood sorrels), *Parrotia persica* (persian ironwood), *Phoradendron* spp. (*P. leucarpum, P. serotinum*), *Photinia fraseri, Picea sitchensis* (Sitka spruce), *Pickeringia montana*, *Pieris* spp. (*P. formosa, P. hybrids, P. japonica* (Lily-of-the-valley shrub)), *Physocarpus opulifolius*, *Pittosporum undulatum* (Australian cheesewood), *Populus deltoides* (poplar), *Prunus* spp. (*P. laurocerasus* (cherry laurel), *P. lusitanica*), *Pseudotsuga menziesii* (Douglas-fir), *Pteris cretica*, *Pyracantha koidzumii*, *Quercus* spp. (*Q. acuta* (japanese evergreen oak), *Q. agrifolia* (California live oak), *Q. cerris* (European Turkey oak), *Q. chrysolepis* (Canyon live oak), *Q. falcata* (red oak), *Q. ilex* (holm oak), *Q. kelloggii* (California black oak), *Q. parvula, Q. parvula* var. *shrevei*, *Q. petraea* (durmast oak), *Q. phillyraeoides* (ubame oak), *Q. robur* (common oak), *Q. rubra* (northern red oak)), *Rhamnus* spp. (*R. cathartica* (buckthorn), *R. purshiana* (Cascara buckthorn)), *Rhododendron* spp. (Azalea) (*R. arboreum, R. catawbiense, R. hirsutum, R. impeditum, R. macrophyllum* (Pacific rhododendron), *R. ponticum* (rhododendron), *R. yakushimanum*), *Rhus diversiloba* (Pacific poisonoak), *Ribes laurifolium*, *Rosa* spp. (*R. californica* (California rose), *R. gymnocarpa, R. gymnocarpa, R. rugosa*), *Rubus* spp. (*R. spectabilis* (salmonberry), *R. ursinus* (boysenberry)), *Salix caprea* (pussy willow), *Sambucus nigra* (elder), *Sarcococca* spp., *Schima* spp. (*S. argentea*, *S. wallichii* (Chinese guger tree)), *Sequoia sempervirens* (coast redwood), *Symphoricarpos* spp. (snowberry), *Syringa vulgaris* (lilac), *Taxus* spp. (*T. baccata* (English yew), *T. brevifolia*, *T.* x *media*), *Torreya californica*, *Toxicodendron diversilobum*, *Trientalis latifolia*, *Tsuga heterophylla* (western hemlock), *Umbellularia californica* (California laurel), *Vaccinium* spp. (blueberries) (*V. arboreum* (Tree huckleberry), *V. intermedium*, *V. parvifolium*, *V. vitis-idaea*, *V. myrtillus*, *V. ovatum* (Box blueberry)), *Vancouveria planipetala*, *Viburnum* spp. (*V. bodnantense*, *V. davidii*, *V. farreri*, *V. hillieri*, *V.* x *bodnantense*, *V. plicatum*, *V. tinus*), *Vinca minor* (common periwinkle).

[94] Dispersal methods include moving infected ornamental and nursery plants, contaminated soil on machinery, tools and footwear, leaf litter and other plant material (EPPO, 2020). Certified nursery plants may still harbour the pathogen due to lack of disease expression and latent foliar symptoms, soil containing oospores/sporangia and sporulation without necrosis (Denman et al., 2009).

[95] *P. ramorum* can establish itself on a host plant quickly and can easily survive through harsh climatic conditions (Eyre et al., 2013).

[96] By releasing zoospores, *P. ramorum* can colonize neighbouring plants via water splash, it can also colonize new hosts over greater distances via wind, rain, rivers or streams. Transportation by humans, for example on their shoes or car tyres, is also possible. In nurseries, *P. ramorum* was found in field soil, various substrates, water sediments (e.g. in puddles, sediment runoff, water retention reservoirs), wind carried leaves, plants, and plant debris. *P. ramorum* has also been proven to be effectively moved through in green waste (EPPO, 2020).

[97] Nurseries in Europe and North America have been strongly affected. In most cases, when samples from a nursery test positive for *P. ramorum*, quarantine measures are implemented, and host plants are destroyed. This leads to significant extra costs or a change in the

plant production (EPPO, 2020).
[98] Despite the name, this virus rarely occurs naturally in tomatoes but causes serious diseases in other crops. Many different isolates of TRSV have been found in different hosts and in different geographical areas. Some of those isolates have been reported to be of increased severity. Over a hundred TRSV isolates were characterised serologically and were found to correspond to four distinct serological strains, the most common being NC-38.
[99] Host range includes: *Aeonium* spp., *Ajuga reptans* (carpet bugle), *Ambrosia artemisiifolia* (common ragweed), *Aster* spp., *Astilbe chinensis*, *Capsicum* spp. (peppers), *Capsicum annuum* (bell pepper), *Citrullus lanatus* (watermelon), *Cucumis melo* (melon), *Cucumis sativus* (cucumber), *Cucurbita* spp. (pumpkin), *Cucurbita moschata* (pumpkin), *Cucurbita pepo* (marrow), *Eupatorium purpureum*, *Gladiolus grandifloras*, *Gladiolus hybrids* (sword lily), *Glycine max* (soyabean), *Gossypium hirsutum* (Bourbon cotton), *Nicotiana* spp., *Nicotiana tabacum* (tobacco), *Pelargonium* spp. (pelargoniums), *Phlox subulate*, *Prunus* spp. (stone fruit), *Pueraria montana*, *Pueraria montana* var. *lobata* (kudzu), *Rubus* spp. (blackberry, raspberry), *Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Solanum nigrum* (black nightshade), *Solanum tuberosum* (potato), *Sophora microphylla*, *Vaccinium* spp. (blueberries), *Vaccinium corymbosum* (blueberry), *Vitis* spp. (grape), *Vitis vinifera* (grapevine).
[100] In blueberry, the symptoms are general stunting of the plant, chlorotic and necrotic spots on the leaves, and stem dieback.
[101] Some strain(s) are present in parts of Australia (Queensland, South Australia and Western Australia) (EPPO, 2022). Tobacco ringspot No. 2 has been reported in South Australia.
[102] Numerous symptomless TRSV infections have been reported in several parts of the world at very low incidence due to the importation of contaminated seeds (for example on ornamentals).
[103] The principal vector of TRSV is considered to be nematodes of the *Xiphinema americanum* complex, which is found widespread in Australia. Transmission of TRSV has also been reported for aphids, beetles, grasshoppers, thrips species and spider mites, however, generally, the transmission efficiency of these vectors was low and their significance unclear (EPPO, 2022). Where vectors are present, contaminated seeds (for example on ornamentals) may provide opportunities for spread of the virus to other more susceptible crops.
[104] On blueberries, TRSV causes blueberry necrotic ringspot disease in susceptible cultivars. Infected bushes show a slow and steady decline, which may eventually lead to plant death. The disease has been an important factor in blueberry production in the USA since the 1950s and losses up to a few million USD a year have been reported (EPPO, 2022). Found to not represent an economic threat when found on contaminated seeds (for example on ornamentals).
[105] This species could be wind dispersed from New Zealand to Australia, however, no other spider mite species are known to have spread via this pathway.
[106] Feeding causes leaves to dry out and may cause stems to break and reduce yields. Can be managed using pesticides.
[107] This species behaves as a hitchhiker like the Brown Marmorated Stink Bug (*Halyomorpha halys*) but has comparatively fewer hosts leading to an entry potential risk rating of MEDIUM for this species (*Euschistus conspersus*) relative to an entry potential risk rating of HIGH for the Brown Marmorated Stink Bug (*Halyomorpha halys*)(BRP, 2024).
[108] The Brown Marmorated Stink Bug (*Halyomorpha halys*) is highly polyphagous with a wider host range than *Euschistus conspersus* leading to a relatively lower economic impact risk rating of HIGH for *Euschistus conspersus* compared to EXTREME for the Brown Marmorated Stink Bug (*Halyomorpha halys*)(BRP, 2024).
[109] This species affects at least 130 economically important plants (Young & Orrey, 1986).
[110] This species has a very wide host range with at least 385 known hosts (Young, 1986), this would mean that hosts are likely to be available allowing the pest to establish.
[111] Fruit becomes distorted around feeding site. Managed overseas using insecticides.
[112] There are many insect vectors of *Xylella* overseas, but glassy winged sharpshooter is identified as the greatest threat due to its large size and once GWSS acquires *Xylella*, the bacteria can survive in gut indefinitely. *Xylella* is graft transmissible.
[113] Cornara et al. (2019)
[114] *Xylella fastidiosa* is present in many countries and may enter Australia through infected vectors (including on air currents).
[115] *Xylella fastidiosa* is vectored by the exotic leafhopper *Homalodisca vitripennis*, however, it is suspected that endemic leafhoppers are capable of vectoring this pathogen. The current knowledge of potential Australian vectors is limited, new research may impact establishment and spread ratings.
[116] Suitable environment for establishment.
[117] Can spread through spores on people and planting material.
[118] *Azalea* spp., *Camellia* spp., pear, Berry, laurel, quince, loquat, pear, camphor, Cotoneaster, oak, strawberry, guava, holly, *Eucalyptus* spp., leatherleaf, *Cleyera* spp., rose apple, *Rhododendron* spp., tea, pecan, spruce, silky oak, sweet pepperbush, coffee, silverthorn, *Erica* spp., *Hibiscus* spp., jasmine, walnut, Juniper, deer grass, *Oxalis* spp., *Photinia* spp., doghobble, chokeberry, cranberry, *Viburnum* spp. (Beard 2018). Loquat, American Sycamore, *Pyracantha* spp., pear and oak have been questioned as true hosts (Qld DPI and NGIA, 2019).
[119] Although *Oligonychus ilicis* was reported in Australia (NSW) on *Azalea* spp. and *Camellia* spp., the Australian Department of Agriculture, Water and the Environment reports it as eradicated.
[120] Damage to crop plants most often recorded on alfalfa, clover, potato, cereals and sugarbeet (Holopainen and Varis 1991).
[121] European species (Holopainen and Varis 1991). Wide host range suggests it could establish in Australia.
[122] Including lucerne, asparagus, peach, peanut, okra, Berry, *Capsicum* spp., cotton *Chrysanthemum* spp., strawberry, rose, soybean, tomato, *Lilium* spp., pea, peanut, common bean, adzuki bean.
[123] Bangladesh, Georgia, Japan, Korea, Israel, Mongolia, Taiwan, Pakistan, Philippines, Qatar, Thailand, Spain, Turkey, Algeria, Italy, Croatia, Canada, USA, Greenland, Albania, Austria, Belgium, Iran, Czechia, India, China, Estonia, Denmark, Finland, France, Germany, Iraq, Greece, Hungary, UK, Netherlands, Norway, Poland, Portugal, Russia, Romania, Sweden, Switzerland, Bulgaria, Ukraine, NZ
[124] Tiny size of adults and the fact that eggs are laid inside plant material means it could enter on plant material, however, pathway is regulated (see BICON). Cut flowers are also considered a potential entry pathway for this species into Australia (BRP, 2024).
[125] Its current reported distribution suggests that there are similar environments in parts of Australia that would be suitable for its establishment and spread.

[126] Flower thrips cause distortion of fruit, discolouration and reductions in quality (Buxton and Easterbrook 1988). Multiple papers report damage to strawberries causing deformed fruit.
[127] The entry potential risk rating of *Thrips fuscipennis* was suggested to be slightly than *Frankliniella intonsa* due to the relatively smaller host range of *Thrips fuscipennis*. However, cut flowers (Roses) are also considered a potential entry pathway for this species into Australia (BRP, 2024).
[128] China, Korea, Brazil, Mexico, Taiwan, Iran, Germany, Ethiopia, Canada, USA, Spain, Austria, Uruguay, Argentina, Finland, Paraguay, Belgium, France, Venezuela, Netherlands, Italy, Portugal, Bulgaria, Switzerland
[129] The pathogen is very widespread throughout the world, and it has previously entered Australia and was subsequently eradicated (McGeehan and Fahy 1976, and Gillings, Fahy and Bradley, 1988).
[130] The bacterium has a requirement of low daytime temperatures and low night-time temperatures and high humidity for disease initiation (Maas 1998). Spread potential is high in runners.
[131] The species that causes strawberry red stele root rot (*Phytophthora fragariae*, previously *Phytophthora fragariae var. fragariae*) is not present in Australia, but the species that affects *Rubus* spp., causing Rubus root root (*Phytophthora rubi* previously *Phytophthora fragariae var. rubi*) is present in Australia.
[132] Spores can spread through water and soil. Long distance spread can occur through infested planting material such as farming tools or equipment and infected nursery stock.
[133] India, Israel, Japan, Lebanon, Taiwan, Egypt, NZ, Canada, Mexico, USA, Chile, Ecuador, Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Ireland, Lithuania, Sweden, Ukraine, Luxembourg, Syria, Netherlands, Italy, Norway, Serbia, UK, Slovakia, Slovenia, Russia, Switzerland
[134] The organism is present in countries where strawberry fruit is imported from (e.g. New Zealand).
[135] If an undetected incursion happened in one of the strawberry nurseries the pathogen could be rapidly spread Australia-wide
[136] If an incursion occurred in a strawberry nursery, the economic impact for fruit growers would be extreme.
[137] https://www.agric.wa.gov.au/organisms/128476
[138] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/rb17000/
[139] https://www.agric.wa.gov.au/organisms/93645
[140] Including strawberry, *Rubus* spp., lime, blueberry, kiwi, apple, nuts, cherimoya, soursop, breadfruit, bilimbi, plum, carambola, *Capsicum* spp., chilli, olive, papaya, cherry, caimito, sour orange, lemon, *Citrus* spp., guava, grapefruit, lily, coffee, tomato, pumpkin, quince, persimmon, longan, kumquat.
[141] https://interstatequarantine.org.au/pest/queensland-fruit-fly/
[142] https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0008/1482740/Queensland-fruit-fly.pdf
[143] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/QFly-and-Medfly-FS-1.pdf
[144] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/insects/horticultural/queensland-fruit-fly
[145] https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/queensland-fruit-fly/identifying-queensland-fruit-fly
[146] https://www.agric.wa.gov.au/queensland-fruit-fly-qfly-updates-0
[147] https://fruitfly.sa.gov.au/about-fruit-fly/identify-and-report-fruit-fly
[148] https://fruitfly.sa.gov.au/outbreak-map
[149] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/QFly-and-Medfly-FS-1.pdf
[150] https://www.dpi.nsw.gov.au/biosecurity/insect-pests/medfly
[151] https://dpir.nt.gov.au/__data/assets/pdf_file/0007/233791/380.pdf
[152] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/priority-pest-disease/mediterranean-fruit-fly
[153] https://www.agric.wa.gov.au/medfly/mediterranean-fruit-fly-life-cycle-biology
[154] https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/mediterranean-fruit-fly
[155] https://web-prd.dpird.wa.gov.au/siteassets/documents/biosecurity/plant/pb020-23-green-snail-biosecurity-alert-factsheet.pdf
[156] https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/green-snail
[157] https://pir.sa.gov.au/biosecurity/plant_health/emergency_and_significant_plant_pests/pests_and_diseases_of_significant_concern/green_snail
[158] https://www.dpi.nsw.gov.au/dpi/bfs/insect-pests/rifa/maps-of-infestations-and-zones
[159] https://www.fireants.org.au/FACT
[160] https://www.dpi.qld.gov.au/business-priorities/biosecurity/policy-legislation-regulation/biosecurity-act-2014/biosecurity-regulation
[161] https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0010/1449199/Biosecurity-Invasive-Ant-Carriers-Control-Order-2023.pdf
[162] https://www.planthealthaustralia.com.au/wp-content/uploads/2019/06/Fire-ants-FS-Tea-tree.pdf
[163] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/animals/invasive/restricted/fire-ant
[164] https://www.dpi.nsw.gov.au/biosecurity/insect-pests/fire-ants
[165] https://invasives.org.au/wp-content/uploads/2015/01/Fact-Sheet-Red-Fire-Ants.pdf
[166] https://apps.lucidcentral.org/ppp/text/web_full/entities/ants_red_imported_fire_ant_363.htm
[167] https://extensionaus.com.au/periurbanenvirobiosecurity/wp-content/uploads/sites/21/2020/10/J20-025-Factsheet-Fire-ant-D2.pdf
[168] https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/fire-ants
[169] https://www.fireants.org.au/about-us/program
[170] https://dpir.nt.gov.au/__data/assets/pdf_file/0011/396587/Plant-Quarantine-Manual.pdf (see Condition 22; p. 55)
[171] https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0011/205130/Western-Flower-Thrips-and-TSWV.pdf
[172] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/02/Western-flower-thrips-FS.pdf

[173] https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/ny11001-managing-western-flower-thrips-in-production-nurseries.pdf
[174] https://apps.lucidcentral.org/ppp_v9/text/web_full/entities/western_flower_thrips_183.htm
[175] https://www.greenlifeindustry.com.au/static/uploads/files/chilli-thrips-technical-paper-final-2021-wfspoiktpmhb.pdf
[176] https://www.agric.wa.gov.au/horticulture/chilli-thrips-roses
[177] https://www.pir.sa.gov.au/__data/assets/pdf_file/0003/464565/Plant_Quarantine_Standard_South_Australia_version_17.5.pdf (see Condition 1; p. 29)
[178] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/blueberry-rust
[179] https://nre.tas.gov.au/biosecurity-tasmania/plant-biosecurity/pests-and-diseases/blueberry-rust
[180] https://agriculture.vic.gov.au/biosecurity/plant-diseases/fruit-and-nut-diseases/blueberry-rust-disease-of-plants
[181] https://www.agric.wa.gov.au/plant-biosecurity/blueberry-rust-declared-pest
[182] https://www.pir.sa.gov.au/biosecurity/plant_health/emergency_and_significant_plant_pests/blueberry_rust
[183] https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/ny15002-southern-red-mite-factsheet.pdf
[184] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Southern-red-mite-CP.pdf
[185] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Exotic-spider-mites-FS.pdf
[186] https://www.agric.wa.gov.au/strawberries/mite-pests-strawberry-crops
[187] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Spider-mites-FS.pdf
[188] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Spotted-winged-drosophila-FS-Blueberries.pdf
[189] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/spottedwing-drosophila
[190] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/blueberry-aphid
[191] https://www.planthealthaustralia.com.au/wp-content/uploads/2025/01/Brown-marmorated-stink-bug-fact-sheet.pdf
[192] https://www.agric.wa.gov.au/plant-biosecurity/biosecurity-alert-brown-marmorated-stink-bug
[193] https://nre.tas.gov.au/Documents/BMSB%20fact%20sheet.pdf
[194] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/brown-marmorated
[195] https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/brown-marmorated-stink-bug
[196] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/priority-pest-disease/brown-marmorated-stink-bug
[197] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Brown-marmorated-stink-bug-CP.pdf
[198] https://www.plantbiosecuritydiagnostics.net.au/app/uploads/2018/11/NDP-23-Glassy-winged-sharpshooter-Homalodisca-vitripennis-V1.2.pdf
[199] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Bacterial-leaf-scorch-sharpshooter-FS-Blueberries.pdf
[200] https://www.agric.wa.gov.au/glassy-winged-sharpshooter
[201] https://www.pir.sa.gov.au/biosecurity/plant_health/emergency_and_significant_plant_pests/glassy-winged_sharpshooter
[202] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/glassywing-sharpshooter
[203] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/priority-pest-disease/glassy-winged-sharpshooter
[204] https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/ny11001-glassy-winged-sharpshooter.pdf
[205] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/02/Glassy-winged-sharp-shooter-CP-NG-2017.pdf
[206] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/02/Tarnished-and-Western-plant-bugs-FS-1.pdf
[207] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/02/Tarnished-plant-bug-CP-2011.pdf
[208] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/NDP-42-Gypsy-moths-Lymantria-dispar-V1.pdf
[209] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/02/Gypsy-moth-FS-Plantation-forestry.pdf
[210] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/asian-gypsy-moth
[211] https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/spongy-moth
[212] https://www.agric.wa.gov.au/plant-biosecurity/spongy-moth-declared-pest
[213] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Gypsy-moth-CP-2009.pdf
[214] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/24-003E-Nun-Moth_Final.pdf
[215] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/nun-moth
[216] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/blueberry-leaftier
[217] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Exotic-thrips-FS.pdf
[218] https://www.greenlifeindustry.com.au/static/uploads/files/chilli-thrips-technical-paper-final-2021-wfspoiktpmhb.pdf
[219] https://www.agric.wa.gov.au/horticulture/chilli-thrips-roses
[220] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Strawberry-angular-leaf-spot-FS.pdf
[221] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/priority-pest-disease/angular-leaf-spot
[222] https://www.plantbiosecuritydiagnostics.net.au/app/uploads/2018/11/NDP-6-Pierces-disease-Xylella-fastidiosa-V1.2.pdf
[223] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Bacterial-leaf-scorch-sharpshooter-FS-Blueberries.pdf
[224] https://agriculture.vic.gov.au/biosecurity/plant-diseases/fruit-and-nut-diseases/xylella
[225] https://pir.sa.gov.au/biosecurity/plant_health/emergency_and_significant_plant_pests/xylella_fastidiosa
[226] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/xylella
[227] https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/plant/national-action-plans/nap-xylella
[228] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/02/Xylella-fastidiosa-CP-NG-2017.pdf
[229] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/diseases/horticultural/botrytis-grey-mould
[230] https://www.plantbiosecuritydiagnostics.net.au/app/uploads/2018/11/NDP-1-Apple-Brown-Rot-Monilinia-fructigena-V2.1.pdf

[231] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/02/Apple-brown-rot-FS.pdf
[232] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/brown-rot
[233] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Mummy-berry-FS.pdf
[234] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/mummy-berry
[235] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Orange-rust-FS.pdf
[236] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Red-stele-rot-FS.pdf
[237] https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/ny11001-phytophthora-diseases.pdf
[238] https://www.plantbiosecuritydiagnostics.net.au/app/uploads/2018/11/NDP-5-Sudden-Oak-Death-Phytophthora-ramorum-V2.pdf
[239] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/02/Sudden-oak-death-FS-Nursery-and-Garden.pdf
[240] https://nurseryproductionfms.com.au/wp-content/uploads/download-manager-files/Pest-Factsheet-Phytophthora-ramorum.pdf
[241] https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/sudden-oak-death
[242] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Sudden-oak-death-and-other-diseases-caused-by-Phytophthora-ramorum-CP.pdf
[243] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Nepovirus-group-FS.pdf
[244] *A. vaccinii* was only found in the USA until it was found in South Africa in 2012, it's currently unknown how this dispersal occurred. The mite spends most of its life inside buds so post-harvest treatment is needed to effectively reach mites on plants (Craemer, 2018).
[245] Once discovered on a blueberry farm in South Africa *A. vaccinii* was able to spread to all blueberry plants within a 2-year period. Symptoms can take time to be seen which allows populations to establish (Ngubane, 2018).
[246] A. vaccinii hasn't been reported to spread via wind, however Eriophyid mites are known to passively move via wind (De Lillo & Skoracka, 2009).
[247] In South Africa a farm with A. vaccinii reported to have an 80% reduction of fruit production, in the USA it is reported as a major pest of blueberry production. Applications of pesticides may not impact the population size as the mites often hide under buds (Craemer, 2018; Ngubane, 2018).
[248] Hosts include *Acacia* spp. (*A. decurrens*), *Acer* spp. (A. *campestre*, *A. negundo*, *A. oblongum*, *A. palmatum*, *A. pictum* subsp. *mono*, *A. platanoides*, *A. pseudoplatanus*, *A. saccharinum*, *Aesculus* spp. (*A. hippocastanum*), *Albizia* spp. (*A. julibrissin*), *Allocasuarina verticillata*, *Alnus* spp. (*A. firma* var. *multinervis*, *A. firma*, *A. hirsuta*, *A. maximowiczii, A. sieboldiana*), *Aralia* spp. (*A. cordata), Atalantia buxifolia*, *Betula* spp. (*B. pendula*, *B. platyphylla* var. *japonica*, *B. platyphylla*), *Broussonetia papyrifera*, *Brucea javanica*, *Cajanus* spp. (*C. cajan*), *Camellia* spp. (*C. oleifera*), *Carpinus* spp. (*C. betulus*, *C. laxiflora*), *Carya illinoinensis*, *Castanea* spp. (*C. crenata*), *Castanopsis* spp. (*C. sieboldii*), *Casuarina* spp. (*C. equisetifolia*), *Catalpa* spp., *Cercis* spp., *Chaenomeles* spp., *Citrus* spp. (*C. maxima*, *C. reticulata*, *C. trifoliata*, *C.* x *aurantiifolia*, *C.* x *aurantium* var. *sinensis*, *C.* x *aurantium* var. *unshiu, C.* x *aurantium*, *C.* x *junos*, *C. x limon*, *C. x limonia*, *C. x nobilis*), *Cornus* spp., *Corylus avellana*, *Cotoneaster* spp., *Crataegus* spp., *Cryptomeria japonica*, *Elaeagnus* spp. (*E. multiflora, E. umbellata*), *Eriobotrya* spp. (*E. japonica*), *Fagus* spp. (*F. crenata, F. sylvatica*), *Ficus* spp. (*F. carica*), *Fortunella* spp. (*F. margarita*), *Fraxinus* spp. (*F. americana*), *Grevillea* spp., *Hedera* spp. (*H. rhombea*), *Hibiscus* spp. (*H. mutabilis, H. syriacus*), *Ilex* spp. (*I. chinensis*), *Juglans* spp. (*J. mandshurica*), *Lagerstroemia* spp. (*L. indica*), *Lindera* spp. (*L. praecox*), Liquidambar, *Litchi* spp. (*L. chinensis*), *Maackia* spp. (*M. amurensis*), *Machilus thunbergii*, *Mallotus* spp. (*M. japonicus*), *Malus* spp. (*M. asiatica, M. domestica, M. sylvestris*), *Melia* spp. (*M. azedarach*), *Momordica charantia*, *Morus* spp. *(M. alba, M. bombycis*), *Olea* spp. (*O. europaea*), *Ostrya* spp., *Persea* spp., *Platanus* spp. (*P. occidentalis*, *P. orientalis*, P. *x hispanica*), *Populus* spp. (P. *alba, P. maximowiczii, P. nigra, P. sieboldii, P. tomentosa*), *Prunus* spp. (*P. armeniaca*, *P. laurocerasus, P. x yedoensis*), *Psidium* spp. (*P. guajava*), *Punica granatum*, *Pyracantha* spp. (*P. angustifolia*), *Pyrus* spp. (*P. pyrifolia var. culta, P. pyrifolia, P. ussuriensis*), Quercus spp. (*Q. acutissima*, *Q. glauca, Q. petraea, Q. robur, Q. serrata*), *Rhododendron* spp., *Rhus* spp., *Robinia* spp. (*R. pseudoacacia*), *Rosa* spp. (*R. multiflora, R. rugosa*), *Rubus* spp. (*R. microphyllus, R. palmatus*), *Sageretia* spp., *Salix* spp. (*S. babylonica, S. gracilistyla, S. integra, S. koriyanagi, S. pierotii*), *Sambucus* spp., *Sapium* spp., *Sophora* spp., *Sorbus* spp., *Stranvaesia* spp., *Styrax japonicus*, Toona, *Toxicodendron vernicifluum*, *Triadica sebifera*, *Ulmus* spp. (*U. davidiana* var. *japonica*), *Vaccinium* spp. (*V. corymbosum*), *Vernicia* spp. (*V. fordii*), *Viburnum* spp., *Zanthoxylum bungeanum*, *Zelkova* spp., *Ziziphus* spp. (EPPO, 2020).
[249] Larvae and eggs could be transported in nursery plants. Frass and holes created by larvae can be difficult to detect due to their small size (EPPO, 2020).
[250] Due to the wide host range of A. chinensis populations could establish if any suitable hosts were near the point of entry or emergence (EPPO, 2020).
[251] Adult *A. chinensis* can fly easily and on average move ~200m per year, in agricultural areas the flight distance has been seen to reach 663m (EPPO, 2020).
[252] Infestation of *A. chinensis* larvae causes symptoms on the whole plant and can cause plant death. Some infested plants may not show symptoms for some time, allowing populations to establish without detection. As it is highly polyphagous, there is a wide possible impact on many commodities (EPPO, 2020). Blueberry bushes are quite small and are unsuitable habitat for a large borer (TRP, 2024).
[253] Reported on over 200 hosts including *Acacia* spp. *(A. dealbata, A. decurrens, A. floribunda, A. longifolia, A. melanoxylon, A. pycnantha), Acer* spp. *(A. pseudoplatanus), Aesculus hippocastanum, Agathis australis, Albizia julibrissin, Alectryon excelsus, Alnus* spp. *(A. glutinosa, A. incana), Aristotelia serrata, Asparagus setaceus, Avicennia*spp. *(A. marina, A. resinifera), Azara* spp., *Betula* spp. *(B. nigra, B. pendula), Brachyglottis* spp. *(B. greyi, B. repanda, B. rotundifolia), Buddleia davidii, Camellia* spp., *Carmichaelia australis, Casimiroa edulis, Cassinia* spp. *(C. leptophylla, C. retorta), Castanea sativa, Casuarina cunninghamiana, Celtis australis, Cestrum elegans, Chamaecyparis* spp., *Chamaecytisus* spp., *Choisya ternata, Cinnamomum camphora, Citrus* spp. *(C. reticulata, C. x aurantium var. sinensis, C. x limon var. meyerii, C. x limon, C. x tangelo), Clerodendrum trichotomum, Clianthus* spp., *Coprosma robusta, Coriaria* spp., *Cornus nuttallii, Corokia buddleioides, Corylus maxima, Corymbia ficifolia, Corynocarpus laevigatus, Cryptomeria japonica, Cupressus* spp., *Cytisus scoparius, Dahlia* spp. *(D. excelsa, D. imperialis), Dais cotinifolia, Diospyros kaki, Dodonaea viscosa, Entelea arborescens, Eriobotrya* spp. *(E. japonica, E. caffra, E. corallodendron, E. variegata), Eucalyptus* spp. *(E. botryoides, E. camaldulensis, E. fastigata, E. globulus, E. macarthurii, E. nitens, E. regnans), Euonymus japonicus, Fagus sylvatica, Ficus carica, Fraxinus excelsior, Freycinetia banksii, Gahnia xanthocarpa, Geniostoma ligustrifolium, Gleditsia triacanthos, Grevillea robusta, Hakea salicifolia, Hedycarya arborea, Hesperocyparis macrocarpa, Hibiscus rosa-sinensis, Hoheria* spp., *Idesia polycarpa, Juglans* spp. *(J. ailanthifolia, J. nigra, J. regia), Knightia excelsa, Koelreuteria paniculata, Kunzea*

ericoides, Laburnum anagyroides, Leptospermum scoparium, Ligustrum sp., Liriodendron tulipifera, Lophostemon confertus, Macadamia tetraphylla, Malus spp. *(M. domestica, M. sylvestris), Melaleuca* spp. *(M. citrina, M. sparsa), Melicytus ramiflorus, Metrosideros excelsa, Muehlenbeckia* spp., *Myoporum laetum, Nerium oleander, Nothofagus* spp. *(N. solandri, N. truncata), Nyssa sylvatica, Olearia* spp. *(O. laxiflora, O. solandri, O. traversii), Osteospermum moniliferum, Paraserianthes lophantha, Parsonsia* spp., *Paulownia tomentosa, Pennantia corymbosa, Pericopsis elata, Persea americana, Phyllostachys* spp., *Phytolacca octandra, Pinus* spp. *(P. contorta, P. radiata), Piper excelsum, Pittosporum* spp. *(P. crassifolium, P. eugenioides, P. ralphii, P. tenuifolium, P. turneri), Platanus* spp. *(P. orientalis, P. x hispanica), Pomaderris apetala, Populus* spp. *(P. alba, P. nigra var. italica, P. nigra, P. trichocarpa, P. yunnanensis), Prunus* spp. *(P. armeniaca, P. avium, P. domestica, P. dulcis, P. persica var. nucipersica, P. persica), Pseudopanax laetus, Psoralea pinnata, Punica granatum, Pyrus* spp. *(P. communis, P. pyrifolia), Quercus* spp. *(Q. coccinea, Q. ilex, Q. palustris, Q. robur, Q. rubra), Ribes uva-crispa, Ripogonum scandens, Rosa* spp., *Salix* spp. *(S. alba, S. babylonica, S. caprea, S. x reichardtii), Sambucus nigra, Schefflera digitata, Senecio reinholdi, Solanum* spp. *(S. aviculare, S. betaceum, S. mauritianum), Sophora tetraptera, Sorbus aucuparia, Styphnolobium japonicum, Syringa vulgaris, Syzygium* spp. *(S. floribundum, S. smithii), Tabebuia sp., Tamarix ramosissima, Telopea oreades, Tilia cordata, Toxicodendron succedaneum, Ulex europaeus, Ulmus* spp. *(U. glabra, U. minor, U. parvifolia, U. procera), Vaccinium* spp., *Vella* spp., *Verbascum thapsus, Vernicia fordii, Veronica salicifolia, Virgilia* spp., *Vitex lucens, Vitis vinifera, Weinmannia racemosa, Wisteria* spp., *Zelkova* spp. *(*EPPO, 2021).

[254] Eggs are laid inconspicuously on plants with larvae burrowing into the sapwood to feed. Detection prior to plants showing symptoms is difficult so infested plant material could lead to entry. This has occurred in Wisteria plants imported to the United Kingdom from New Zealand (EPPO, 2021). Natural dispersal from New Zealand may be possible (TRP, 2024).

[255] Adult females lay about 50 eggs in cracks, cuts and under bark in a 1–2-month period. Adults are nocturnal and aren't attracted to light, they hide during the day so may not be found in small populations. As they have a wide host range, this may lead to a successful population establishing.

[256] Adults can fly and have been seen to fly to new areas, however the maximum distance they can fly is unknown (EPPO, 2021).

[257] Damage from larvae feeding from a wide range of hosts can lead to the deaths of entire orchards if uncontrolled. Feeding damage can take 1-2 years to present with stem and twig dieback, followed by branch dieback, yield loss and secondary infections. As larvae take a year to pupate, they can be present year-round in wood (EPPO, 2021).

[258] Hosts include *Abelmoschus esculentus* (okra), *Arachis hypogaea* (peanut), *Brassica oleracea* (broccoli), *Carya illinoinensis* (pecan), *Citrullus lanatus* (watermelon), *Dahlia pinnata* (dahlia), *Eucalyptus* spp., *Gaura lindheimeri* (gaura), *Geranium* spp., *Glottidium vesicarium* (bagpod), *Glycine max* (soybean), *Gossypium hirsutum* (cotton), *Hibiscus* spp., *Lycopersicon esculentum* (tomato), *Mirabilis jalapa* (four o'clock flower), *Myrica cerifera* (southern wax myrtle), *Persea americana* (avocado), *Pisum sativum* (pea), *Rosa* spp., *Vaccinium* spp. (*V. corymbosum, V. virgatum*), *Vitis* spp. (*V. rotundifoli*) (Clark et al., 2004; Scherm et al., 2011).

[259] Very limited distribution in the Americas, larvae feed on roots and adults are defoliators of young leaves. It would be likely to be seen if present on leaves, larvae may be able to be distributed via soil with plant material (Braman et al., 2015).

[260] While *C. pseudofavosa* is known as the "Blueberry leaf beetle" it has a reported as having a wider host range and which may increase its ability to establish and spread (Braman et al., 2015).

[261] The impact is primarily from adults which feed on leaf growth year-round, they are also reported to be attracted to netting used for weed control. Post-harvest, high populations of *A. pseudofavosa* feeding can reduce plant vigour and reduce fruit set the following year (Iglesias, 2013).

[262] Larvae on stems and leaves would be visible and less likely to enter on plant material. Overwintered adults in soil with plant material would be the most likely path of entry.

[263] *N. cribripennis* has only been recorded on Vaccinium spp. so establishment and spread would be limited by host availability (Canadian Food Inspection Agency, 2023).

[264] Larvae and adults feed on the foliage causing defoliation. Adults also feed on the bark of blueberry stems leading to girdling. Large infestations can result in a large amount of plant material being lost or plant death. Yield loss isn't reported from feeding (Canadian Food Inspection Agency, 2023).

[265] It is also reported on azalea, rhododendron, camellia, hollies, roses, redbud, oakleaf, hydrangea, and other shrubs (Williamson, 2018).

[266] Eggs and larvae could enter with plant material in soil.

[267] Host availability would determine the establishment and spread of *R. picipes*. Adults are nocturnal, populations may be able to establish undetected (Williamson, 2018).

[268] Adults feed for several weeks on leaves leaving holes in foliage and have also been reported to damage fruit from feeding. Larvae feed on shallow roots near hosts. Uncontrolled populations can lead to severe damage, however information on this pest is limited and it appears there are several control methods via insecticides used (Williamson, 2018).

[269] The lifecycle of A. musculus limits the plant material that could enter Australia. Eggs, larvae and adults at various stages of development can occur on the plant, however visible damage is likely to be seen (Silva et al., 2018).

[270] *A. musculus* is host specific when feeding, adults overwinter in wooded areas, however if hosts are unavailable following this a population would likely not establish (Szendrei & Rodriguez-Saona, 2009).

[271] Adults can fly and will move to and from blueberry bushes and surrounding wooded areas in their lifecycle. As they are host specific, they are unlikely to move beyond the area where hosts are grown (Silva et al., 2018).

[272] Damage occurs from all life stages of *A. musculus*, adult females oviposit eggs into flower buds where larvae develop. Buds fail to open and fall to the ground decreasing yield. Adults emerge and feed on blueberry bush leaves reducing photosynthetic capacity (Silva et al., 2018). Specific pheromone-based baits have been developed to respond to *A. musculus* infestations (Rodriguez-Saona et al., 2020).

[273] Plant material imported would be the most likely path of entry. Eggs, larvae and adults at various stages of development can occur on the plant, however visible damage is likely to be seen (Jeger et al., 2017).

[274] *A. signatus* adults overwinter beneath host plants or under nearby vegetative material or in wooded areas. Available hosts would be needed to establish a population (Jeger et al., 2017).

[275] Adults don't move far or quickly, and it is reported that adults will stay with a 10m range when looking for a host plant to oviposit

(Jeger et al., 2017).
[276] While blueberry is a reported host, it appears to be an occasional one with preferences for strawberry plants. Damage from oviposition and larvae feeding leads to yield loss and adults feeding on leaves reduced photosynthetic capacity (Jeger et al., 2017).
[277] The first generation of *C. nenuphar* have a wider host range compared to the second generation, however both have a preference for *Prunus* spp. Hosts include *Amelanchier* spp. (*A. arborea, A. canadensis*), *Crataegus aestivalis*, *Cydonia oblonga*, *Malus domestica*, *Prunus* spp. (*P. alleghaniensis, P. americana, P. angustifolia, P. armeniaca, P. avium, P. cerasus, P. domestica, P. maritima, P. mexicana, P. mume, P. nigra, P. pensylvanica, P. persica* var. *nucipersica*, *P. persica, P. pumila, P. salicina, P. serotina, P. umbellata, P. virginiana*), *Pyrus communis*, *Ribes* spp., *Sorbus aucuparia*, *Vaccinium* spp. (*V. corymbosum, V. stamineum*), *Vitis rotundifolia* (EPPO, 2021).
[278] The most likely way of entry would be via larvae in fruit or soil with plant material. In most cases fruit with larvae developing will fall off prior to harvest but early harvested blueberry varieties may not initially show signs of infestation (Lampasona et al., 2020).
[279] Establishment would depend on the strain as the northern strain requires overwintering to complete its lifecycle which may be interrupted during distribution. The southern strain may oviposit without overwintering and has a wider timeframe to potentially reproduce. Northern and southern strains are incompatible so a new population couldn't be established between the two (Lampasona et al., 2020).
[280] C. nenuphar adults are not strong fliers and disperse after overwintering first by flying to host plants. On average adults fly around 120m per day and will then crawl (Lampasona et al., 2020). Long distance movement would be via trade of infested fruit or plant material with soil, however temperatures between 0-3°C for 33 days have been shown to kill larvae in cold storage (EPPO, 2021).
[281] Fruit injury is the main cause of economic impact, feeding and oviposition cause injury at different times with damaged fruit often rotting and falling to the ground, larvae in fruit can then move to the soil to overwinter. Different varieties of blueberry harvest times impact the IPM schedules between strains as well. Damaged fruit is unsalable and impacts yield (Lampasona et al., 2020).
[282] Instances of *C. obliquus* are associated with the crown and roots of blueberry bushes, entry could occur via imported plant material and soil (Anderson, 2008).
[283] *C. obliquus* is reported as being a major economically important pest of blueberries, causing the death of twigs, branches and shoots (Ngubane, 2018). In other reports its noted as rarely being found in impactful numbers (Payne et al., 1988).
[284] Adults are flightless and entry would likely be limited to larvae and eggs in soil with plant material (Bolda & Bettiga, 2009).
[285] Females can reproduce with parthenogenesis so only one female is needed to start a population if host plants are accessible (Pfeiffer, n.d.).
[286] Movement could be facilitated via trade of plant material and soil.
[287] Females lay eggs in the crown area of plants and newly hatched larvae burrow and feed on the crown, roots and eat through the bark of the lower stem and large roots (Bolda & Bettiga, 2009). Adults feed on foliage and remove large sections of the leaves, feeding from adults is not usually economically damaging (Bolda & Bettiga, 2009).
[288] Including alfalfa, apple, azalea, beans, begonia, blackberry, blueberry, borage, cabbage, carrot, cauliflower, cherry, cranberry, currant, cyclamen, grape, hops, holly, loganberry, mint, peach, pear, periwinkle, polyanthus, potato, primrose, rhododendron, rhubarb, rose (Campbell et al., 1989).
[289] Introduced range: Argentina, Canada, United States of America, New Zealand (UkrBIN, 2024). Native range: Albania, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Moldova, Mongolia, Montenegro, Netherlands, North Macedonia, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, Uzbekistan.
[290] *O. ovatus* has been introduced to multiple countries, likely via plant material (Brandt et al., 1995).
[291] Females can reproduce with parthenogenesis so only one female is needed to start a population. As *O. ovatus* has a wide host range, it is likely for a suitable host to be found. Adult females will lay between 150-200 eggs so populations can establish quickly.
[292] *O. ovatus* is flightless so cannot move far quickly, however adults are nocturnal and often crawl indoors to dark storage areas making removal of a population difficult (UMass Extension, 2023).
[293] Damage is primarily caused by larvae feeding on and inside roots, often girding the trunks of hosts at soil level or eating large roots close to the main trunk. Adults feed on foliage and remove large sections of the leaves, feeding from adults can also cause blemishes on fruit (Fisher, 2006).
[294] Eggs, larvae or adults could enter with plant material in soil or on leaves.
[295] Host availability would determine the establishment and spread. Adult females lay eggs in curled leaves or buds on the plant rather than in leaf litter (Bell, 1977). Adults are flightless and parthenogenic so local dispersal would be slow, but only require one female, which lays 8 eggs per day (Rosetta, 2017).
[296] Adults feed for several weeks on leaves leaving holes in foliage. Adults typically stay on foliage during the day which may allow for more varied pest management option (Rosetta, 2017). Larvae feed on shallow roots near hosts. Uncontrolled populations can lead to severe damage.
[297] Hosts include *Asparagus officinalis* (asparagus), *Beta vulgaris* (beetroot), *Brassica rapa* (field mustard), *Citrullus* spp., *Daucus carota* (carrot), *Glycine max* (soyabean), *Malus domestica* (apple), *Medicago sativa* (lucerne), *Phaseolus vulgaris* (common bean), *Pyrus* spp. (pears), *Raphanus sativus* (radish), *Solanum lycopersicum* (tomato), *Solanum tuberosum* (potato), *Ugni molinae*, *Vaccinium* spp. (blueberries), *Zea mays* (maize) (Velez-Gavilan, 2022).
[298] There have been many recorded interceptions of *H. rufangulus* in fruit shipments from South America to the United States, additionally an interception has been recorded from Uruguay to France. It is considered a hitchhiker pest and has been found on trucks, tiles and marble as well as fruit. This may increase the pathways for entry (Velez-Gavilan, 2022).
[299] No record being found of this pest establishing outside of its native range (TRP, 2024).
[300] There is limited information about the biology of *H. rufagulus*, adults can jump to move, and females will lay eggs in soil near hosts. Larvae then feed on roots. In the field adults have been seen to move easily in groups, they are also attracted to light and so may hitchhike on vehicles aiding movement (Velez-Gavilan, 2022).

[301] Feeding behaviour of adults is unknown and larvae are considered the most damaging. Larvae build deep galleries and feed on tubers and fleshy roots which results in surface scars. As adults are frequently intercepted, they can result in losses of product via trade (Velez-Gavilan, 2022).
[302] *Actinidia chinensis* (kiwifruit), *Brassica* spp., *Dactylis glomerata* (cocksfoot), *Festuca arundinacea* (tall fescue), *Lolium perenne* (perennial ryegrass), *Lotus uliginosus* (greater lotus), *Malus* spp. (ornamental species apple), pastures, *Prunus* spp. (stone fruit), *Salix* spp. (willows), *Trifolium repens* (white clover), *Vaccinium* spp. (blueberries), *Vitis vinifera* (grapevine).
[303] Larvae and eggs could be transported in soil with plant material, adults are attracted to lights and fly at night so may be likely to move to shipping ports (Brumley et al., 2020).
[304] Adults are short-lived and if they are unable to lay their eggs in soil a population would be unable to establish (AgPest, 2013).
[305] Adults fly twice, first to mate after emergence and secondly to feed over the span of 2-3 weeks. Adult females may lay eggs multiple times as they fly to feed which can contribute to further spread (FAR, 2002). They are active at night, fly to light sources and to seek out host plant material (East et al., 1983).
[306] Adults can severely defoliate host plants in a short period of time leading to a loss of vigor and photosynthetic capability. Trees near pastures are most vulnerable and chemical control must be applied at the correct time in the lifecycle to prevent defoliation (East et al., 1983).
[307] Eggs, larvae or adults could be moved with plant material and soil (Haviland & Hernandez, 2012).
[308] Adults are attracted to light and volatiles from compost and organic material, if attractive components are accessible populations can establish (Haviland & Hernandez, 2012).
[309] Adults are attracted to light and fly after dusk for around 2 hours to find mates. During the day they will hide in soil, as they will fly to find a suitable host and mate this can increase spread (Haviland, 2014).
[310] The larval stage is most economically damaging as they will feed on roots of young plants leading to plant death within a few months. Older plants appear to undergo drought stress but may take longer to show damage from larval feeding. Currently infestations of *C. longula* are mostly controlled with entomopathogenic nematodes through drip irrigation (Haviland, 2014).
[311] Reported to feed on over 300 hosts including, *Acer* spp. (*A. palmatum, A. platanoides*), *Actinidia* spp., *Aesculus hippocastanum*, *Alcea rosea*, *Alnus* spp. (*A. glutinosa, A. japonica*), *Althaea officinalis*, *Ampelopsis japonica*, *Asparagus officinalis*, *Berchemia racemosa*, *Betula populifolia*, *Castanea* spp. (*C. crenata, C. dentata*), *Clethra alnifolia*, *Corylus avellana*, Cyperaceae, *Dioscorea esculenta*, *Fallopia* spp. (F. *convolvulus*, *F. japonica*), *Filipendula kamtschatica*, *Fragaria x ananassa*, *Glycine max*, *Hibiscus* spp. (*H. palustris, H. syriacus*), *Humulus lupulus*, *Hypericum japonicum*, *Juglans nigra*, *Kerria japonica*, *Lagerstroemia indica*, *Malus* spp. (*M. baccata, M. domestica, M. floribunda*), *Malva pusilla*, *Medicago sativa*, *Melia azedarach*, *Ocimum basilicum*, *Oenothera biennis, Parthenocissus quinquefolia*, *Persicaria* spp. (*P. lapathifolia, P. orientalis, P. pensylvanica*), *Phaseolus vulgaris*, *Platanus* spp. (*P. orientalis, P. x hispanica*), Poaceae, *Populus* spp. (*P. maximowiczii*, *P. nigra* var. *italica*), *Prunus* spp. *(P. armeniaca, P. avium, P. cerasifera* var. *pissardii*, *P. cerasus, P. domestica, P. japonica, P. persica* var. *nucipersica*, *P. persica, P. salicina, P. serotina, P. serrulata, P. spinosa*), *Pteridium aquilinum*, *Quercus* spp. (*Q. acutissima*, *Q. variabilis*, *Rheum rhaponticum*, *Robinia pseudoacacia*, *Rosa multiflora*, *Rubus crataegifolius*, *Rumex* spp., *Salix* spp. (*S. discolor, S. viminalis*), *Sassafras albidum*, *Smilax china*, *Solanum* spp. (*S. lycopersicum, S. melongena*), *Sorbus americana*, *Tilia* spp. (*T. americana, T. cordata, T. japonica, T. miqueliana*), *Toxicodendron pubescens*, *Trifolium pratense*, *Ulmus* spp. (*U. americana, U. parvifolia, U. procera*), *Urtica* spp., *Vaccinium corymbosum*, *Vitis* spp. (*V. aestivalis, V. ficifolia* var. *lobata*, *V. labrusca*, *V. vinifera*), *Wisteria floribunda*, *Zea mays*, *Zelkova serrata* (EPPO, 2020).
[312] The movement of *P. japonica* to other countries is thought to have been from nursery plants with larvae in soil. Adults have also been intercepted on agricultural produce and packaging (EPPO, 2020). P. japonica has been intercepted via aircrafts, and new populations traced back to airports frequently on a global scale (TRP, 2024). CFDA records interception data of *P. japonica* annually (Plant Health and Pest Prevention Services Division, 2024).
[313] *P. japonica* is highly polyphagous, and larvae can feed on roots of whatever host is available. Typically, the lifecycle is completed in one year. Adult females lay 1-3 eggs at a time, burrowed in soil, they will re-emerge, feed and remate to lay between 40-60 eggs in their life (Gyeltshen et al., 2019). Limiting factors for populations surviving and establishing are the environment itself temperature and soil moisture can impact survival (EPPO, 2020).
[314] Adults can fly up to 8km, however most adults will stay in the area where hosts are available. In colder temperatures and cloudy days adults will fly less. In areas where populations are high adults are more likely to move via hitchhiking on vehicles (EPPO, 2020). This pest is considered a hitchhiker with one of the main transmission pathways being on aircraft.
[315] Costs due to larvae were estimated to be 234 million USD per year for the control and replacement of damaged plants in 2015 (EPPO, 2020). Adults cause damage on foliage and flowers of a wide range of hosts and are most active on warm sunny days. The feeding on the upper leaf surface usually results in skeletonization. Larvae primarily feed on roots of grasses and cause large dead patches of turf, they also feed on other small root systems of nursery plants (Gyeltshen et al., 2019).
[316] *D. oxycoccana* would be most likely to enter via plant material, eggs are laid in young buds and may not be seen without close inspection. Pupae overwinter in soil so may be transported in soil with plant material (Topičová & Kapitola, 2016).
[317] Adults are short-lived and without a suitable host, populations may not be able to establish (Steck et al., 2020).
[318] *D. oxycoccana* are not strong fliers and are mainly spread via wind or through movement of pupae in soil (Survilienė & Kazlauskaitė, 2019). Even with wind assisted dispersal it is unlikely new populations could establish in this time as the adults only live 1-2 days (Topičová & Kapitola, 2016).
[319] In areas where *D. oxycoccana* is present blueberry production is severely impacted. For some varieties 100% of yield loss occurs (Steck et al., 2020). In the USA losses from populations have exceeded $20 million USD and following the introduction of populations to Europe spread has occurred rapidly through nursery environments in spite of its limited movement ability (Survilienė & Kazlauskaitė, 2019).
[320] Hosts with varying suitability include, *Acca sellowiana, Actinidia arguta* (tara vine), *Actinidia chinensis* (Chinese gooseberry), *Amelanchier lamarckii* (snowy mespilus), *Amelanchier ovalis* (juneberry), *Ampelopsis brevipedunculata* (Amur amelopsis), *Arbutus unedo* (arbutus), *Arum italicum* (Italian arum), *Aucuba japonica* (Japanese aucuba), *Basella alba* (malabar spinach), *Citrus sinensis* (sweet orange), *Cornus alba* (red-barked dogwood), *Cornus canadensis* (creeping dogwood), *Cornus controversa* (giant dogwood), *Cornus kousa* (Kousa

dogwood), *Cornus mas* (cornelian cherry), *Cornus sanguinea* (dogwood), *Cotoneaster coriaceus, Cotoneaster franchetii* (orange cotoneaster), *Cotoneaster rehderi, Crataegus chrysocarpa, Crataegus monogyna* (hawthorn), *Daphne mezereum* (mezereon), *Diospyros kaki* (persimmon), *Diospyros virginiana* (persimmon (common)), *Duchesnea indica* (India mockstrawberry), *Elaeagnus multiflora* (cherry silverberry), *Elaeagnus umbellata* (autumn olive), *Eriobotrya japonica* (loquat), *Eugenia uniflora* (Surinam cherry), *Festuca arundinacea* (tall fescue), *Ficus carica* (common fig), *Fragaria* (strawberry), *Fragaria ananassa* (strawberry), *Fragaria vesca* (wild strawberry), *Frangula alnus* (alder buckthorn), *Gaultheria adenothrix, Hippophae rhamnoides* (sea buckthorn), *Ilex mucronata, Lindera benzoin* (spicebush), *Lonicera* (honeysuckles), *Lonicera alpigena, Lonicera caerulea, Lonicera caprifolium, Lonicera ferdinandii, Lonicera japonica* (Japanese honeysuckle), *Lonicera nigra, Lonicera nitida, Lonicera xylosteum* (Fly honeysuckle), *Lycium barbarum* (Matrimonyvine), *Mahonia aquifolium* (Oregongrape), *Malpighia emarginata, Malus baccata* (siberian crab apple), *Malus domestica* (apple), *Morus alba* (mora), *Morus bombycis* (Japanese mulberry), *Morus rubra* (red mulberrytree), *Murraya paniculata* (orange jessamine), *Myrica rubra, Paris quadrifolia, Parthenocissus quinquefolia* (Virginia creeper), *Photinia beauverdiana, Photinia prunifolia, Photinia villosa, Phytolacca acinosa* (Indian pokeweed), *Phytolacca americana* (pokeweed), *Polygonatum multiflorum, Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus cerasifera* (myrobalan plum), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus japonica* (Japanese bush cherry tree), *Prunus laurocerasus* (cherry laurel), *Prunus lusitanica, Prunus mahaleb* (mahaleb cherry), *Prunus mume* (Japanese apricot tree), *Prunus nipponica, Prunus padus* (bird cherry), *Prunus persica* (peach), *Prunus persica var. nucipersica* (nectarine), *Prunus sargentii* (sargent's cherry), *Prunus serotina* (black cherry), *Prunus spinosa* (blackthorn), *Psidium guajava* (guava), *Pyracantha* (Firethorn), *Pyrus communis* (European pear), *Rhamnus cathartica* (buckthorn), *Ribes rubrum* (red currant), *Rosa acicularis* (Prickly rose), *Rosa canina* (Dog rose), *Rosa glauca* (red-leaved rose), *Rosa pimpinellifolia* (Burnet rose), *Rosa rugosa* (rugosa rose), *Rubus* (blackberry, raspberry), *Rubus armeniacus* (Himalayan blackberry), *Rubus caesius* (dewberry), *Rubus fruticosus* (blackberry), *Rubus hirsutus, Rubus idaeus* (raspberry), *Rubus laciniatus* (cutleaf blackberry), *Rubus loganobaccus* (loganberry), *Rubus phoenicolasius, Rubus saxatilis, Rubus spectabilis* (salmonberry), *Rubus triphyllus, Rubus ursinus* (boysenberry), *Sambucus ebulus, Sambucus nigra* (elder), *Sambucus racemosa* (red-berried elder), *Solanum americanum, Solanum dulcamara* (bittersweet nightshade), *Solanum luteum, Sorbus aria* (whitebeam), *Sorbus aucuparia* (mountain ash), *Symphoricarpos albus* (common snowberry), *Tamus communis, Taxus baccata* (English yew), *Triticum aestivum* (wheat), *Vaccinium angustifolium* (Lowbush blueberry), *Vaccinium corymbosum* (blueberry), *Vaccinium myrtilloides, Vaccinium myrtillus* (blueberry), *Vaccinium oldhamii, Vaccinium vitis-idaea* (cowberry), *Viburnum lantana* (Wayfaring tree), *Viburnum rhytidophyllum, Viscum album* (mistletoe), *Vitis labrusca* (fox grape), *Vitis vinifera* (grapevine).

[321] Global trade of fruit has been attributed to the spread of *D. sukukii*, females prefer to lay eggs in fruit just prior to harvest or just after in some cases making the risk of larvae being transported in fruit higher (Tait et al., 2021). The ovipositor injuries are small and may not be detected on inspection post-harvest. Larvae and adults can overwinter in soil and may be imported in soil with plant material (DAFF Biosecurity, 2013).

[322] All *D. suzukii* life stages are capable of surviving different environments including some cold treatment conditions and changes in environmental conditions (EPPO, 2020). Their wide host range of both cultivated and wild plants allows a higher chance of survival and for a population to establish even through colder seasons (Tait et al., 2021).

[323] Adults can fly easily to find suitable hosts as has been seen following introduction in Europe and North America. It is also suspected that adult *D. suzukii* use passive wind currents to aid their movement and a study found that in one year an adult fly was able to spread 1400km via natural spread or trade (EPPO, 2020).

[324] Management of *D. suzukii* is costly and depending on the availability of control methods crops may be lost to infestation regardless. Studies have found that control methods with insecticides, mulching and traps are unsustainable long-term for control and ability of *D. suzukii* to survive in harsh conditions leads to populations recovering (Rendon et al., 2020). In 2012, the first year of blueberry production post introduction in Maine it was estimated that *D. suzukii* caused $1.4 million USD damage (Drummond et al., 2019). In Italy it was estimated that 30-40% of yield was lost to blueberries in 2011 (EPPO, 2020).

[325] Other hosts reported, but not confirmed may include, *Amelanchier bartramiana*, *Aronia melanocarpa*, *Cornus canadensis*, *Gaultheria procumbens*, *V. vitis-idea* (Government of Canada, 2019; Rodriguez-Saona et al., 2015).

[326] After oviposition and before larvae feeding causes the fruit to rot and drop off the blueberry bush there may be a risk of harvested blueberries being contaminated. Additionally, soil containing overwintering larvae may be moved with plant material, overwintering usually occurs for a year, increasing risk of accidental spread (Vincent et al., 2022). Canada has strict treatment programs enforced for blueberries moving within Canada to minimise further spread (Government of Canada, 2020).

[327] Most likely path of entry would be eggs and larvae entering in fruit just prior to harvest. Overwintering larvae could also enter in soil with plant material.

[328] Literature on *R. tabellaria* is limited in movement pathways, larvae enter diapause for several months prior to emerging as an adult, establishment would depend on availability of fruiting host plants (Yee et al., 2020).

[329] Based on surveys conducted in North America demonstrate that *R. tabellaria* can survive and establish populations with less suitable hosts. Damage to blueberry has been reported over decades in North America and populations, if able to establish in Australia, may impact blueberry production (Yee et al., 2020).

[330]Over 80 species have been reported as hosts including, *Actinidia chinensis, Aleurites moluccanus, Anacardium occidentale, Annona glabra, Averrhoa carambola, Butia capitata, Campomanesia aromatica, Capsicum frutescens, Carissa macrocarpa, Citrus* spp., *Citrus sinensis, Dimocarpus longan, Diospyros kaki, Eriobotrya japonica, Fragaria* x *ananassa, Ficus carica, Genipa americana, Malpighia glabra, Mangifera indica, Musa* spp., *Myrciaria cauliflora, Olea europaea, Olea europaea subsp. europaea, Persea americana, Phoenix dactylifera, Prunus armeniaca, Prunus cerasus, Prunus persica, Prunus persica* var. *nucipersica, Psidium guajava, Punica granatum, Rubus idaeus, Solanum lycopersicum, Spondias tuberosa, Syzygium jambos, Vaccinium* spp., *Vitis vinifera, Ziziphus jujuba, Ziziphus spina-christi* (Bragard et al., 2022).

[331] Algeria, Benin, Cameroon, Cape Verde, Congo (DRC), Cote d'Ivoire, Egypt, Gabon, Guinea, Kenya, Madagascar, Malawi, Mauritius, Mayotte, Morocco, Mozambique, Niger, Nigeria, Reunion, Sao Tome & Principe, Senegal, Seychelles, South Africa, Sudan, Tanzania, Tunisia, Cyprus, Malta, Portugal (Madeira), Spain (Canary Islands), Bangladesh, India, Iran, Iraq, Israel, Lebanon, Jordan, Nepal, Oman, Pakistan, Saudi Arabia, United Arab Emirates, Turkey, Canada, United States of America, Argentina, Brazil, Cayman Islands, Colombia,

Dominican Republic, Ecuador, French Guiana, Martinique, Mexico, Panama, Paraguay, Peru, Uruguay, Venezuela (Bragard et al., 2022).

[332] *Z. indianus* is unable to pierce through unbroken fruit skin making the timeframe for oviposition to then potentially be imported very narrow. Eggs and larvae have been seen to overwinter in fruit and not soil, making pathways for entry limited to fruit (Bragard et al., 2022). This pest feeds on decomposing fruit and requires wounded or decomposing fruit as an initiation (TRP, 2024).

[333] *Z. indianus* relies on access to damaged or overripe fruit, if adults were able to access disposed fruit or compost, a population may be able to establish (Bragard et al., 2022).

[334] Following the introduction of *Z. indianus* to Brazil in the late 90's it has spread rapidly north as far as Canada. It has also been seen to adapt to changes in the environment as this spread has occurred (Da Mata et al., 2009). It is thought that the rapid spread across the Americas was from natural wind currents, transport of fruit via trucks and natural flight (Bragard et al., 2022).

[335] *Malus domestica* (apple), *Medicago sativa* (lucerne), *Rosa* spp. (roses), *Rubus* spp. (blackberry, raspberry), *Rubus idaeus* (raspberry), *Vaccinium* spp. (blueberries), *Vitis* spp. (grape), *Vitis vinifera* (grapevine). Also found on *Abelmoschus esculentus*, *Amaryllis* spp., *Amphiachyris* spp. , *Apium graveolens*, *Arachis hypogaea*, *Baccharis genistelloides*, *Brassica napus* ssp. *Napus*, *Brassica nigra*, *Brassica rapa*, *Chaptalia nutans*, *Cichorium endivia*, *Cichorium intybus*, *Croton* spp., *Cydonia oblonga*, *Dahlia* spp., *Daucus carota*, *Feijoa sellowiana*, *Fuchsia* spp., *Gardenia* spp., *Ipomoea batatas*, *Juglans regia*, *Lactuca sativa*, *Lagenaria siceraria*, *Malus prunifolia* var. *prunifolia*, *Manihot esculenta*, *Manihot palmata, Matricaria* spp., *Medicago sativa*, *Ocimum basilicum*, *Oxalis articulata, Petroselinum crispum*, *Phytolacca americana*, *Pimpinella anisum*, *Prunus domestica* ssp. *domestica* L., *Prunus persica*, *Punica granatum*, *Pyrus communis*, *Raphanus sativus*, *Rubus* spp., *Rubus idaeus*, *Rumex* spp., *Salix babylonica*, *Salix chilensis* Mol., *Salvia officinalis*, *Salvia splendens*, *Sechium edule*, *Solidago microglossa*, *Talinum paniculatum*, *Vaccinium* spp., *Vitis vinifera* (UK Plant Health Risk Register, 2022). Also found on *Cucurbita pepo*, *Prunus domestica*, *Saccharum officinarum*, *Salix humboldtiana*, *Salvia rosmarinus* and *Vitis labrusca* (EPPO, 1996).

[336] Primary entry pathway would be through live plant import and that entry potential would only be high if live plants (or potted plants) are allowed into Australia (TRP, 2024).

[337] Long distance dispersal possible through transportation of infested seedlings or soil that has adhered to agricultural implements (Nondillo et. al, 2013). *Linepithema micans* (ant) has been reported to transport *E. brasiliensis* and aid in its attachment to vine plants (Nondillo et. al, 2013).

[338] *Abelmoschus esculentus* (okra), *Abrus precatorius, Acer rubrum, Albizia julibrissin, Alcea rosea, Amaranthus hybridus, Amaranthus spinosus, Amaranthus viridis, Ambrosia artemisiifolia, Ampelopsis arborea* (peppervine), *Asclepias sp., Asparagus officinalis, Baccharis halimifolia, Begonia sp., Bidens pilosa, Bucida buceras, Caesalpinia pulcherrima, Callicarpa americana, Callistemon viminalis*, *Camellia japonica, Campsis radicans, Carphephorus odoratissimus, Carya illinoinensis* (pecan), *Cassia sp., Casuarina, Catalpa bignonioides, Catalpa sp., Cenchrus purpureus, Cephalanthus occidentalis, Cercis sp., Chenopodium album, Chrysanthemum x morifolium, Citrofortunella mitis, Citrus, Citrus x aurantium var. sinensis, Citrus limon* (lemon), *Clerodendrum indicum, Clusia sp., Codiaeum variegatum, Conocarpus erectus, Convolvulus arvensis, Cordyline fruticosa, Cotoneaster sp., Cycas sp., Dysphania ambrosioides, Elaeagnus sp., Enterolobium cyclocarpum, Erechtites hieraciifolius, Erigeron canadensis, Eriobotrya japonica, Eucalyptus, Eupatorium capillifolium, Eupatorium perfoliatum, Ficus, Ficus benjamina* (weeping fig), *Fortunella* (kumquats), *Fraxinus, Gardenia, Gardenia taitensis, Ginkgo biloba, Gladiolus sp., Glycine max, Gordonia lasianthus, Gossypium herbaceum, Helianthus, Helianthus annuus, Hemionitis arifolia, Heptapleurum actinophyllum, Heterotheca subaxillaris, Hibiscus rosa-sinensis* (Chinese rose), *Ilex, Ilex glabra, Ilex vomitoria, Indigofera hirsuta, Ipomoea, Jasminum mesnyi, Juglans regia* (walnut), *Lactuca canadensis, Lagerstroemia indica* (Indian crape myrtle), *Lantana camara, Laurus nobilis* (sweet bay), *Leucadendron, Ligustrum sp., Liquidambar styraciflua, Ludwigia peruviana, Macadamia sp., Magnolia grandiflora* (Southern magnolia), *Magnolia virginiana, Malus* (ornamental species apple), *Malus sylvestris, Mangifera indica, Manilkara roxburghiana, Medicago sativa, Melaleuca quinquenervia* (paperbark tree), *Melaleuca viminalis, Melia azedarach, Mimosa* (sensitive plants), *Mirabilis jalapa* (four o'clock flower), *Momordica charantia, Monarda fistulosa, Morella cerifera, Myrtus communis* (myrtle), *Nerium oleander, Nyssa sylvatica, Oenothera laciniata, Oenothera simulans, Olea* (olive), *Olea europaea, Ostrya virginiana, Parkinsonia aculeata* (Mexican palo-verde), *Parthenocissus quinquefolia, Pennisetum purpureum* (elephant grass), *Persea americana* (avocado), *Photinia, Phytolacca americana, Pinus sp., Pisum sp.), Pittosporum sp., Platanus sp., Pisum* (pea), *Populus* (poplars), *Prunus* (stone fruit), *Prunus americana* (American plum), *Prunus angustifolia, Prunus avium* (sweet cherry), *Prunus caroliniana), Prunus domestica* (plum), *Prunus dulcis* (almond), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Psidium* (guava), *Psophocarpus tetragonolobus* (winged bean), *Pteridium aquilinum, Pyracantha* (Firethorn), *Pyracantha coccinea, Pyrus* (pears), *Pyrus communis, Quercis, Quercus laevis* (Turkey oak), *Quercus virginiana* (Live oak), *Rhus* (Sumach), *Ricinus communis, Rosa* (roses), *Rubus fruticosus* (blackberry), *Rudbeckia laciniata, Salix* (willows), *Salix caroliniana, Sambucus canadensis, Sansevieria sp., Sassafras albidum, Schinus terebinthifolia, Senna occidentalis, Senna tora, Sida cordifolia, Sida rhombifolia, Smilax laurifolia, Solidago altissima, Solidago fistulosa, Solidago sp., Sonchus asper, Sorghum bicolor, Sorghum halepense, Spathodea campanulata, Swietenia mahagoni* (Cuban mahogany), *Tetragonolobus sp., Thuja sp., Urena lobata, Vernicia fordii, Viburnum sp., Vigna unguiculata, Vitis* (grape), *Vitis munsoniana, Vitis vinifera* (grapevine), *Wisteria, x Citrofortunella microcarpa, Xanthium sp., Yucca aloifolia, Zea mays.* Also found on *Vaccinium* spp. (blueberry) (Tertuliano et. al, 2012).

[339] Rarely causes economic damage on its own, however, it is a vector of *Xylella fastidiosa* which causes the bacterial disease known as bacterial leaf scorch, Pierce's disease, Phoney peach or citrus variegated chlorosis (Plant Health Australia, 2016). Negligible economic impact without *Xylella fastidiosa*.

[340]*Acer buergerianum* (trident maple), *Acer negundo* (box elder), *Acer palmatum* (Japanese maple), *Acer pictum* (painted maple), *Acer platanoides* (Norway maple), *Acer pseudoplatanus* (sycamore), *Acer rubrum* (red maple), *Acer saccharinum* (silver maple), *Actinidia chinensis* (Chinese gooseberry), *Ailanthus altissima* (tree-of-heaven), *Albizia julibrissin* (silk tree), *Alcea* spp., *Alnus incana* (grey alder), *Amelanchier* spp. (serviceberries), *Amelanchier canadensis* (thicket serviceberry), *Angelica dahurica, Aralia cordata* (spikenard), *Aralia elata* (Japanese aralia), *Arctium lappa* (burdock), *Armoracia rusticana* (horseradish), *Betula alleghaniensis* (yellow birch), *Betula lenta* (sweet birch), *Betula nigra* (river birch), *Betula papyrifera* (paper birch), *Betula pendula* (common silver birch), *Betula platyphylla* (Manchurian birch), *Broussonetia papyrifera* (paper mulberry), *Buxus microphylla* (little-leaf box), *Buxus sinica* (chinese box), *Callistephus chinensis* (China aster), *Camellia sinensis* (tea), *Cannabis sativa* (hemp), *Carpinus caroliniana* (American hornbeam), *Carya glabra* (Pignut hickory), *Carya ovata* (shagbark hickory), *Castanea crenata* (Japanese chestnut), *Cedrela fissilis* (Spanish cedar), *Celastrus orbiculatus* (Asiatic bittersweet), *Colutea arborescens* (bladder senna), *Cornus* spp. (Dogwood), *Cornus controversa* (giant dogwood), *Cornus florida*

(Flowering dogwood), *Cornus kousa* (Kousa dogwood), *Cornus officinalis, Corylus americana* (American hazel), *Diospyros kaki* (persimmon), *Elaeagnus umbellata* (autumn olive), *Epilobium angustifolium* (rosebay willowherb), *Euphorbia pulcherrima* (poinsettia), *Fagus grandifolia* (American beech), *Ficus carica* (common fig), *Firmiana simplex, Forsythia* spp. (golden bells), *Fraxinus* spp. (ashes), *Fraxinus americana* (white ash), *Glycine max* (soyabean), *Humulus lupulus* (hop), *Humulus scandens* (Japanese hop), *Juglans* spp. (walnuts), *Juglans hindsii* (californian black walnut), *Juglans major* (arizona walnut), *Juglans mandshurica* (Manchurian walnut), *Juglans microcarpa* (River walnut tree), *Juglans nigra* (black walnut), *Juglans regia* (walnut), *Juniperus chinensis* (Chinese juniper), *Ligustrum lucidum* (broad-leaf privet), *Lindera benzoin* (spicebush), *Liriodendron tulipifera* (tuliptree), *Lonicera* spp., *Luffa* spp., *Maackia amurensis, Magnolia kobus, Mallotus japonicus, Malus domestica* (apple), *Malus spectabilis, Malus* spp., *Melia azedarach* (Chinaberry), *Monarda* spp., *Morus alba* (mora), *Morus australis, Nicotiana* spp., *Nyssa sylvatica* (tupelo), *Ocimum basilicum* (basil), *Osmanthus* spp., *Ostrya virginiana* (American hophornbeam), *Parthenocissus quinquefolia* (Virginia creeper), *Paulownia kawakamii* (kawakami paulownia), *Paulownia tomentosa* (paulownia), *Phellodendron amurense* (amur cork tree), *Phyllostachys edulis, Picrasma quassioides, Pinus densiflora* (Japanese umbrella pine), *Pinus strobus* (eastern white pine), *Platanus acerifolia* (London planetree), *Platanus occidentalis* (sycamore), *Platanus orientalis* (plane), *Populus alba* (silver-leaf poplar), *Populus grandidentata* (Bigtooth aspen), *Populus maximowiczii* (Japanese poplar), *Populus tomentiglandulosa, Populus tomentosa* (Chinese white poplar), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus cerasus* (sour cherry), *Prunus mume* (Japanese apricot tree), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Prunus serotina* (black cherry), *Prunus serrulata* (Japanese flowering cherry), *Prunus serrulata var. spontanea, Prunus yedoensis, Pseudocydonia sinensis* (Chinese quince), *Pterocarya stenoptera* (chinese wing nut), *Punica granatum* (pomegranate), *Punica granatum* (pomegranate), *Pyrus* spp., *Quercus* (oaks), *Quercus acutissima* (sawtooth oak), *Quercus aliena* (oriental white oak), *Quercus montana* (basket oak), *Quercus rubra* (northern red oak), *Rhus chinensis* (nutgal sumac), *Rhus typhina* (staghorn sumac), *Robinia pseudoacacia* (black locust), *Rosa hybrida, Rosa multiflora* (multiflora rose), *Rosa rugosa* (rugosa rose), *Rosa* spp., *Rubus* (blackberry, raspberry), *Rubus crataegifolius, Salix* spp. (willows), *Salix babylonica* (weeping willow), *Salix koreensis, Salix matsudana* (Peking willow), *Salvia* (sage), *Sassafras albidum* (common sassafras), *Sorbaria sorbifolia, Sorbus commixta* (japanese rowan), *Styphnolobium japonicum* (pagoda tree), *Styrax japonica, Syringa vulgaris* (lilac), *Tamarix chinensis* (five-stamen tamarisk), *Tetradium daniellii, Thuja occidentalis* (Eastern white cedar), *Tilia americana* (basswood), *Toona sinensis* (Chinese Toona), *Toxicodendron radicans* (poison ivy), *Ulmus* (elms), *Ulmus pumila* (dwarf elm), *Ulmus rubra* (slippery elm), *Vaccinium angustifolium* (Lowbush blueberry), *Viburnum prunifolium* (blackhaw viburnum), *Vitis* spp. (grape), *Vitis amurensis* (amur grape), *Vitis labrusca* (fox grape), *Vitis riparia, Vitis vinifera* (grapevine), *Zanthoxylum simulans, Zelkova serrata* (Japanese selkova).

[341] This species could potentially enter Australia in egg form on a variety of substrates including natural and manufactured items, cargo and/or conveyances (Urban & Leach, 2023). Some reports suggest this species often deposits eggs on rust metal on vehicles, trailers and trains, which may facilitate egg dispersal (Lee et. al, 2019). The species was suspected to have been introduced in Japan on planting or wood packaging materials from China (Lee et. al, 2019). The species was suspected to have entered the United States of America in the egg mass stage as eggs laid on a shipment of landscaping stone (Urban & Leach, 2023). Its geographic distribution has been reported to have steadily expanded since it was first introduced into the United States of America (Lee et. al, 2019).

[342] Highly polyphagous feeding on a wide range of host plants representing 103 plant taxa (Urban & Leach, 2023).

[343] Adults are reported to fly short distances (<40 metres) and to fly in high numbers during mating season onto trees or plants in previously uninfested or less infested areas (Urban & Leach, 2023).

[344] Can cause damage and potential economic impact though feeding in the form of host plant damage, and through indirect feeding in the form of production of honeydew (Urban & Leach, 2023). Honeydew can accumulate on understorey plants and attract other insects and provide a substrate on which sooty mould can develop (Urban & Leach, 2023). Significant fruit contamination due to sooty mould has been reported (Urban & Leach, 2023). Insecticides have been shown to be effective causing high levels of mortality to the pest (Lee et. al, 2019).

[345] *Abutilon pictum, Acer* (maples), *Callistemon citrinus* (lemon bottlebrush), *Camellia spp., Cannabis sativa* (hemp), *Ceiba pentandra, Carya illinoinensis* (pecan), *Castanea sativa* (chestnut), *Catalpa, Cirsium* (thistle), *Citrus spp., Citrus limon* (lemon), *Citrus sinensis* (sweet orange), *Coffea, Crataegus monogyna* (hawthorn), *Crocosmia, Cucumis sativus* (cucumber), *Cucurbita pepo* (marrow), *Cycas revoluta* (sago cycas), *Daucus carota* (carrot), *Elaeis guineensis, Fraxinus* (ashes), *Glycine max, Gossypium, Hordeum marinum* (seaside barley), *Hoya, Ipomoea* (morning glory), *Juniperus oxycedrus* (prickly juniper), *Laurus nobilis* (sweet bay), *Liquidambar styraciflua* (Sweet gum), *Luffa aegyptiaca* (loofah), *Lythrum salicaria* (purple loosestrife), *Magnolia grandiflora* (Southern magnolia), *Malvaviscus arboreus* (wax mallow), *Malus domestica* (apple), *Olea europaea, Parthenocissus quinquefolia* (Virginia creeper), *Platanus* (planes), *Populus nigra var. italica, Prunus domestica, Prunus persica* (peach), *Pueraria montana, Pyrus communis* (European pear), *Pyrus pyraster, Quercus rubra* (northern red oak), *Rosa* (roses), *Rubus* (blackberry, raspberry), *Saccharum officinarum, Salix* (willows), *Schinus molle* (false pepper tree), *Solanum melongena* (aubergine), *Sorghum bicolor, Tamarix* (tamarisk), *Tectona grandis, Theobroma cacao, Trachelospermum jasminoides* (star-jasmine), *Typha* (reedmace), *Ulmus* (elms), *Vaccinium* (blueberries), *Vasconcellea heilbornii, Viburnum, Vitis* (grape), *Zea mays* (maize). Also found on *Mangifera spp.* (Mango), *Camellia sinensis* (tea), *Coffee, Glycine spp.* (soybean), *Gossypium spp.* (cotton), *Panicum spp.* (millet) *and Theobroma spp.* (cocoa)(NSW DPI, 2007). Also found on *Clematis vitalba* (Galetto et. al, 2019) *and Ceiba pentandra* (kapok) (Rossi & Lucchi, 2015).

[346] Wide host range and extremely polyphagous; feeding on over 60 plant species in 33 families (Galetto et. al, 2019).

[347] On many crops, is considered to be a minor pest (Rossi & Lucchi, 2015). Hosts of economic concern reported to include mango (*Mangifera*), apple, citrus, tea, coffee, soybean (*Glycine*), cotton (*Gossypium*), millet (*Panicum*) and cocoa (*Theobroma*) (NSW DPI, 2007).

[348] *Prunus persica* (peach), *Malus* spp. (apple), *Prunus* spp. (plum), *Prunus virginiana* (chokeberry)(Palmiter et. al, 1960). Also found on *Solanum tuberosum* (potato) (Pantoja et. al, 2008). Also found on *Trifolium pratense* (red clover), *Fragaria virginiana* (strawberry) and *Rubus allegheniensis* (blackberry) (McClure, 1980). Also found on *Ceanothus velutinus* (sticky laurel), *Spiraea* spp. (spirea), *Cirsium* spp. (thistle), *Populus balsamifera* (balsam poplar), wild rose, willow, *Rhus* spp. (sumac), *Berberis* spp. (Oregon grape), peach, and sweet cherry, *Medicago* spp. (alfalfa), *Lotus* spp. (trefoil), *Trifolium* spp. (red clover), *Melilotus* spp. (sweetclover), *Rumex acetosella* (sheep sorrel), *Stellaria* spp. (chickweed), peach, chokecherry, wild black cherry (Say, 1830). Also found on *Vinca rosea* (periwinkle), *Callistephus chinensis* (aster) and *Trifolium repens* (ladino clover) (Chiykowski, 2011). Also found on *Fragaria virginiana* (Virginia strawberry, wild

strawberry, common strawberry, or mountain strawberry) and *Apium graveolens* (celery)(McClure, 1980). Also found on *Citrus* spp., peach, common choke cherry tree, blueberries.

[349] *S. acutus* has multiple generations a year, eggs appear to undergo diapause which can interrupt treatment timing (Wilson & Turner, 2021).

[350] Higher if vectoring pathogens such as blueberry stunt disease; a disease which is economically important to all cultivars of *Vaccinium corymbosum* (highbush blueberry) and in some lowbush cultivars (*V. angustifolium, V vacillans, V. atrococcum, V. stamineum, V. myrtilloides*) (Tozzp et. al, 1993). Very low if not vectoring pathogens such as blueberry stunt disease.

[351]*Gaylussacia frondosa* (Dangleberry), *Kalmia angustifolia* (Sheep laurel), *Vaccinium* spp. (blueberries), *Vaccinium macrocarpon* (cranberry). Also found on *Gaylussacia* spp. (huckleberry) (Pfeiffer, N.D.). Also found on *Chamaedaphne calyculata* (leatherleaf), *Kalmia angustifolia* (sheep laurel), *Vaccinium austral*, *V. corymbosum* (blueberry), *Dendrium buxifolium* (sand myrtle), *Vaccinium macrocarpon* (cranberry) (Provancher, 1889).

[352]*Gaylussacia frondosa* (Dangleberry), *Kalmia angustifolia* (Sheep laurel), *Vaccinium* spp. (blueberries). Also found on cranberry (Hutchinson, 1955), *Leucothoe racemose* (fetterbush) (Hutchinson, 1955), *Gaylussacia baccata* (black huckleberry) (Hutchinson, 1955), *Vaccinium crassifolium* (creeping blueberry)(Whitney & Meyer, 1988), *Chamaedaphne calyculeta* (Maramorosch, 1955) and *Gaylussacia dumosa* (dwarf huckleberry, bush huckleberry, gopherberry)(Whitney, 1987).

[353] High if vectoring pathogens.

[354] *Abelia × grandiflora* (Glossy abelia), *Abelmoschus esculentus* (Okra), *Acer × freemanii* (Freeman maple), *Acer × tegmentosum* (Manchurian snakebark maple), *Acer buergerianum* (Trident maple), *Acer campestre* (Hedge maple) *Acer circinatum* (Vine maple), *Acer griseum* (Paperbark maple), *Acer japonicum - Amur* (Japanese downy) *maple, Acer macrophyllum* (Bigleaf maple), *Acer negundo* (Boxelder), *Acer palmatum* (Japanese maple), *Acer pensylvanicum* (Striped maple), *Acer platanoides* (Norway maple), *Acer pseudoplatanus*, *Acer rubrum* (Red maple), *Acer saccharinum* (Silver maple), *Acer saccharum* (Sugar maple), *Actinidia deliciosa* (Kiwifruit), *Aesculus × carnea* (Red horse-chestnut), *Aesculus glabra* (Ohio buckeye), *Ailanthus altissima* (Tree of heaven), *Akebia* spp. (Chocolate vine), *Amaranthus caudatus - Love-lies-bleeding* (amaranth), *Amelanchier laevis* (syn. × grandiflora) - *Allegheny* (apple) *serviceberry, Antirrhinum majus* (Garden snapdragon), *Arctium minus* (Lesser burdock), *Armoracia rusticana* (Horseradish), *Artemisia argyi* (Argyi wormwood), *Asimina triloba* (American pawpaw), *Asparagus officinalis* (Asparagus), *Baptisia australis* (Blue wild indigo), *Basella rubra* (Ceylon spinach), *Beta vulgaris* (Beet), *Beta vulgaris ssp. cicla* (Swiss chard), *Betula* spp. (Birch), *Betula nigra* (River birch), *Betula papyrifera* (Paper birch), *Betula pendula* (European white birch), *Brassia* spp. (Orchid), *Brassica juncea* (Wild mustard), *Brassica napus* (Canola), *Brassica oleracea* (Cabbage, collards), *Buddleja* spp. (Butterflybush), *Buddleja davidii* (Butterflybush), *Camellia oleifera* (Oil-seed camellia), *Camellia sinensis* (Chinese tea), *Cannabis sativa* (Hemp), *Capsicum annuum* (Cayenne pepper), *Caragana arborescens* (Siberian peashrub), *Carpinus betulus* (European hornbeam), *Carya ovata* (Shagbark hickory), *Carya illinoinensis* (Pecan), *Catalpa* spp. (Catalpa), *Cayratia japonica* (Bushkiller), *Celastrus orbiculatus* (Oriental bittersweet), *Celosia* spp. (Cock's comb), *Celosia argentea* (Feather cockscomb), *Celtis occidentalis* (Common hackberry), *Celtis koraiensis* (Korean hackberry), *Cephalanthus occidentalis* (Common buttonbush), *Cercidiphyllum japonicum* (Katsura tree), *Cercis canadensis* (Eastern redbud), *Cercis canadensis var. texensis* (Texas redbud), *Cercis occidentalis* (Hackberry), *Chaenomeles speciosa* (Japanese flowering quince), *Chamaecyparis obtusa* (Hinoki cypress), *Chenopodium berlandieri* (Pitseed goosefoot), *Chionanthus retusus* (Chinese fringe tree), *Chionanthus virginicus* (White fringe tree), *Cinnamomum camphora* (Camphor tree), *Citrus* spp. (Orange, mandarin, yuzu), *Cladrastis kentukea* (syn. lutea) - *Kentucky* (American) *yellowwood, Cleome* spp. (Cleome), *Clerodendrum trichotomum* (Harlequin glorybower), *Cornus × Stellar series* (Dogwood), *Cornus florida* (Flowering dogwood), *Cornus kousa* (Kousa dogwood), *Cornus macrophylla* - (Large-leaf) *dogwood, Cornus officinalis - Asiatic* (Japanese cornel) *dogwood, Cornus racemosa* (Gray dogwood), *Cornus sericea* (Redosier dogwood), *Corylus colurna* (Filbert, hazelnut), *Crataegus laevigata - Smooth* (English) *hawthorn, Crataegus monogyna* (Oneseed hawthorn), *Crataegus pinnatifida* (Chinese hawthorn), *Crataegus viridis* (Green hawthorn), *Cucumis sativus* (Garden cucumber), *Cucurbita pepo - Field pumpkin* (summer squash), *Cupressus* spp. (Cypress), *Decaisnea fargesii, Dendranthema morifolium* (Chrysanthemum), *Diospyros* spp. (Persimmon), *Diospyros kaki* (Japanese persimmon), *Elaeagnus angustifolia* (Russian olive), *Elaeagnus umbellata* (Autumn olive), *Eriobotrya japonica* (Loquat), *Euonymus alatus* (Winged euonymus), *Euonymus japonicus* (Japanese spindle), *Evodia* spp., *Ficus carica* (Edible fig), *Firmiana platanifolia* (Chinese parasol tree), *Forsythia suspensa* (Weeping forsythia), *Fraxinus americana - White* (American) *ash, Fraxinus chinensis* (Chinese ash), *Fraxinus pennsylvanica* (Green ash), *Ginkgo biloba - Maidenhair tree* (ginkgo), *Gleditsia triacanthos var. inermis* (Thornless common honeylocust), *Glycine max* (Soybean), *Gossypium hirsutum* (Upland cotton), *Halesia tetraptera - Mountain* (carolina) *silverbell, Hamamelis japonica* (Invasive witchhazel), *Hamamelis virginiana* (American witchhazel), *Helianthus annuus* (Sunflower), *Heptacodium miconioides* (Seven sons flower), *Hibiscus moscheutos* (Crimsoneyed rosemallow), *Hibiscus rosa-sinensis* (Chinese hibiscus), *Hibiscus syriacus - Rose of sharon* (hibiscus), *Humulus lupulus* (Common hop), *Humulus scandens* (japonicus) (Japanese hops), *Ilex aquifolium* (English holly), *Ilex opaca* (American holly), *Ilex verticillata* (Winterberry holly), *Impatiens balsamina* (Rose balsam), *Juglans nigra* (Black walnut), *Juniperus virginiana* (Eastern red cedar), *Koelreuteria paniculata* (Goldenrain tree), *Lagerstroemia indica* (Crepe myrtle), *Larix kaempferi* (syn. leptolepis) (Japanese larch), *Ligustrum japonicum* (Japanese or wax-leaf privet), *Ligustrum sinense* (Chinese privet), *Liquidambar styraciflua* (Sweetgum), *Liriodendron tulipifera* (Tulip tree), *Lonicera* spp. (Honeysuckle), *Lonicera tatarica* (Tatarian honeysuckle), *Lycium barbarum* (Wolfberry), *Lythrum salicaria* (Purple loosestrife), *Magnolia stellata* (Star magnolia), *Magnolia grandiflora* (Southern magnolia), *Mahonia aquifolium - Holly leaved barberry* (oregon grape), *Malus × zumi* (Crab apple), *Malus baccata* (Siberian crab apple), *Malus domestica* (Apple), *Malus pumila* (syn. domestica) (Paradise apple), *Malus sargentii* (Sargent's crab apple), *Manihot esculenta* (Tapioca), *Metasequoia glyptostroboides* (Dawn redwood), *Mimosa* spp. - *Sensitive plant* (mimosa), *Morus* spp. (Mulberry), *Morus alba* (White mulberry), *Musineon divaricatum* (Leafy wild parsley), *Nicotiana alata* (Jasmine tobacco), *Nyssa sylvatica - Blackgum* (tupelo), *Olea oleaster* (Wild olive), *Oxydendrum* spp., *Panicum miliaceum* (Common millet), *Parrotia* spp., *Paulownia tomentosa - Princess tree* (paulownia), *Phalaenopsis* spp. (Orchid, moth), *Phaseolus* spp. (Bean), *Phaseolus lunatus* (Lima bean), *Phaseolus vulgaris* (Kidney bean), *Photinia* (syn. Aronia) spp. (Chokeberry), *Phytolacca americana* (American pokeweed), *Pistacia chinensis* (Chinese pistache) *Pisum sativum* (Pea), *Platanus occidentalis* (American sycamore), *Platycladus orientalis* (Oriental arborvitae), *Polygonum perfoliatum* (Mile-a-minute weed), *Populus tomentosa* (Chinese white poplar), *Prunus* spp. (Cherry, plum), *Prunus × incam* (Flowering cherry), *Prunus armeniaca* (Apricot), *Prunus avium* (Sweet cherry), *Prunus cerasifera* (Cherry plum), *Prunus domestica* (Plum), *Prunus grayana* (Japanese bird cherry), *Prunus incisa*

(Fuji cherry), *Prunus laurocerasus* (Cherry laurel), *Prunus mume* (Green plum), *Prunus persica* (Peach), *Prunus pseudocerasus* (Cambridge cherry), *Prunus serotina* (Black cherry), *Prunus serrulata* (Japanese flowering cherry), *Prunus subhirtella - Winter-flowering* (Higan) *cherry, Pseudocydonia sinensis* (Chinese-quince), *Pueraria montana var. lobata* (Kudzu), *Punica granatum* (Pomegranate), *Pyracantha* spp. (Firethorn), *Pyracantha coccinea* (Firethorn), *Pyrus* spp. (Pear), *Pyrus calleryana - Callery* (Bradford) *pear, Pyrus fauriei* (Korean sun pear), *Pyrus pyrifolia - Chinese* (Asian) *pear, Quercus alba* (White oak), *Quercus coccinea* (Scarlet oak), *Quercus robur* (English oak), *Quercus rubra* (Northern red oak), *Rhamnus* spp. (Buckthorn), *Rhamnus cathartica* (Common buckthorn), *Rhodotypos scandens* (Jetbead), *Rhus* spp. (Sumac), *Rhus typhina* (Staghorn sumac), *Robinia pseudoacacia* (Black locust), *Rosa canina - Dog* (native) *rose, Rosa multiflora* (Mulitflora rose), *Rosa rugosa* (Rugosa rose), *Rubus* spp. (Raspberry, blackberry), *Rubus phoenicolasius - Wine raspberry* (wineberry), *Salix* spp. (Willow), *Sambucus* spp. (Elder), *Sambucus racemosa* (Red elderberry), *Sassafras albidum* (Sassafras), *Secale cereale* (Cereal rye), *Setaria italica* (Pearl millet), *Sicyos angulatus* (Bur cucumber), *Solanum lycopersicum* (Tomato), *Solanum melongena* (Eggplant), *Solanum nigrum* (Black nightshade), *Sophora japonica* (Japanese pagoda tree) *Sophora japonica L. forma pendula* (Weeping scholar tree), *Sorbus* spp. (Mountain ash), *Sorbus airia* (Winterbeam), *Sorbus americana* (American mountain ash), *Sorghum bicolor* (Sorghum), *Spiraea* spp. (Spirea), *Stewartia koreana* (Korean stewartia), *Stewartia pseudocamellia* (Japanese stewartia), *Styrax japonicus* (Japanese snowbell), *Symphytum* spp. (Comfrey), *Syringa* spp. (Lilac), *Syringa pekinensis - Peking* (Chinese) *tree lilac, Taxus cuspidata* (Japanese yew), *Tetradium daniellii* (syn. Euodia hupehensis) - *Bee-bee tree* (Korean euodia), *Tilia* spp. (Basswood), *Tilia americana* (American basswood), *Tilia cordata* (Little leaf linden), *Tilia tomentosa* (Silver linden), *Triticum aestivum* (Wheat), *Tropaeolum majus* (Nasturtium), *Tsuga canadensis* (Eastern hemlock), *Ulmus* spp. (Elm), *Ulmus americana* (American elm), *Ulmus parvifolia* (Chinese elm), *Ulmus pumila* (Elm), *Ulmus procera* (syn. minor) - *English* (smooth leaf) *elm, Vaccinium corymbosum* (Highbush blueberry), *Vibernum* spp. (Viburnum), *Viburnum × burkwoodii* (Viburnum), *Viburnum dilatatum* (Linden arrowwood), *Viburnum opulus var. americanum* (Highbush cranberry), *Viburnum prunifolium - Viburnum* (blackhaw), *Viburnum setigerum* (Tea viburnum), *Vigna angularis* (Azuki bean), *Vigna sesquipedalis* (Chinese long bean), *Vigna unguiculata* (Cowpea), *Vitex negundo* (Chinese chaste tree), *Vitis riparia* (Riverbank wild grape), *Vitis vinifera* (Wine grape), *Weigela hortensis* (Japanese weigela), *Wisteria sinensis* (Chinese wisteria), *Zea mays - Corn* (field and sweet corn), *Zelkova* spp. (Japanese zelkova), *Ziziphus jujube* (Jujube), Chestnut, Pine, Arrowroot, Wax myrtle, *Acacia* spp., Alder, Cedar, Chinese milk vetch, Clover, Common mallow, Hairy vetch, Hollyhock, Strawberry, Tung (Australian Department of Agriculture, Fisheries and Forestry, 2019).

[355] *Ailanthus* spp., *Allamanda* spp., *Ampelopsis* spp., *Aralia* spp., *Ardisia* spp., *Bischofia javanica* (bishop wood), *Camellia japonica* (camellia), *Cephalanthus occidentalis* (common buttonbush), *Choisya ternata* (mexican orange-blossom), *Citrus* spp., *Citrus aurantium* (sour orange), *Citrus limon* (lemon), *Citrus reticulata* (mandarin), *Citrus sinensis* (sweet orange), *Coffea* spp. (coffee), *Coffea arabica* (arabica coffee), *Diospyros* spp. (malabar ebony), *Diospyros kaki* (persimmon), *Diospyros virginiana* (persimmon (common)), *Distylium racemosum* (isu), *Ehretia* spp., *Ficus* spp., *Ficus benjamina* (weeping fig), *Ficus macrophylla* (moreton Bay fig), *Fraxinus* spp. (ashes), *Gardenia* spp., *Gardenia jasminoides* (cape jasmine), *Glochidion* spp., *Hedera* spp. (Ivy), *Hedera helix* (ivy), *Helicia* spp., *Jasminum* spp. (jasmine), *Lagerstroemia indica* (Indian crape myrtle), *Ligustrum* spp. (privet), *Ligustrum japonicum* (Japanese privet), *Lithocarpus* spp. (stone oaks), *Lonicera japonica* (Japanese honeysuckle), *Machilus* spp., *Maclura pomifera* (osage orange), *Magnolia* spp., *Melia azedarach* (Chinaberry), *Myrtus* spp. (myrtle), *Myrtus communis* (myrtle), *Nerium oleander* (oleander), *Osmanthus* spp., *Prunus* spp. (stone fruit), *Prunus laurocerasus* (cherry laurel), *Punica granatum* (pomegranate), *Pyracantha* spp. (Firethorn), *Pyrus* spp. (pears), *Quercus nigra* (water oak), *Ricinus communis* (castor bean), *Rubus* spp. (blackberry, raspberry), *Sabal* spp. (palmetto-palm), *Schefflera* spp. (umbrella tree), *Smilax* spp. (greenbriar), *Syringa vulgaris* (lilac), *Syzygium jambos* (rose apple), *Tecoma* spp., *Vaccinium* spp. (blueberries), *Viburnum* spp., *Wendlandia* spp., *Zanthoxylum* spp. (prickly-ash).

[356] Transport of living host plants or fresh foliage of host plants presents the main quarantine risk.

[357] Primary host are *Citrus* spp., limited information on blueberry as a host. Impact would be more severe with production of sooty mould.

[358] Under laboratory conditions, *Chenopodium quinoa* (quinoa) (Plant Biosecurity and Product Integrity, 2017) and *Nicotiana occidentalis* (Lowery et. al, 2007) have been reported as hosts.

[359] Aphids are known to transmit BIScV locally by flying or up to a few kilometres by wind dispersal BIScV can also be spread via infected grafting or propagation material. For *Vaccinium corymbosum* (highbush blueberry), productivity of infected plants declines each year, eventually leading to plant death (Plant Biosecurity and Product Integrity, 2017). Multiple strains of BIScV exist such as the New Jersey (or East Coast) strains and the Northwest (or West Coast) strains. Molecular characterisation of BIScV isolates in Italy has also suggested the presence of a new strain in Piedmont (Netherlands Food and Consumer Product Safety Authority, 2012).

[360] Long-distance spread of blueberry aphid and blueberry scorch virus (BISCv) is possible with the transport of infected plant material (Plant Biosecurity and Product Integrity, 2017).

[361] Aphids can spread locally through flight or up to a few kilometres by wind dispersal. Long-distance spread of blueberry aphid and BIScV is possible with the transport of infected plant material (Plant Biosecurity and Product Integrity, 2017).

[362] Through feeding, blueberry aphid causes damage to host plants in the form of deformed leaves and reduced plant vigour. Blueberry aphid also impacts host plant health by secreting honeydew and encouraging fungal growth. Blueberry aphid is also the main vector of blueberry scorch virus (BIScV). The insect-disease complex made up of blueberry aphid and blueberry scorch virus (BISCv) is considered a serious threat to Australia's blueberry industry; with all *Vaccinium corymbosum* (highbush blueberry) varieties appearing to be susceptible with productivity of infected plants declining each year eventually leading to plant death (Plant Biosecurity and Product Integrity, 2017).

[363] This insect is a sap-feeder and as a result of the pest sucking sap, can cause devitalization of the host tree (Beers, 2007). Furthermore, this species produces honeydew (a high-sugar fluid excrement) which can drop on fruit and serve as a substrate for sooty mold and therefore may require control (Beers, 2007). This species can also directly infest and feed on fruit, possibly becoming a direct pest or quarantine concern (Beers, 2007).

[364] Plant material with galls is the most likely pathway of entry. Larvae overwinter in galls formed, after which adults emerge from galls to lay eggs almost immediately. Imported plant material released without an inspection of plant material or while larvae are incubating may lead to populations appearing (Isaacs et al., 2020).

[365] Larvae survival during overwintering is more likely following mild winters. High temperatures induced by field burning has been seen

to significantly reduce survival of larvae (Canadian Food Inspection Agency, 2023).

[366] Adults hop short distances and can fly, in most cases oviposition will occur within minutes of adult females leaving the gall, so spread has been recorded as generally being slow. Natural wind currents may also aid in dispersal (Canadian Food Inspection Agency, 2023).

[367] There are many natural enemies of *H. nubilipennis* including other parasitic wasps, which may also inhabit galls and birds. Chemical control and regular pruning are typically used to manage populations; however, this can reduce populations of other predatory wasps (Isaacs et al., 2020). *H. nubilipennis* is more of a nuisance pest and can be controlled, timing of treatments is important as damage from adult females will accumulate with generations each year and reduce the yield of the plant (DeVisser et al., 2023).

[368] *Alchemilla* spp. (Lady's mantle), *Alnus incana* (grey alder), *Betula nana, Betula pendula* (common silver birch), *Betula pubescens* (Downy birch), *Calluna vulgaris* (heather), *Carpinus betulus* (hornbeam), *Cistus* (rockrose), *Crataegus laevigata, Crataegus monogyna* (hawthorn), *Erica* spp. (heaths), *Fragaria ananassa* (strawberry), *Frangula alnus* (alder buckthorn), *Hippophae rhamnoides* (sea buckthorn), *Lythrum salicaria* (purple loosestrife), *Malus domestica* (apple), *Populus tremula* (aspen (European)), *Prunus salicina* (Japanese plum), *Prunus spinosa* (blackthorn), *Pyrus communis* (European pear), *Quercus robur* (common oak), *Rhamnus cathartica* (buckthorn), *Rosa* spp. (roses), *Rosa majalis* (cinnamon rose), *Rubus* spp. (blackberry, raspberry), *Rubus chamaemorus* (yellow berry), *Rubus fruticosus* (blackberry), *Rubus idaeus* (raspberry), *Salix aurita* (eared willow), *Salix caprea* (pussy willow), *Salix cinerea* (grey sallow), *Salix phylicifolia* (tea-leaved willow), *Salix starkeana, Salix viminalis* (osier), *Sorbus aucuparia* (mountain ash), *Spiraea* spp., *Ulmus* spp. (elms), *Vaccinium myrtillus* (blueberry), *Vaccinium uliginosum* (bog whortleberry).

[369] Larvae reported to cause severe defoliation of blueberries and to be a major pest of *Vaccinium angustifolium* (wild blueberry) (Crozier, 1995; Ramanaidu, 2010). Damage caused by larval feeding on foliage and flower buds can, in severe outbreaks, cause complete defoliation (Crozier, 1995). The species also attacks emerging shoots and mature plants (Ramanaidu et. al, 2011). Control measures exist for this pest which likely reduce the economic impact of this pest (TRP, 2024).

[370] This species is described as wingless (Hebert & St-Antoine, 2012).

[371] *Acer* (maples), *Acer pseudoplatanus* (sycamore), *Acer rubrum* (red maple), *Betula* (birches), *Calluna vulgaris* (heather), *Carpinus betulus* (hornbeam), *Castanea sativa* (chestnut), *Corylus, Corylus avellana* (hazel), *Crataegus* (hawthorns), *Cydonia* (quince), *Fagus sylvatica* (common beech), *Fraxinus americana* (white ash), *Fraxinus nigra* (black ash), *Larix decidua* (common larch), *Malus* (ornamental species apple), *Malus domestica* (apple), *Malus sylvestris* (crab-apple tree), *Myrica* (waxmyrtles), *Picea* (spruces), *Picea abies* (common spruce), *Picea sitchensis* (Sitka spruce), *Populus* (poplars), *Prunus* (stone fruit), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus cerasifera* (myrobalan plum), *Prunus domestica* (plum), *Prunus padus* (bird cherry), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Pyrus* (pears), *Pyrus communis* (European pear), *Quercus* (oaks), *Quercus afares, Quercus canariensis* (Algerian oak), *Quercus garryana* (Garry oak), *Quercus petraea* (durmast oak), *Quercus pubescens* (downy oak), *Quercus robur* (common oak), *Quercus rubra* (northern red oak), *Quercus suber* (cork oak), *Ribes nigrum* (blackcurrant), *Ribes uva-crispa* (gooseberry), *Rosa* (roses), *Rubus idaeus* (raspberry), *Salix* (willows), *Sorbus aucuparia* (mountain ash), *Tilia americana* (basswood), *Tilia cordata* (small-leaf lime), *Ulmus* (elms), *Ulmus americana* (American elm), *Ulmus procera* (english elm), *Vaccinium* (blueberries), *Vaccinium myrtillus* (blueberry).

[372] Defoliation of up to 10% was reported in 2011 in Brazil which was the first record of this species causing damage to an agricultural crop (Louzada et. al, 2011).

[373] *Abies balsamea* (balsam fir), *Acacia* spp. (wattles), *Acer* spp. (maples), *Acer negundo* (box elder), *Acer pensylvanicum* (striped maple), *Acer platanoides* (Norway maple), *Acer rubrum* (red maple), *Acer saccharinum* (silver maple), *Acer saccharum* (sugar maple), *Acer spicatum* (Mountain maple), *Acer velutinum, Alnus* (alders), *Alnus alnobetula* (green alder), *Alnus glutinosa* (European alder), *Alnus incana* (grey alder), *Alnus maritima, Alnus oblongifolia, Alnus rubra* (red alder), *Alnus serrulata, Amelanchier* (serviceberries), *Amelanchier canadensis* (thicket serviceberry), *Amelanchier intermedia, Aronia melanocarpa* (black chokeberry), Azaleas, *Berberis vulgaris* (European barberry), *Betula* spp. (birches), *Betula alleghaniensis* (yellow birch), *Betula davurica* (mongolian birch), *Betula lenta* (sweet birch), *Betula nigra* (river birch), *Betula occidentalis* (Water birch), *Betula papyrifera* (paper birch), *Betula pendula* (common silver birch), *Betula populifolia* (gray birch), *Betula pubescens* (Downy birch), *Betula pumila* (low birch), *Carpinus* spp. (hornbeams), *Carpinus caroliniana* (American hornbeam), *Carya* spp. (hickories), *Carya cordiformis* (bitternut hickory), *Carya glabra* (Pignut hickory), *Carya ovata* (shagbark hickory), *Carya tomentosa, Castanea* (chestnuts), *Castanea dentata* (American chestnut), *Castanea sativa* (chestnut), *Cedrus* spp. (cedars), *Cedrus libani* (cedar of Lebanon), *Celtis occidentalis* (hackberry), *Chamaecyparis thyoides* (Atlantic white cedar), *Clethra alnifolia, Comptonia peregrina* (sweetfern), *Cornus* spp. (Dogwood), *Cornus florida* (Flowering dogwood), *Cornus sericea* (redosier dogwood), *Corylus* spp., *Corylus americana* (American hazel), *Corylus avellana* (hazel), *Corylus cornuta* (beaked hazel), *Corylus heterophylla* (siberian hazel), *Cotinus coggygria* (fustet), *Cotinus obovatus, Crataegus* spp. (hawthorns), *Cydonia oblonga* (quince), *Diospyros* spp. (malabar ebony), *Diospyros virginiana* (persimmon (common)), *Eubotrys racemosa, Eucalyptus* spp., *Eucalyptus camaldulensis* (red gum), *Fagus* spp. (beeches), *Fagus grandifolia* (American beech), *Fagus sylvatica* (common beech), *Fraxinus* spp. (ashes), *Fraxinus americana* (white ash), *Fraxinus nigra* (black ash), *Fraxinus pennsylvanica* (downy ash), *Fraxinus quadrangulata* (Blue ash), *Gaultheria procumbens* (Aromatic wintergreen), *Gaylussacia baccata* (black huckleberrry (USA)), *Gaylussacia frondosa* (Dangleberry), *Gleditsia triacanthos* (honey locust), *Gymnocladus dioica, Hamamelis virginiana* (Virginian witch-hazel), *Ilex laevigata, Ilex opaca* (American holly), *Iris versicolor, Juglans* spp. (walnuts), *Juglans cinerea* (butternut), *Juglans nigra* (black walnut), *Juniperus communis* (common juniper), *Juniperus virginiana* (eastern redcedar), *Kalmia angustifolia* (Sheep laurel), *Kalmia latifolia* (Mountain laurel), *Larix* (larches), *Larix decidua* (common larch), *Larix gmelinii* (Dahurian larch), *Larix kaempferi* (Japanese larch), *Larix laricina* (American larch), *Larix lyallii* (subalpine larch), *Larix occidentalis* (western larch), *Lespedeza bicolor* (bicolor lespedeza), *Ligustrum vulgare* (common privet), *Liquidambar styraciflua* (Sweet gum), *Liriodendron tulipifera* (tuliptree), *Litchi chinensis* (lichi), *Lithocarpus edulis, Lyonia ligustrina, Maackia amurensis, Malus* (ornamental species apple), *Malus angustifolia, Malus coronaria* (sweet crab-apple), *Malus domestica* (apple), *Malus fusca, Malus ioensis* (prairie crab-apple), *Morus alba* (mora), *Myrica caroliniensis, Myrica gale* (waxberry), *Nyssa sylvatica* (tupelo), *Ostrya carpinifolia* (hop-hornbeam), *Ostrya virginiana* (American hophornbeam), *Parrotia persica* (persian ironwood), *Picea* spp. (spruces), *Picea abies* (common spruce), *Picea engelmannii* (Engelmann spruce), *Picea glauca* (white spruce), *Picea jezoensis* (Yeddo spruce), *Picea mariana* (black spruce), *Picea rubens* (red spruce), *Pinus* spp. (pines), *Pinus armandii* (armand's pine), *Pinus brutia* (brutian pine), *Pinus contorta* (lodgepole pine), *Pinus echinata* (shortleaf pine), *Pinus monticola* (western white pine), *Pinus radiata* (radiata pine), *Pinus resinosa* (red pine), *Pinus rigida* (pitch pine), *Pinus strobus* (eastern white pine), *Pinus sylvestris* (Scots pine), *Pinus sylvestris var. mongolica, Pinus tabuliformis* (chinese pine),

Pinus taeda (loblolly pine), *Pistacia vera* (pistachio), *Platanus acerifolia* (London planetree), *Platanus occidentalis* (sycamore), *Populus* spp. (poplars), *Populus alba* (silver-leaf poplar), *Populus angustifolia* (narrow-leaved poplar), *Populus balsamifera* (balm of Gilead), *Populus deltoides* (poplar), *Populus grandidentata* (Bigtooth aspen), *Populus heterophylla* (Swamp cottonwood), *Populus nigra* (black poplar), *Populus nigra var. italica, Populus tremuloides* (trembling aspen), *Prunus* spp. (stone fruit), *Prunus americana* (American plum), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus cerasifera* (myrobalan plum), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus maritima* (beach plum), *Prunus pensylvanica* (pin cherry), *Prunus salicina* (Japanese plum), *Prunus serotina* (black cherry), *Prunus serrulata* (Japanese flowering cherry), *Prunus virginiana* (common chokecherrytree), *Pseudotsuga menziesii* (Douglas-fir), *Pyrus calleryana* (bradford pear), *Pyrus communis* (European pear), *Pyrus ussuriensis* (amur pear), *Quercus* spp. (oaks), *Quercus alba* (white oak), *Quercus austrina, Quercus bicolor* (swamp white oak), *Quercus castaneifolia, Quercus cerris* (European Turkey oak), *Quercus coccinea* (scarlet oak), *Quercus ellipsoidalis* (Northern pin oak), *Quercus garryana* (Garry oak), *Quercus ilex* (holm oak), *Quercus ilicifolia* (bear oak), *Quercus imbricaria* (Shingle oak), *Quercus lobata* (California white oak), *Quercus macrocarpa* (mossy-cup oak), *Quercus michauxii* (Swamp chestnut oak), *Quercus mongolica* (Mongolian oak), *Quercus montana* (basket oak), *Quercus muehlenbergii* (Chinquapin oak), *Quercus palustris* (pin oak), *Quercus petraea* (durmast oak), *Quercus prinoides* (Dwarf chinquapin oak), *Quercus robur* (common oak), *Quercus rubra* (northern red oak), *Quercus stellata* (Post oak), *Quercus suber* (cork oak), *Quercus velutina* (black oak), *Rhus copallina* (Shining sumac), *Rhus copallinum, Rhus glabra* (smooth sumac), *Rhus typhina* (staghorn sumac), *Ribes rubrum* (red currant), *Robinia* spp. (locust), *Robinia pseudoacacia* (black locust), *Rosa* spp. (roses), *Rosa rubiginosa* (sweet briar), *Rosa virginiana* (Virginia rose), *Rubus* spp. (blackberry, raspberry), *Rumex crispus* (curled dock), *Salix* spp. (willows), *Salix alba* (white willow), *Salix babylonica* (weeping willow), *Salix discolor, Salix exigua* (sandbar willow), *Salix fragilis* (crack willow), *Salix nigra* (black willow), *Sambucus canadensis* (American black elderberry), *Sassafras* spp., *Sassafras albidum* (common sassafras), *Sorbus americana* (American mountainash), *Sorbus aucuparia* (mountain ash), *Spiraea tomentosa* (Hardhack), *Symplocarpus foetidus, Taxodium distichum* (bald cypress), *Thuja occidentalis* (Eastern white cedar), *Tilia* spp. (limes), *Tilia americana* (basswood), *Tilia cordata* (small-leaf lime), *Toxicodendron radicans* (poison ivy), *Tsuga* spp. (hemlocks), *Tsuga canadensis* (eastern hemlock), *Ulmus* spp. (elms), *Ulmus americana* (American elm), *Ulmus glabra* (mountain elm), *Ulmus rubra* (slippery elm), *Vaccinium* spp. (blueberries), *Vaccinium angustifolium* (Lowbush blueberry), *Vaccinium corymbosum* (blueberry), *Vaccinium macrocarpon* (cranberry), *Vaccinium vacillans, Viburnum acerifolium* (Mapleleaf viburnum), *Viburnum dentatum* (Arrowwood viburnum), *Viburnum lentago* (Sheepberry), *Viburnum opulus* (Guelder rose), *Vitis labrusca* (fox grape).

[374] Algeria, Morocco, Tunisia, Afghanistan, Armenia, Azerbaijan, China, India, Iran, Iraq, Israel, Japan, Kazakhstan, Kyrgyzstan, Lebanon, Mongolia, North Korea, South Korea, Syria, Taiwan, Tajikistan, Turkey, Turkmenistan, Uzbekistan, Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, France, Germany, Greece, Hungary, Italy, Lithuania, Moldova, Netherlands, North Macedonia, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, Canada, United States of America.

[375] This species may enter through trade with egg masses laid on cars, trucks, trains, boats, logs or containers.

[376] This species is polyphagous on a wide host range and has a high reproductive rate making it a successful invader of many types of forest and urban landscapes. It is also capable of being transported on human-made objects (e.g. egg masses laid on vehicles, logs etc.).

[377] For the European strain (*Lymantria dispar dispar*), natural dispersal is limited to short-distance, wind-borne movement of first instars and flight of adult males. Adult females of the European strain are not capable of flight. In contrast, adult females of the Asian strain (*Lymantria dispar asiatica*) are capable of flight and can fly distances of >1km. Dispersal is also possible through trade with egg masses being laid on cars, trucks, trains, boats, logs or containers.

[378] *Abies alba* (silver fir), *Abies concolor* (Rocky Mountain white fir), *Abies fabri* (Faber fir), *Abies firma* (momi fir), *Abies nephrolepis* (Khingan fir), *Acer platanoides* (Norway maple), *Betula ermanii* (Erman's birch), *Betula pendula* (common silver birch), *Betula populifolia* (gray birch), *Carpinus betulus* (hornbeam), *Carpinus cordata* (heart-leaved hornbeam), *Corylus avellana* (hazel), *Corylus heterophylla* (siberian hazel), *Evonymus europeus, Fagus longipetiolata, Fagus sylvatica* (common beech), *Frangula alnus* (alder buckthorn), *Fraxinus excelsior* (ash), *Juniperus chinensis* (Chinese juniper), *Juniperus communis* (common juniper), *Keteleeria fortunei* (fortune's keteleeria), *Larix decidua* (common larch), *Larix gmelinii* (Dahurian larch), *Larix kaempferi* (Japanese larch), *Malus domestica* (apple), *Picea abies* (common spruce), *Picea asperata* (dragon spruce), *Picea glauca* (white spruce), *Picea jezoensis* (Yeddo spruce), *Picea pungens* (blue spruce), *Picea sitchensis* (Sitka spruce), *Pinus armandii* (armand's pine), *Pinus banksiana* (jack pine), *Pinus contorta* (lodgepole pine), *Pinus densiflora* (Japanese umbrella pine), *Pinus koraiensis* (fruit pine), *Pinus nigra* (black pine), *Pinus strobus* (eastern white pine), *Pinus sylvestris* (Scots pine), *Pinus yunnanensis* (Yunnan pine), *Populus nigra* (black poplar), *Populus tremula var. davidiana, Prunus armeniaca* (apricot), *Prunus serotina* (black cherry), *Pseudotsuga menziesii* (Douglas-fir), *Pseudotsuga menziesii var. glauca, Pseudotsuga sinensis* (chinese douglas fir), *Pyrus communis* (European pear), *Quercus aliena* (oriental white oak), *Quercus glandulifera* (Glandbearing oak), *Quercus lobata* (California white oak), *Quercus petraea* (durmast oak), *Quercus robur* (common oak), *Quercus rubra* (northern red oak), *Quercus velutina* (black oak), *Rubus idaeus* (raspberry), *Salix babylonica* (weeping willow), *Sorbus alnifolia* (hornbeam-ash), *Sorbus aucuparia* (mountain ash), *Tilia cordata* (small-leaf lime), *Tilia platyphyllos* (large-leaved lime), *Tilia tuan, Tsuga canadensis* (eastern hemlock), *Tsuga chinensis* (Chinese hemlock), *Ulmus laevis* (Russian white elm), *Ulmus macrocarpa, Ulmus pumila* (dwarf elm), *Vaccinium myrtillus* (blueberry).

[379] Armenia, Azerbaijan, China (Native), Georgia, Japan (Native), Kazakhstan (Native), North Korea (Native), South Korea (Native), Turkey, Vietnam (Native), Austria (Native), Belgium, Bosnia and Herzegovina, Bulgaria (Native), Czechia (Native), Denmark (Native), Estonia (Native), Finland (Native), France (Native), Germany (Native), Greece (Native), Hungary, Italy (Native), Latvia (Native), Lithuania (Native), Netherlands (Native), North Macedonia (Native), Norway (Native), Poland (Native), Portugal (Native), Romania (Native), Russia, Slovenia, Spain (Native), Sweden (Native), Switzerland (Native), Ukraine (Native), United Kingdom.

[380] May be spread on containers and ships as egg masses (2021 Berry Biosecurity Plan).
[381] Adult moths capable of flight; noting males are more active than females; the latter whom usually sit on stems of host plants and may fly more actively after depositing most of her eggs. First- and second-instars are capable of wind-dispersal over considerable distances. Note however, that adult moths do not feed and live for less than a week (Plant Biosecurity and Product Integrity, 2016).
[382] Considered a serious pest of forestry industries worldwide (Plant Biosecurity and Product Integrity, 2016). *Picea abies* (Norway spruce) and *Pinus sylvestris* (Scots pine) are reported to be the species most preferred -and damaged - by *Lymantria monacha*.
[383] *Abies* spp. (firs), *Acer platanoides* (Norway maple), *Alnus glutinosa* (European alder), *Alnus incana* (grey alder), *Arbutus unedo* (arbutus), *Betula* (birches), *Betula nana, Betula pendula* (common silver birch), *Betula pubescens* (Downy birch), *Caragana arborescens* (Siberian pea-tree), *Carpinus betulus* (hornbeam), *Castanea sativa* (chestnut), *Corylus avellana* (hazel), *Cotoneaster, Crataegus* (hawthorns), *Crataegus monogyna* (hawthorn), *Fagus sylvatica* (common beech), *Fragaria vesca* (wild strawberry), *Frangula alnus* (alder buckthorn), *Fraxinus excelsior* (ash), *Humulus lupulus* (hop), *Larix sibirica* (Siberian larch), *Malus domestica* (apple), *Picea abies* (common spruce), *Picea sitchensis* (Sitka spruce), *Pinus contorta* (lodgepole pine), *Pinus sylvestris* (Scots pine), *Populus tremula* (aspen (European)), *Prunus avium* (sweet cherry), *Prunus spinosa* (blackthorn), *Quercus robur* (common oak), *Ribes nigrum* (blackcurrant), *Rosa canina* (Dog rose), *Rubus fruticosus* (blackberry), *Rubus idaeus* (raspberry), *Rumex acetosella* (sheep's sorrel), *Salix alba* (white willow), *Salix aurita* (eared willow), *Salix caprea* (pussy willow), *Salix cinerea* (grey sallow), *Salix myrsinifolia* (dark-leaved willow), *Salix phylicifolia* (tea-leaved willow), *Salix starkeana, Sorbus aucuparia* (mountain ash), *Syringa vulgaris* (lilac), *Tilia europaea, Ulmus* (elms), *Vaccinium myrtillus* (blueberry), *Vaccinium uliginosum* (bog whortleberry), *Vaccinium vitis-idaea* (cowberry).
[384] Highly polyphagous with a wide host range. Can inhabit a wide range of habitats including open woodlands, valleys and urban gardens (Wildlife Insight, N.D.).
[385] Polyphagous with a wide host range. Adult males capable of flight but flight behaviour has been described as weak (Wildlife Insight, N.D.). Adult females are flightless (Wildlife Insight, N.D.).
[386] Larvae reported as capable of causing complete defoliation of shrubs and trees.
[387] *Abies balsamea* (balsam fir), *Acer negundo* (box elder), *Acer platanoides* (Norway maple), *Acer rubrum* (red maple), *Acer saccharinum* (silver maple), *Acer saccharum* (sugar maple), *Aesculus flava* (yellow buckeye), *Aesculus glabra* (Texas buckeye), *Aesculus hippocastanum* (horse chestnut), *Ailanthus altissima* (tree-of-heaven), *Albizia julibrissin* (silk tree), *Alnus serrulata, Amelanchier canadensis* (thicket serviceberry), *Asimina triloba* (Pawpaw-apple), *Berberis canadensis* (American barberry), *Berberis vulgaris* (European barberry), *Betula lenta* (sweet birch), *Betula nigra* (river birch), *Betula papyrifera* (paper birch), *Betula pubescens* (Downy birch), *Buxus sempervirens* (common boxwood), *Campsis radicans* (trumpetcreeper), *Carpinus caroliniana* (American hornbeam), *Carya illinoinensis* (pecan), *Castanea dentata* (American chestnut), *Castanea pumila* (Allegheny chinquapin), *Catalpa bignonioides* (Southern catalpa), *Catalpa speciosa* (hardy catalpa), *Celtis occidentalis* (hackberry), *Cephalanthus occidentalis* (common buttonbush), *Cercis canadensis* (eastern redbud), *Chamaecyparis thyoides* (Atlantic white cedar), *Chenopodium album* (fat hen), *Chionanthus virginicus* (white fringe tree), *Cornus alternifolia* (pagoda dogwood), *Cornus florida* (Flowering dogwood), *Corylus americana* (American hazel), *Cotinus coggygria* (fustet), *Crataegus crus-galli* (Cockspur hawthorn), *Cydonia oblonga* (quince), *Diospyros kaki* (persimmon), *Diospyros virginiana* (persimmon (common)), *Euonymus atropurpureus* (purple spindle), *Fagus grandifolia* (American beech), *Ficus carica* (common fig), *Fraxinus americana* (white ash), *Fraxinus excelsior* (ash), *Geranium maculatum* (spotted geranium (USA)), *Gleditsia triacanthos* (honey locust), *Gordonia lasianthus, Gossypium herbaceum* (short staple cotton), *Gymnocladus dioicus* (Kentucky coffeetree), *Hamamelis virginiana* (Virginian witch-hazel), *Hibiscus syriacus* (shrubby althaea), *Hibiscus trionum* (Venice mallow), *Humulus lupulus* (hop), *Ilex opaca* (American holly), *Ipomoea purpurea* (silk tree) (tall morning glory), *Iris* spp. (irises), *Jasminum* spp. (jasmine), *Juglans cinerea* (butternut), *Juglans nigra* (black walnut), *Juglans regia* (walnut), *Juniperus virginiana* (eastern redcedar), *Larix decidua* (common larch), *Larix laricina* (American larch), *Ligustrum vulgare* (common privet), *Liquidambar styraciflua* (Sweet gum), *Liriodendron tulipifera* (tuliptree), *Lonicera japonica* (Japanese honeysuckle), *Maclura pomifera* (osage orange), *Magnolia virginiana* (sweet bay), *Malus domestica* (apple), *Malva* spp. (mallow), *Morus rubra* (red mulberrytree), *Myrica pensylvanica* (northern bayberry (USA)), *Nyssa sylvatica* (tupelo), *Ostrya virginiana* (American hophornbeam), *Oxydendrum arboreum* (Sourwood), *Parthenocissus quinquefolia* (Virginia creeper), *Paulownia tomentosa* (paulownia), *Picea glauca* (white spruce), *Pinus strobus* (eastern white pine), *Plantago* spp. (Plantain), *Platanus occidentalis* (sycamore), *Poa pratensis* (smooth meadow-grass), *Populus alba* (silver-leaf poplar), *Populus balsamifera* (balm of Gilead), *Populus deltoides* (poplar), *Populus fremontii* (Fremont cottonwood), *Populus nigra* (black poplar), *Populus tremuloides* (trembling aspen), *Prunus americana* (American plum), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus ilicifolia* (holly-leaved cherry), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Prunus virginiana* (common chokecherrytree), *Pyracantha coccinea* (scarlet firethorn), *Pyrus communis* (European pear), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Quercus laurifolia* (Laurel oak), *Quercus montana* (basket oak), *Quercus nigra* (water oak), *Quercus phellos* (Willow oak), *Quercus rubra* (northern red oak), *Quercus virginiana* (Live oak), *Rhamnus alnifolia, Rhododendron* (Azalea), *Ribes* spp. (currants), *Ricinus communis* (castor bean), *Robinia pseudoacacia* (black locust), *Rosa* spp. (roses), *Rubus* spp. (blackberry, raspberry), *Salix fragilis* (crack willow), *Salix lutea* (Heart-leaved willow), *Sambucus canadensis* (American black elderberry), *Sassafras albidum* (common sassafras), *Spiraea virginiana* (Virginia spiraea), *Staphylea trifolia* (american bladder nut), *Symphoricarpos albus* (common snowberry), *Syringa vulgaris* (lilac), *Tamarix gallica* (French tamarisk), *Taraxacum officinale complex* (dandelion), *Taxus canadensis* (Canadian yew (USA)), *Tilia americana* (basswood), *Tilia cordata* (small-leaf lime), *Tilia platyphyllos* (large-leaved lime), *Trifolium* (clovers), *Ulmus americana* (American elm), *Ulmus rubra* (slippery elm), *Vaccinium* spp. (blueberries), *Viburnum* spp., *Wisteria frutescens* (american wisteria), *Wisteria sinensis* (Chinese wisteria), *Zanthoxylum clava-herculis* (herculesclub (USA)), *Zea mays* (maize).
[388] Wide host range; feeding on at least 140 species (Schowalter, 2018). This species has a high thermal tolerance range and is likely to become more abundant in warmer climates (Schowalter, 2018).
[389] Wide host range; feeding on at least 140 species (Schowalter, 2018). Unlike males, adult females are flightless hence the major mode of dispersal of this species is via larvae which produce a silk thread that they use to "balloon" (Hall et. al, 2014).
[390] Reported to occasionally defoliate *Vaccinium* spp. (blueberry) in Canada (Nova Scotia) and the United States of America (Michigan) causing significant crop losses. Larvae are reported to defoliate blueberries with severe defoliation reported during outbreaks (Isaacs & Van Timmeren, 2009; Schowalter, 2018). When larvae are highly abundant, feeding can cause defoliation and even death of young plants

(Isaacs & Van Timmeren, 2009). Larvae also contaminate blueberries and as larvae can be collected during mechanical harvesting (Isaacs & Van Timmeren, 2009), can result in significant economic losses for producers (Schowalter, 2018).

[391] *Abies balsamea* (balsam fir), *Abies grandis* (grand fir), *Acer* spp. (maples), *Acer negundo* (box elder), *Acer saccharum* (sugar maple), *Alcea rosea* (Hollyhock), *Allium cepa* (onion), *Alnus rubra* (red alder), *Ambrosia artemisiifolia* (common ragweed), *Amelanchier canadensis* (thicket serviceberry), *Anthemis cotula* (dog fennel), *Apium graveolens* (celery), *Arachis hypogaea* (groundnut), *Asparagus officinalis* (asparagus), *Asparagus setaceus* (asparagus fern), *Aster, Avena sativa* (oats), *Beta vulgaris* (beetroot), *Beta vulgaris var. saccharifera* (sugarbeet), *Brassica napus var. napus* (rape), *Brassica nigra* (black mustard), *Brassica oleracea* (cabbages, cauliflowers), *Brassica oleracea var. capitata* (cabbage), *Brassica rapa subsp. oleifera* (turnip rape), *Capsella bursa-pastoris* (shepherd's purse), *Capsicum annuum* (bell pepper), *Chamaecyparis thyoides* (Atlantic white cedar), *Chenopodium quinoa* (quinoa), *Chrysanthemum* (daisy), *Cicer arietinum* (chickpea), *Cichorium* (chicory), *Cirsium* (thistle), *Citrullus lanatus* (watermelon), *Citrus limon* (lemon), *Citrus sinensis* (sweet orange), *Conyza canadensis* (Canadian fleabane), *Corylus, Cucumis melo* (melon), *Cucumis sativus* (cucumber), *Cucurbita moschata* (pumpkin), *Cynara cardunculus var. scolymus* (globe artichoke), *Dahlia, Datura stramonium* (jimsonweed), *Daucus carota* (carrot), *Dianthus* (carnation), *Epilobium angustifolium* (rosebay willowherb), *Erigeron* (Fleabane), *Eupatorium, Fragaria ananassa* (strawberry), *Geranium* (cranesbill), *Gladiolus hybrids* (sword lily), *Gleditsia triacanthos* (honey locust), *Glycine max* (soyabean), *Gossypium* (cotton), *Helianthus annuus* (sunflower), *Hordeum vulgare* (barley), *Humulus lupulus* (hop), *Inula helenium* (Elecampane), *Ipomoea batatas* (sweet potato), *Lactuca sativa* (lettuce), *Lathyrus odoratus* (sweet pea), *Linum usitatissimum* (flax), *Lolium* (ryegrasses), *Maclura pomifera* (osage orange), *Malus domestica* (apple), *Medicago sativa* (lucerne), *Melia azedarach* (Chinaberry), *Melilotus albus* (honey clover), *Mentha piperita* (Peppermint), *Mentha spicata* (Spear mint), *Morus alba* (mora), *Nicotiana tabacum* (tobacco), *Parthenium argentatum* (Guayule), *Persea americana* (avocado), *Petunia, Phaseolus lunatus* (lima bean), *Phaseolus vulgaris* (common bean), *Phleum pratense* (timothy grass), *Picea glauca* (white spruce), *Pimenta dioica* (allspice), *Pisum sativum* (pea), *Plantago* (Plantain), *Polygonum* (knotweed), *Populus* (poplars), *Portulaca oleracea* (purslane), *Prunus* (stone fruit), *Prunus armeniaca* (apricot), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Pseudotsuga menziesii* (Douglas-fir), *Pteridium aquilinum* (bracken), *Pyrus communis* (European pear), *Raphanus sativus* (radish), *Rheum hybridum* (rhubarb), *Rhus* (Sumach), *Ribes uva-crispa* (gooseberry), *Rosa* (roses), *Rubus fruticosus* (blackberry), *Rubus idaeus* (raspberry), *Rubus occidentalis* (black raspberry), *Rumex* (Dock), *Salix* (willows), *Salvia officinalis* (common sage), *Secale cereale* (rye), *Sinapis alba* (white mustard), *Solanum lycopersicum* (tomato), *Solanum tuberosum* (potato), *Solidago* (Goldenrod), *Sonchus* (Sowthistle), *Spinacia oleracea* (spinach), *Stellaria media* (common chickweed), *Trifolium* (clovers), *Triticum aestivum* (wheat), *Tropaeolum majus* (nasturtium), *Tsuga canadensis* (eastern hemlock), *turfgrasses, Vaccinium* spp. (blueberries), *Vicia* spp. (vetch), *Vicia faba* (faba bean), *Viola* (violet), *Vitis vinifera* (grapevine), *Xanthium strumarium* (common cocklebur), *Zea mays* (maize), *Zea mays subsp. mays* (sweetcorn), *Zea mays subsp. mexicana* (teosinte), *Zinnia* spp.

[392] Morocco, Tunisia, Armenia, China, Israel, Japan, South Korea, Sri Lanka, Syria, Taiwan, Turkey, Albania, Austria, Belgium, Bulgaria, Czechia, Denmark, Faroe Islands, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, United Kingdom, Bermuda, Canada, Costa Rica, Guatemala, Jamaica, Mexico, Puerto Rico, United States of America (including Hawaii), Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Uruguay, Venezuela

[393] Spread potential - Wide host range with adult moths migratory and capable of flight over long distances (Crabo et. al, 2009) with moths able to travel distances at night for several hours at speeds between 2-6 km/hr and faster with wind assistance (Wurster & Timms, 2010).

[394] Reported to damage fruit trees such as apples, peaches and pears; particularly fruit on lower branches of trees and those in contact with herbaceous understorey plants.

[395] *Abelmoschus esculentus* (okra), *Achyranthes aspera* (devil's horsewhip), *Alcea rosea* (Hollyhock), *Allium cepa* (onion), *Allium fistulosum* (Welsh onion), *Allium sativum* (garlic), *Alpinia purpurata* (red ginger), *Amaranthus* (amaranth), *Amaranthus deflexus* (Perennial Pigweed), *Amaranthus hybridus* (smooth pigweed), *Amaranthus quitensis, Amaranthus retroflexus* (redroot pigweed), *Amaranthus spinosus* (spiny amaranth), *Amaranthus viridis* (slender amaranth), *Antirrhinum majus* (snapdragon), *Apium graveolens* (celery), *Arachis hypogaea* (groundnut), *Artemisia absinthium* (Wormwood), *Asparagus officinalis* (asparagus), *Beta, Beta vulgaris* (beetroot), *Beta vulgaris var. cicla, Bidens pilosa* (blackjack), *Brassica napus var. oleifera, Brassica nigra* (black mustard), *Brassica oleracea* (cabbages, cauliflowers), *Brassica oleracea var. capitata* (cabbage), *Brassica oleracea var. viridis* (collards), *Brassicaceae* (cruciferous crops), *Camellia japonica* (camellia), *Capsicum annuum* (bell pepper), *Carica papaya* (pawpaw), *Cecropia peltata* (trumpet tree), *Centrosema pubescens* (Centro), *Chenopodium quinoa* (quinoa), *Chrysanthemum morifolium* (chrysanthemum (florists')), *Cicer arietinum* (chickpea), *Citharexylum fruticosum, Citrullus lanatus* (watermelon), *Citrus, Citrus limon* (lemon), *Citrus sinensis* (sweet orange), *Coffea arabica* (arabica coffee), *Commelina diffusa* (spreading dayflower), *Conyza bonariensis* (hairy fleabane), *Conyza canadensis* (Canadian fleabane), *Coriandrum sativum* (coriander), *Crotalaria spectabilis* (showy rattlepod), *Cucumis melo* (melon), *Cucumis sativus* (cucumber), *Cucurbita maxima* (giant pumpkin), *Cynodon nlemfuensis* (African Bermuda-grass), *Daucus carota* (carrot), *Dianthus* (carnation), *Dianthus caryophyllus* (carnation), *Digitaria* (crabgrass), *Digitaria ischaemum, Digitaria sanguinalis* (large crabgrass), *Dioscorea* (yam), *Dioscorea batatas* (Chinese yam), *Eclipta prostrata* (eclipta), *Eucalyptus, Fragaria vesca* (wild strawberry), *Geranium* (cranesbill), *Gerbera jamesonii* (African daisy), *Gladiolus hybrids* (sword lily), *Glycine max* (soyabean), *Gonzalagunia spicata, Gossypium* (cotton), *Gossypium herbaceum* (short staple cotton), *Gossypium herbaceum* (short staple cotton), *Gossypium hirsutum* (Bourbon cotton), *Hamelia patens, Helianthus* (sunflower), *Helianthus annuus* (sunflower), *Hibiscus cannabinus* (kenaf), *Hibiscus rosa-sinensis* (Chinese rose), *Impatiens walleriana* (busy lizzy), *Ipomoea batatas* (sweet potato), *Ipomoea purpurea* (tall morning glory), *Lactuca sativa* (lettuce), *Lagerstroemia indica* (Indian crape myrtle), *Laportea aestuans, Lavandula angustifolia* (lavender), *Leucaena leucocephala* (leucaena), *Linum usitatissimum* (flax), *Lolium perenne* (perennial ryegrass), *Lonicera japonica* (Japanese honeysuckle), *Ludwigia* (waterprimrose), *Malus domestica* (apple), *Malva parviflora* (pink cheeseweed), *Manihot esculenta* (cassava), *Medicago sativa* (lucerne), *Melinis minutiflora* (molasses grass), *Melissa officinalis* (Lemon balm), *Mentha* (mints), *Mentha arvensis* (Corn mint), *Mentha arvensis var. piperascens* (Japanese mint), *Mentha piperita* (Peppermint), *Mentha spicata* (Spear mint), *Mimosa pudica* (sensitive plant), *Mimosa scabrella, Morus alba* (mora), *Mucuna pruriens* (velvet bean), *Musa* (banana), *Nasturtium officinale* (watercress), *Nerium oleander* (oleander), *Neurolaena lobata, Nicotiana alata* (sweet-scented tobacco), *Nicotiana tabacum* (tobacco), *Ocotea, Odontoglossum, Oryza sativa* (rice), *Passiflora edulis* (passionfruit), *Pelargonium* (pelargoniums), *Pelargonium*

hortorum, Pennisetum purpureum (elephant grass), *Persea americana* (avocado), *Phaseolus* (beans), *Phaseolus lunatus* (lima bean), *Phaseolus vulgaris* (common bean), *Phyllanthus urinaria* (chamber bitter), *Phytolacca americana* (pokeweed), *Phytolacca dioica, Phytolacca rivinoides, Phytolaccaceae, Pisum sativum* (pea), *Plantago major* (broad-leaved plaintain), *Poaceae* (grasses), *Portulaca grandiflora* (Rose moss), *Portulaca oleracea* (purslane), *Psidium guajava* (guava), *Pyrus communis* (European pear), *Rheum hybridum* (rhubarb), *Ricinus communis* (castor bean), *Ricinus communis* (castor bean), *Rosa* (roses), *Rubus idaeus* (raspberry), *Rubus rosifolius* (roseleaf raspberry), *Rumex* (Dock), *Rumex crispus* (curled dock), *Rumex obtusifolius* (broad-leaved dock), *Salix* (willows), *Sanchezia speciosa* (shrubby whitevein), *Schinus terebinthifolius* (Brazilian pepper tree), *Schinus terebinthifolius* (Brazilian pepper tree), *Sechium edule* (chayote), *Sida rhombifolia, Solanum americanum, Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Solanum rugosum, Solanum torvum* (turkey berry), *Solanum tuberosum* (potato), *Sonchus* (Sowthistle), *Sonchus oleraceus* (common sowthistle), *Spinacia oleracea* (spinach), *Taraxacum officinale complex* (dandelion), *Trifolium* (clovers), *Urera baccifera, Vaccinium corymbosum* (blueberry), *Vaccinium macrocarpon* (cranberry), *Vicia faba* (faba bean), *Vigna unguiculata* (cowpea), *Vitis labrusca* (fox grape), *Vitis vinifera* (grapevine), *Xanthosoma* (cocoyam), *Zea mays* (maize), *Zinnia. Amaranthus* spp (pigweed) *and Phytolacca americana* (pokeweed) are especially favored (Capinera, 1999).

[396] Benin, Cameroon, Gabon, Nigeria, India, 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 of America, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.

[397] Polyphagous, generalist feeder on a wide host range of more than 200 plant species.

[398] Causes damage to host plants through leaf-eating and skeletonisation and in extreme cases, complete defoliation (Montezano & Specht, 2019).

[399] *Acer* spp. (maples), *Allium cepa* (onion), *Apium graveolens* (celery), *Arctium* (Burdock), *Aronia melanocarpa* (black chokeberry), *Atropa belladonna* (deadly nightshade), *Avena sativa* (oats), *Beta vulgaris* (beetroot), *Beta vulgaris var. saccharifera* (sugarbeet), *Brassica oleracea* (cabbages, cauliflowers), *Brassica oleracea var. botrytis* (cauliflower), *Brassica oleracea var. capitata* (cabbage), *Brassica oleracea var. gemmifera* (Brussels sprouts), *Brassica oleracea var. viridis* (collards), *Brassica rapa subsp. chinensis* (Chinese cabbage), *Brassica rapa subsp. oleifera* (turnip rape), *Calendula* (marigolds), *Chenopodium* (Goosefoot),*Chrysanthemum* (daisy),*Cichorium* (chicory),*Cirsium arvense* (creeping thistle),*Citrus sinensis* (sweet orange),*Comptonia peregrina* (sweetfern),*Cucumis sativus* (cucumber),*Daucus carota* (carrot), *Epilobium* spp. (willowherbs), *Fragaria* spp. (strawberry), *Gossypium* spp. (cotton), *Helianthus annuus* (sunflower), *Hordeum vulgare* (barley), *Lactuca sativa* (lettuce), *Lamium album* (white deadnettle), *Linum usitatissimum* (flax), *Lobelia* spp., *Malus domestica* (apple), *Medicago sativa* (lucerne), *Melilotus* spp. (melilots), *Mentha spicata* (Spear mint), *Myosotis* spp. (forget-me-nots), *Nicotiana tabacum* (tobacco), *Onobrychis* spp. (sainfoin), *Papaver* spp. (poppies), *Phaseolus vulgaris* (common bean), *Phleum pratense* (timothy grass), *Pisum sativum* (pea), *Plantago* spp. (Plantain), Poaceae (grasses), *Primula* (Primrose),*Prunus avium* (sweet cherry), *Prunus persica* (peach),*Pyrus communis* (European pear),*Rheum hybridum* (rhubarb),*Ribes uva-crispa* (gooseberry),*Rosa* (roses),*Rubia tinctorum* (Rose madder),*Rubus idaeus* (raspberry), *Rumex* spp. (Dock), *Salix repens* (creeping willow (UK)), *Senecio vulgaris, Solanum lycopersicum* (tomato), *Solanum tuberosum* (potato), *Solidago* spp. (Goldenrod), *Spiraea latifolia* (Meadowsweet), *Stellaria media* (common chickweed),*Taraxacum officinale complex* (dandelion),*Thalictrum* spp. (meadow-rue), *Trifolium* spp. (clovers), *Triticum aestivum* (wheat), *Vaccinium angustifolium* (Lowbush blueberry), *Vaccinium myrtillus* (blueberry), *Viburnum* spp., *Vicia* spp. (vetch), *Viola* spp. (violet), *Vitis vinifera* (grapevine), *Zea mays* (maize).

[400] Described as a general feeder on many vegetables and crops (Landolt, 2000).

[401] Considered to be a minor agricultural pest in most of its range but can develop into a major local infestation on a wide variety of crops such as grapevine. Reported to cause occasional economic damage to vineyards, orchards and various row crops (Landolt et. al, 2010).

[402] *Cotoneaster* spp., *Crataegus azarolus*, *Crataegus laevigata*, *Crataegus monogyna* (hawthorn), *Crataegus sanguinea*, *Cydonia* spp. (quince), *Malus domestica* (apple), *Mespilus germanica* (medlar), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus domestica* (plum), *Prunus dulcis* (almond), *Prunus nana*, *Prunus padus* (bird cherry), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Prunus spinosa* (blackthorn), *Pyrus communis* (European pear), *Quercus robur* (common oak), *Rosa* spp. (roses), *Rosa canina* (Dog rose), *Sorbus* spp. (rowan), *Sorbus aucuparia* (mountain ash), *Spiraea media* (oriental spirea), *Vaccinium uliginosum* (bog whortleberry). Also found on *Vaccinium corymbosum* (Безручeнок, 2022), *Vaccinium myrtillus* and *Vaccinium vitis-idaea* (Viljur et. al, 2020).

[403] Control methods appear to exist for this pest (Безручeнок, 2022).

[404] *Vaccinium* spp. (blueberries). Also found on *Cupressus lusitanica* (Cedar), *Thuja plicata* (Western red cedar), *Cedrus deodara* (Indian cedar), *Cupressus macrocarpa* (Monterey cypress), *Quercus robur* (English oak), *Chamaecyparis lawsonianea* (Lawson's cypress), *Juniperus squamata*, *Juniperus communis* (Common juniper), *Erica vagans* (Cornish heath), *Erica darleyensis*, *Podocarpus hallii*, *Cytisus scoparius* (Scotch broom), Berberis vulgaris (Barberry), *Acacia dealbata* (Silver wattle), *Salix babylonica* (Weeping willow), *Pinus radiata* (Moneterey pine), *Juniperus chinensis* (Chinese juniper), *Hypericum calycinum*, *Cupressus sempervirens*, *Cupressus arizonia*, *Chamaecyparis pisifera*, *Chamaecyparis lawsoniana*, *Cryptomeria japonica*, *Santolina chamaecyparissus*, *Leptospermum scoparium*, *Dodonaena viscosa*, *Cupressus torulosa*, *Cedrus atlantica*, *Thuja occidentalis*, *Chamaecyparis obtusa*, *Taxus baccata*, *Kunzea baxteri*, *Cassinia fulvida*, *Escallonia macrantha*, *Podocarpus dacrydioides*, *Adenandra fragrans*, *Lophomyrtus obcordata*, *Myrtus ralphii*, *Lophomyrtus bullata*, *Lophomyrtus obcordata*, *Mahonia aquifolium*, *Beaufortia sparsa*, *Rosa moyesii*, *Rosa damascena*, *Chamaecyparis obtusa*, *Cassia corymbosa*, *Phebalium squameum*, *Cydonia* spp., *Pyrus malus*, *Prunus persica*, *Citrus* spp., *Prunus armeniaca* (Ooi, 1967).

[405] Dispersal is possible via larvae (Oooi, 1967) and through wind dispersal of newly hatched caterpillars (Nuttall, 1982). Adult females are maggot-like, wingless and never emerge from larval case (Moths and Butterflies of New Zealand, N.D.).

[406] Generally considered to be of little or no economic importance (Ooi, 1967). In 1985, the species was reported to have contributed to damage caused to *Vaccinium corymbosum* (blueberries) fruit leading to fruit rejection (Tomkins & Koller, 1985).

[407] *Betula* spp., *Carpinus betulus*, *Crataegus* spp., *Cydonia oblonga*, *Fagus sylvatica*, *Forsythia suspensa*, *Fraxinus* spp., *Gossypium*

herbaceum, *Humulus* spp., *Laburnum* spp., *Ligustrum* spp., *Lonicera xylosteum*, *Malus domestica*, *Malus* spp., *Medicago* spp., *Morus* spp., *Pistacia lentiscus*, *Populus* spp., *Prunus armeniaca*, *Prunus avium*, *Prunus domestica*, *Prunus persica*, *Prunus* spp., *Pyrus communis*, *Pyrus* spp., *Ribes nigrum*, *Ribes rubrum*, *Ribes* spp., *Rosa canina*, *Rubus idaeus*, *Rubus* spp., *Salix caprea*, *Salix viminalis*, *Syringa vulgaris*, *Tilia* spp., *Ulmus* spp., *Vaccinium* spp.

[408] Dispersal is mainly by transportation of infested plant material. The flying activity is often restricted to the night, and migration is limited, especially for females.

[409] *Acer* (maple), *Acer negundo* (boxelder), *Acer rubrum* (red maple), *Acer spicatum* (mountain maple), *Rhus* (sumac),*Toxicodendron pubescens* (Atlantic poison oak), *Betula papyrifera* (paper birch), *Carpinus* (hornbeam), *Viburnum* (viburnum), *Cornus glabrata* (brown dogwood), *Cornus* (dogwood), *Arbutus* (madrone), *Arctostaphylos* (manzanita), *Ledum groenlandicum* (bog Labrador tea), *Rhododendron* (rhododendron), *Vaccinium* (blueberry), *Amorpha fruticose* (desert false indigo), *Medicago sativa* (alfalfa), *Melilotus* (sweetclover), *Robinia pseudoacacia* (black locust), *Vicia* (vetch), *Quercus agrifolia* (California live oak), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Quercus douglasii* (blue oak), *Quercus Dumosa* (coastal sage scrub oak), *Quercus garryana* (Oregon white oak), *Quercus kelloggii* (California black oak), *Quercus lobata* (valley oak), *Quercus rubra* (red oak), *Quercus wislizeni* (interior live oak), *Quercus* (oak), *Ribes nigrum* (European black currant), *Ribes uva-crispa* (European gooseberry), *Ribes* (currant), *Aesculus californica* (California buckeye), *Aesculus hippocastanum* (horse chestnut), *Eriodictyon* (yerba santa), *Eriodictyon californicum* (California yerba santa), *Carya* (hickory), *Juglans* (walnut), *Allium cepa* (garden onion), *Myrica* (sweetgale), *Comptonia peregrina* (sweet fern), *Fraxinus* (ash), *Fraxinus latifolia* (Oregon ash), *Abies concolor* (white fir), *Pseudotsuga macrocarpa* (bigcone Douglas-fir), *Pseudotsuga menziesii* (Douglas-fir), *Platanus* (sycamore), *Ceanothus cuneatus* (buckbrush), *Ceanothus incanus* (coast whitethorn), *Cercocarpus* (mountain mahogany), *Cercocarpus montanus* (alderleaf mountain mahogany), *Cercocarpus montanus var. glaber* (birchleaf mountain mahogany), *Crataegus* (hawthorn), *Malus domestica* (apple), *Malus pumila* (paradise apple), *Malus* (apple), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus ilicifolia* (hollyleaf cherry), *Prunus pensylvanica* (pin cherry), *Prunus virginiana* (chokecherry), *Prunus, Pyrus communis* (common pear), *Pyrus* (pear), *Rosa californica* (California wildrose), *Rosa* (rose), *Rubus deliciosus* (delicious raspberry), *Rubus* (blackberry), *Citrus* (citrus), *Citrus X sinensis [maxima X reticulata]* (sweet orange), *Populus balsamifera* (balsam poplar), *Populus grandidentata* (bigtooth aspen), *Populus tremuloides* (quaking aspen), *Populus* (cottonwood), *Salix lasiolepis* (arroyo willow), *Salix sessilifolia* (northwest sandbar willow), *Salix* (willow), *Tilia americana* (American basswood), *Ulmus americana* (American elm), *Ulmus* (elm), *Vitis* (grape).

[410] *Acer circinatum* (vine maple), *Acer macrophyllum* (bigleaf maple), *Acer rubrum* (red maple), *Acer* (maple), *Alnus glutinosa* (European alder), *Alnus incana* (gray alder), *Alnus rhombifolia* (white alder), *Alnus rubra* (red alder), *Alnus* (alder), *Calendula officinalis* (Pot marigold), *Citrus, Corylus avellana* (common filbert), *Corylus cornuta var. californica* (California hazelnut), *Corylus* (hazelnut), *Viburnum opulus* (European cranberry bush), *Viburnum* (viburnum), *Cornus nuttallii* (Pacific dogwood), *Cornus racemosa* (gray dogwood), *Cornus sericea* (redosier dogwood), *Vaccinium* (blueberry), *Caragana arborescens* (Siberian peashrub), *Foeniculum* (fennel), *Quercus robur* (English oak), *Quercus rubra* (red oak), *Quercus* (oak), *Ribes nigrum* (European black currant), *Ribes rubrum* (red currant), *Ribes* (currant), *Carya* (hickory), *Ligustrum vulgare* (European privet), *Ligustrum* (privet), *Syringa* (lilac) *[unspecified], Rhamnus* (buckthorn), *Crataegus douglasii* (black hawthorn), *Crataegus* (hawthorn), *Malus domestica* (apple), *Malus sylvestris* (European crab apple), *Malus* (apple), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus domestica* (European plum), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Prunus virginiana* (chokecherry), *Prunus, Pinopsida* (conifers), *Pinus* (pines), *Pyrus communis* (common pear), *Pyrus* (pear), *Rosa canina* (Dog rose), *Rosa rugosa* (rugosa rose), *Rosa* (rose), *Rubus idaeus* (American red raspberry), *Rubus parviflorus* (thimbleberry), *Rubus* (blackberry), *Citrus* (citrus), *Populus* (cottonwood), *Salix* (willow), *Solanum* (nightshade), *Ulmus* (elm), *Urtica dioica* (stinging nettle).

[411] *Abies* spp. (firs), *Abies nordmanniana* (Nordmann fir), *Acer* spp. (maples), *Achillea clavennae, Achillea pannonica, Alnus alnobetula* (green alder), *Ampelopsis* spp., *Anethum graveolens* (dill), *Artemisia campestris, Artemisia vulgaris* (mugwort), *Aster* spp., *Athamanta cretensis, Betula* spp. (birches), *Boehmeria nivea* (ramie), *Calluna vulgaris* (heather), *Camellia sinensis* (tea), *Carum carvi* (caraway), *Cedrus deodara* (Himalayan cedar), *Centaurea* spp. (Knapweed), *Chrysanthemum* spp. (daisy), *Citrus* spp., *Clinopodium vulgare, Colutea arborescens* (bladder senna), *Crataegus* spp. (hawthorns), *Cunninghamia* spp., *Cydonia oblonga* (quince), *Dryas octopetala, Epilobium angustifolium* (rosebay willowherb), *Erica* spp. (heaths), *Erica tetralix, Erigeron acer, Euonymus* spp. (spindle trees), *Foeniculum vulgare* (fennel), *Fragaria ananassa* (strawberry), *Frangula alnus* (alder buckthorn), *Genista* spp. (broom), *Gentiana asclepiadea* (swallowwort gentian), *Gentiana pneumonanthe, Helichrysum* spp., *Hibiscus cannabinus* (kenaf), *Humulus lupulus* (hop), *Larix* spp. (larches), *Lavandula angustifolia* (lavender), *Lotus corniculatus* (bird's-foot trefoil), *Lotus pedunculatus, Malus domestica* (apple), *Malus sylvestris* (crab-apple tree), *Melissa officinalis* (Lemon balm), *Morus* spp. (mulberrytree), *Myrica gale* (waxberry), *Parthenocissus* spp., *Phaseolus* spp. (beans), *Picea* spp. (spruces), *Pimpinella saxifraga, Pinus* spp. (pines), *Populus* spp. (poplars), *Populus alba* (silver-leaf poplar), *Potentilla* spp. (Cinquefoil), *Prunus* spp. (stone fruit), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus domestica* (plum), *Prunus padus* (bird cherry), *Prunus persica* (peach), *Pyracantha* spp. (Firethorn) (green alder), *Pyrus communis* (European pear), *Quercus* spp. (oaks), *Ranunculus* spp. (Buttercup), *Rhamnus* spp. (Buckthorn), *Rubus caesius* (dewberry), *Salvia pratensis, Senecio* spp. (Groundsel), *Senecio erucifolius, Solidago* spp. (Goldenrod), *Tanacetum vulgare* (tansy), *Trifolium* spp. (clovers), *Vaccinium* spp. (blueberries), *Vaccinium myrtillus* (blueberry), *Vaccinium uliginosum* (bog whortleberry), *Vaccinium vitis-idaea* (cowberry), *Vitis labrusca* (fox grape), *Vitis vinifera* (grapevine), *Zea mays* (maize).

[412] Immature stages can potentially be transported over long distances on infested plant material and fruit consignments; with larvae able to complete their development in stored apple fruit (Gambaro, 1962). Australia's apple supply is mostly domestically provided, except for imports of apples from the United States of America where this pest species has not been found. This species was listed as a quarantine pest in the USA in 1994 (EPPO, 2014).

[413] Highly polyphagous on wild trees and shrubs, garden plants and economically important crops including grapevine and apple (Alford, 2007; Ioriatti et. al, 2012). Females deposit their eggs in batches of 40-50 on the upper surface of leaves (Ioriatti et. al, 2012).

[414] Adults are capable of flight. This species has not been known to have spread beyond its native range.

[415] Larvae primarily feed on the leaves of host plants but are also reported to feed on developing inflorescences and fruitlets, buds and fruit (Alford, 2007; Gilligan & Epstein, 2014; Ioriatti et. al, 2012). Reported damage includes skeletonisation of the underside of leaves

(Gilligan & Epstein, 2014).

[416] *Acer* spp. (maple), *Apocynum* spp. (dogbane), *Ilex decidua* (possumhaw), *Ambrosia trifida* (great ragweed), *Chrysanthemum* spp. (daisy), *Zinnia violacea* (elegant zinnia), *Alnus* spp. (alder), *Betula papyrifera* (paper birch), *Lobelia* spp. (lobelia), *Lonicera* spp. (honeysuckle), *Vaccinium* spp. (blueberry), *Quercus* spp. (oak), *Geranium* spp. (geranium), *Alcea rosea* (hollyhock), *Leucanthemum vulgare* (oxeye daisy), *Myrica gale* (sweetgale), *Platanthera cristata* (crested yellow orchid), *Abies balsamea* (balsam fir), *Larix* spp. (larch), *Picea glauca* (white spruce), *Picea mariana* (black spruce), *Picea rubens* (red spruce), *Pinus sylvestris* (Scots pine), *Tsuga canadensis* (eastern hemlock), *Malus* (apple), *Malus domestica* (apple), *Prunus domestica* (European plum), *Prunus pensylvanica* (pin cherry), *Prunus persica* (peach), *Prunus serotina* (black cherry) *Rosa* (rose), *Populus tremuloides* (quaking aspen), *Salix* (willow), *Tilia americana* (American basswood), *Ulmus americana* (American elm), *Viola* (violet), *Vitis vinifera* (wine grape).

[417] *Abies balsamea* (balsam fir), *Acer negundo* (boxelder), *Acer rubrum* (red maple), *Acer saccharinum* (silver maple), *Acer* spp. (maple), *Aesculus californica* (California buckeye), *Aesculus* spp. (buckeye), *Alnus incana* (gray alder), *Ambrosia* spp. (ragweed), *Amelanchier stolonifera* (running serviceberry), *Amorpha fruticosa* (desert false indigo), *Aster* spp. (aster), *Betula* spp. (birches), *Betula alleghaniensis* (yellow birch), *Betula papyrifera* (paper birch), *Betula populifolia* (gray birch), *Calycanthus occidentalis* (western sweetshrub), *Ceanothus integerrimus* (deerbrush), *Celtis occidentalis* (common hackberry), *Cercis canadensis* (eastern redbud), *Comandra umbellata* (bastard toadflax), *Cornus florida* (flowering dogwood), *Cornus racemosa* (gray dogwood), *Cornus* (dogwood), *Corylus*, *Corylus avellana* (hazel, common filbert), *Crataegus* spp. (hawthorns), *Dianthus caryophyllus* (carnation), forest trees (woody plants), *Fraxinus nigra* (black ash), *Fraxinus* spp. (ash), *Geranium* spp. (geranium), *Helianthus annuus* (common sunflower), *Hypericum* spp. (St Johnswort), *Ilex* spp. (Holly), *Lonicera periclymenum* (European honeysuckle), *Lonicera* spp. (honeysuckle), *Malus domestica* (apple), *Malus pumila* (paradise apple), *Malus* spp. (apple), *Ostrya virginiana* (hophornbeam), *Phaseolus vulgaris* (kidney bean), *Physocarpus*, *Pistacia vera* (pistachio), *Pistacia* (pistache), *Platanus occidentalis* (sycamore), *Picea glauca* (white spruce), *Populus balsamifera* spp. (balsam poplar), *Populus* spp. (cottonwood), *Populus tremuloides* (quaking aspen, trembling aspen), *Populus* spp. (poplars), *Prunus* spp. (stone fruit), *Prunus avium* (sweet cherry), *Prunus ilicifolia* (hollyleaf cherry), *Prunus pensylvanica* (pin cherry), *Prunus persica* (peach), *Prunus virginiana* (common chokecherrytree), *Prunus* spp., *Pseudotsuga menziesii* (Douglas-fir), *Pyrus communis* (European pear), *Pyrus* spp. (pear), *Quercus agrifolia* (California live oak), *Quercus alba* (white oak), *Quercus macrocarpa* (bur oak), *Quercus rubra* (red oak), *Quercus* spp. (oak), *Rhamnus* spp. (buckthorn), *Rhododendron* spp. (rhododendron), *Rhus coriaria* (Sicilian sumac), *Rosa* spp. (roses), *Rubus flagellaris* (northern dewberry), *Rubus idaeus* (raspberry, American red raspberry), *Rubus* spp. (blackberry, raspberry), *Salix lasiolepis* (arroyo willow), *Salix* spp. (willow), *Shepherdia canadensis* (Russet buffaloberry), *Solidago* spp. (goldenrod), *Spiraea* spp. (meadowsweet), *Symphoricarpos oreophilus var. utahensis* (Utah snowberry), *Syringa vulgaris* (common lilac), *Syringa* spp. (lilac), *Tilia americana* (American basswood), *Tilia* spp. (basswood), *Trifolium pratense* (red clover), *Tsuga heterophylla* (western hemlock), *Typha latifolia* (broadleaf cattail), *Ulmus americana* (American elm), *Ulmus* spp. (elm), *Vaccinium corymbosum* (highbush blueberry), *Vaccinium* spp. (blueberry), *Verbena* spp. (vervain), *Viburnum lentago* (nannyberry), *Viburnum* spp. (viburnum).

[418] This species has a wide host range and would be likely to be able to become established.

[419] Larvae are external feeders, so are unlikely to spread with fruit. Potentially spread with nursery plants.

[420] Pest outbreaks result in quality and yield losses.

[421] *Acer negundo* (boxelder), *Acer* (maple), *Osmorhiza berteroi* (sweetcicely), *Solidago* (goldenrod), *Alnus incana* (gray alder), *Alnus viridis* (green alder), *Alnus viridis ssp. Crispa* (mountain alder), *Alnus* (alder), *Betula nana* (dwarf birch), *Betula papyrifera* (paper birch), *Betula*(birch), *Corylus* (hazelnut), *Cornus canadensis* (bunchberry dogwood), *Rhododendron canadense* (rhodora), *Vaccinium* (blueberry), *Frasera fastigiata* (clustered green gentian), *Frasera* (green gentian), *Ribes* (currant), *Maianthemum canadense* (Canada mayflower), *Comptonia peregrina* (sweet fern), *Fraxinus* (ash), *Abies balsamea* (balsam fir), *Abies concolor* (white fir), *Abies lasiocarpa* (subalpine fir), *Abies* (fir), *Larix occidentalis* (western larch), *Larix* (larch), *Picea engelmannii* (spruce), *Picea glauca* (white spruce), *Picea* (spruce), *Pinus banksiana* (jack pine), *Pinus* (pine), *Pseudotsuga menziesii* (Douglas-fir), *Pseudostuga* (Douglas-fir), *Ceanothus* (ceanothus), *Malus pumila* (paradise apple, Prunus persica (peach), *Prunus virginiana* (chokecherry), *Prunus, Rosa* (rose), *Rubus* (blackberry), *Populus balsamifera* (balsam poplar), *Populus balsamifera trichocarpa* (black cottonwood), *Populus tremuloides* (quaking aspen), *Populus* (cottonwood), *Salix* (willow), *Ulmus* (elm).

[422] Species distribution is more aligned with cooler temperate regions. Unlikely to cope with Australian summers.

[423] Additionally, there are a few records of it damaging berries (only strawberry and blueberry).

[424] *Acca sellowiana* (feijoa), *Actinidia arguta* (tara vine), *Actinidia chinensis* (Chinese gooseberry), *Actinidia deliciosa*, *Aster* spp. (daisy), *Avicennia marina* var. *resinifera* (gray mangrove), *Babingtonia virgata*, *Berberis* spp. (barberry), *Camellia japonica*, *Citrus* spp. (citrus), *Clianthus puniceus* (Kaka beak), *Coprosma rotundifolia*, *Corynocarpus laevigata* (New Zealand laurel), *Cyclamen* spp. (cyclamen), *Diospyros kaki* (Japanese persimmon), *Diospyros* spp. (malabar ebony), *Dovyalis caffra* (kei apple), *Escallonia* spp., *Lonicera* spp. (honeysuckle), *Malus domestica* (apple), *Malus* spp. (apple), *Prunus armeniaca* (apricot), *Prunus* spp. persica (peach), *Prunus* spp. (cherry and plum), *Ribes* spp. (currant), *Ribes nigrum* (European black currant), *Rosa* spp. (rose), *Rubus* spp. (blackberry, raspberry, cranberry), *Rubus idaeus* (raspberry), *Syzygium smithii* (lilly pilly), *Vaccinium* spp. (blueberries), *Veronica* spp. (speedwell), *Vitis vinifera* (grapevine).

[425] It is considered to be a strong candidate for natural dispersal from New Zealand to Australia.

[426] Primarily a pest of cherry on which damage is normally observed on fruits. Was considered a major pest of cherry from 1914 to 1960s although primarily a problem in poorly sprayed orchards.

[427] Host plants for planting and infested fruit could potentially provide a pathway to new area (EPPO, 2018). In 1963, USDA inspectors intercepted the pest in fruits imported from Mexico.

[428] Adults are capable of flight enabling dispersal over short distances.

[429] Economic impact due to market access issues (2016 Blueberry Biosecurity Plan). Larvae feed on blueberry and cherry fruits internally and overwinter in pruned twigs. Feeding damage spoils fruit quality and marketability and reduces crop yield (EPPO, 2018).

[430] Long-distance spread possible through commercial movement of infested poplar seedlings for planting. Poplar wood is not considered a likely pathway for spread to new areas.

[431] Larvae capable of migrating more than 1 metre from their feeding site to find a suitable overwintering place. Adult moths capable of

flight however flight distance unknown. Long-distance spread possible through commercial movement of infested poplar seedlings for planting. Poplar wood is not considered a likely pathway for spread to new areas.

[432] No information on damage to blueberries found.

[433] First reported on blueberry in Geneva (New York) in 1957 (Schaefers, 1962).

[434] Reported to cause damage to blueberries in the form of damage to the tips of current-season wood causing wilt and die back, with no discernable yield reduction (Schaefers, 1962).

[435] May be transported on host plants. Reported to be intercepted on fresh avocadoes from New Zealand to Australia (EPPO, 2016). Reported to be intercepted twice on blueberry fruit on the United States of America including on blueberry fruit from New Zealand (EPPO, 2016; USDA, 2008). Occasionally intercepted on Fragaria, Malus or Prunus (EPPO, 2016; Gilligan & Epstein, 2014). Is a regulated pest on apple in Australia (EPPO, 2016). It is also possible that this species could enter Australia via natural dispersal from New Zealand (Berry Biosecurity Plan 2021).

[436] Polyphagous on wide host range including many native and introduced forest, orchard, garden shrubs and trees and conifers (EPPO, 2016).

[437] May cause economic damage by feeding directly on the surface of fruit (EPPO, 2016).

[438] *Acer pseudoplatanus* (sycamore), *Actinidia deliciosa* (kiwifruit), *Citrus sinensis* (sweet orange), *Diospyros* spp. (malabar ebony), *Malus domestica* (apple), *Mespilus germanica* (medlar), *Pinus radiata* (radiata pine), *Platanus orientalis* (plane), *Prunus armeniaca* (apricot), *Prunus domestica* (plum), *Prunus persica* (peach), *Pyrus communis* (European pear), *Simmondsia chinensis* (jojoba), *Vitis vinifera* (grapevine). Also reported as a pest on *Vaccinium corymbosum* (blueberry) in Chile (Cepeda & Cubillos, 2011).

[439] Flight distance unknown but suspected to be 5 to 10km at most.

[440] Considered a secondary or incidental pest of fruit trees.

[441] Moths are diurnal and capable of flight over short distances (Slessor et. al, 1987).

[442] Described as an economically important pest of cranberry (Sylvia & Averill, 2005). Described as a serious pest of *Vaccinium macrocarpon* (cranberry) that causes cranberry bogs to exhibit a scorched appearance (Slessor et. al, 1987) and to damage flowers, leaves and developing berries (Fitzpatrick & Troubridge, 1992).

[443] Due to Australia's geographic isolation, wind dispersal of blueberry thrips into Australia from the United States of America is unlikely. Due to disease risk, Australia's import conditions do not permit entry of non-tissue culture *Vaccinium* spp. host material for use as nursery stock making it unlikely this pest would enter Australia through any legal import pathways (DAFF, 2024).

[444] Narrow host range. Adults are reported to overwinter in the soil (Hall, 2012; Langille & Forsythe, 1972).

[445] Thrips are considered among the weakest flying insects but may be carried long distances by wind (Lewis, 1990).

[446] In Maine (USA) and Atlantic Canada, this species is considered to be a minor pest on *Vaccinium angustifolium* (lowbush blueberry) causing leaf distortion and discolouration in small, isolated patches in fields (Finn, 2003; Liburd et. al, 2005). Pesticides are reported to be effective at controlling thrips (Sial, 2021). Insecticides have been shown to control blueberry thrips with timing of insecticide application very important for effective management (Hall, 2012). In addition to control with insecticides, blueberry thrips can also be controlled with cultural methods such burning infested patches (Hall, 2012).

[447] Wide host range including, *Arachis hypogea*, *Capsicum* spp., *Chrysanthemum* spp., *Citrullus lanatus*, *Citrus* spp., *Cucumis sativus*, *Fragaria* spp., *Hibiscus* spp., *Juniperus* spp., *Nicotiana* spp., *Passiflora* spp., *Persea americana*, *Phaseolus* spp., *Rosa* spp., *Secale cereale*, *Solanum* spp. (*S. lycopersicon, S. melongena*), *Triticum* spp., *Vaccinium* spp. (V. *corymbosum, V. darrowii, V. ashei*), *Zea mays* (Groussset et al., 2016).

[448] All stages of life have the risk to be imported on plant material, eggs are often laid in flowers with adults being able to move and hide in crevices on the plant (Arévalo-Rodríguez, 2006). Larvae and adults feed on the plant, however pupae are often found in the soil and don't feed at all in this life stage (Arthurs et al., 2022). Cut flowers is noted as a common entry pathway (TRP, 2024).

[449] *F. bispinosa* is polyphagous and would be likely to find a suitable host easily. Without natural predators, which can keep populations under control, *F. bispinosa* can freely establish (Arthurs et al., 2022).

[450] Thrips are known for easily moving and can leave plants for a different host then return to escape predation or chemical treatments (Arthurs et al., 2022).

[451] *F. bispinosa* causes reduction in quality and quantity of fruits produced with damage to foliage, and direct damage on fruit through feeding and scars from egg laying. Adults have also been reported to feed on mature fruits. *F. bispinosa* is the dominant thrips species on blueberry in Florida and can cause major yield loss. *F. bispinosa* is also a known vector of Tomato spotted wilt virus (Groussset et al., 2016).

[452] Wide host range including apple, sweet cherry, sour cherry, plum, peach, strawberry, roses, soybean, common bean, lucerne, oats, asparagus (Sprague et al., 2019). Armoracia rusticana (horseradish), *Asparagus officinalis* (asparagus), *Avena sativa* (oats), *Bauhinia forficata*, *Carthamus tinctorius* (safflower), *Cassia* spp. (sennas), *Chrysanthemum* spp. (daisy), *Cleome* spp., *Cratylia argentea*, *Daucus carota* (carrot), *Fragaria ananassa* (strawberry), *Glycine max* (soyabean), *Gossypium* spp. (cotton), *Medicago sativa* (lucerne), *Mimosa caesalpiniifolia*, *Mucuna pruriens* (velvet bean), *Phaseolus lathyroides* (Phasey bean), *Prunus avium* (sweet cherry), *Prunus domestica* (plum), *Pueraria montana* var. *lobata* (kudzu), *Raphanus raphanistrum* (wild radish), *Rosa* spp. (roses), *Rubus* spp. (blackberry, raspberry), *Secale cereale* (rye), *Senna alata* (candle bush), *Sinapis arvensis* (wild mustard), *Solanum lycopersicum* (tomato), *Trifolium* spp. (clovers), *Triticum aestivum* (wheat), *Vigna unguiculata* (cowpea). In western USA *F. tritici* feeds on *Vaccinium corymbosum* and *Vaccinium virgatum* (Rodriguez-Saona et al., 2010).

[453] Actual disitribution of *F. tritici* is likely not fully reported. Surveys conducted on general thrips populations will often note *F. tritici* as present with no further information (De Oliveira et al., 2023; El-Wahab et al., 2011; Virteiu et al., 2015).

[454] *F. tritici* has been intercepted several times at the Australian border and internationally on different hosts (DAWR, 2017). Cut flowers is noted as a common entry pathway (TRP, 2024).

[455] Other members of the *Frankliniella* genus can transmit orthotoviruses, however there have been no reports of *F. tritici* transmitting any (Mound et al., 2022). *F. tritici* isn't usually associated with blueberries with other thrip species causing more severe damage. Impact on strawberry plants is far more severe by *F. tritici* (Canovas et al., 2023).

[456] Due to Australia's geographic isolation, wind dispersal of blueberry thrips into Australia from the United States of America is unlikely. Due to disease risk, Australia's import conditions do not permit entry of non-tissue culture Vaccinium spp. host material for use as nursery stock making it unlikely this pest would enter Australia through any legal import pathways (DAFF, 2024).
[457] Narrow host range. Adults are reported to overwinter in the soil (Hall, 2012; Langille & Forsythe, 1972).
[458] Thrips are considered among the weakest flying insects but may be carried long distances by wind (Lewis, 1990). Thrips are reported to have the ability to move long distances along air currents (Finn, 2003).
[459] Infested leaves remain tightly curled around the stem of the host plant which prevents flower bud development by shielding the developing flower-bud from light (Hall, 2012). Heavily infested stems produce no flowers the following spring (Hall, 2012). Damage is usually confined to small, isolated, heavily infested patches range from 100 square feet to one-half acre or more in size (Hall, 2012). In Maine (USA) and Atlantic Canada, this species is considered to be a minor pest on *Vaccinium angustifolium* (lowbush blueberry) causing leaf distortion and discolouration in small, isolated patches in fields (Finn, 2003; Liburd et. al, 2005). Insecticides such as permethrin are reported to provide adequate control of this species (Collins & Forsythe, 1992; MacPhee et. al, 1982). Timing of insecticide application is very important for effective management (Hall, 2012). In addition to control with insecticides, blueberry thrips can also be controlled with cultural methods such burning infested patches (Hall, 2012).
[460] *Adenostoma fasciculatum, Carya illinoinensis, Citron cirus, Citrus medica, Citrus reticulata, Citrus trifoliata, Citrus* x *aurantiifolia, Citrus* x *aurantium* var. *clementina, Citrus* x *aurantium* var. *paradisi, Citrus* x *aurantium* var. *sinensis, Citrus* x *aurantium* var. *unshiu, Citrus* x *limon, Citrus* spp., *Coffea arabica, Dahlia imperialis, Fortunella* spp., *Gossypium hirsutum, Larrea tridentata, Magnolia tripetala, Magnolia* spp., *Mangifera indica, Medicago sativa, Myrtus* spp., *Phoenix dactylifera, Prosopis* spp., *Quercus* spp., *Rhizophora mangle, Rhus laurina, Rosa* spp., *Salix* spp., *Schinus molle, Simmondsia chinensis, Umbellularia californica, Vaccinium corymbosum, Vaccinium hybrids, Vitis vinifera* (EPPO, 2022).
[461] *S. citri* feeds on actively growing leaf and fruit tissue and not grasses like other thrip species, limiting the available plant material *S. citri* may be imported on. Plants for planting, soil and young fruit may be a pathway, but not mature fruit (Jeger et al., 2018).
[462] Reported host range is likely higher than the actual host preferences, protected areas of production could allow for a population to establish. Adults live longer in warm environments and can produce up to 12 generations per year in ideal conditions. They also hide in sepals of developing fruit which may mean establishing populations aren't found (EPPO, 2022).
[463] *S. citri* adults do fly but don't move far between hosts, human assisted spread is more likely to occur (Jeger et al., 2018).
[464] *S. citri* is considered a main pest of citrus and blueberry plants, it has only recently been found to impact blueberry production and has quickly been found to be a significant pest in the USA (Haviland et al., 2009). Feeding damage causes curling and abnormal growth of new leaves and scarring of new twigs (Jeger et al., 2018). The main impact to farmers comes from the cost of IPM to control populations (Haviland et al., 2016).
[465] *S. dorsalis* is reported to be highly polyphagous, however since the separation of cryptic species, SA 1, SA 2 and EA 1 have been determined to have a wider host range compared to EA 2, EA 3 and EA 4 (Dickey et al., 2015). Hosts include *Abelia x grandiflora, Abelmoschus esculentus, Acacia, Acalypha chamaedrifolia, Acalypha hispida, Acalypha indica, Acalypha macrostachya, Actinidia chinensis, Allamanda cathartica, Allium cepa, Allium* sp., *Almeidea rubra, Amaranthus spinosus, Anacardium occidentale, Antirrhinum majus, Apium graveolens, Arachis hypogaea, Ardisia compressa, Azadirachta indica, Barringtonia racemosa, Begonia* sp., *Begonia tuberhybrida hybrids, Berberis bealei, Bremeria pervillei, Brexia madagascariensis, Breynia disticha, Brownea* sp., *Bruguiera* sp., *Caladium* sp., *Camellia japonica, Camellia sasanqua, Camellia sinensis, Campanula carpatica, Capparis erythrocarpos, Capsicum annuum, Capsicum frutescens, Carica papaya, Catunaregam spinosa, Ceiba pentandra, Celosia argentea var. plumosa, Celosia argentea, Chrysanthemum* sp., *Citroncirus Citrumelo hybrids, Citroncirus webberi, Citroncirus, Citrus medica, Citrus reshni, Citrus trifoliata, Citrus x aurantiifolia, Citrus x aurantium var. sinensis, Citrus x aurantium var. unshiu, Citrus x aurantium, Citrus x latifolia, Citrus x limon var. meyerii, Citrus x limon, Citrus, Clitoria javitensis, Codiaeum variegatum, Coleus scutellarioides, Colocasia esculenta, Conocarpus erectus, Coreopsis* sp., *Coriandrum sativum, Cosmos caudatus, Crassula ovata, Crinum purpurascens, Crossandra infundibuliformis, Crossandra massaica, Cucumis sativus, Cuphea* sp., *Dahlia* sp., *Daucus carota, Desmanthus* sp., *Dieffenbachia seguine, Dimocarpus longan, Dimorphotheca ecklonis, Dioscorea alata, Diospyros kaki, Diplocyclos palmatus, Dissotis rotundifolia, Duranta erecta, Echinacea purpurea, Echinochloa colonum, Eclipta prostrata, Ehretia cymosa, Embelia procumbens, Epipremnum pinnatum, Euadenia eminens, Eucalyptus deglupta, Euphorbia hypericifolia, Euphorbia pulcherrima, Eustoma russellianum, Ficus elastica, Ficus exasperata, Ficus lingua, Fittonia albivenis, Fortunella, Fragaria x ananassa, Garcinia livingstonei, Garcinia mangostana, Gardenia jasminoides, Gardenia thunbergia, Gerbera jamesonii, Gerbera* sp., *Glandularia* sp., *Glycine max, Gnetum costatum, Gossypium barbadense, Gossypium hirsutum, Gossypium* sp., *Hedera helix, Heptapleurum arboricola, Hevea brasiliensis, Hevea* sp., *Hibiscus arnottianus, Hibiscus liliiflorus, Hibiscus rosa-sinensis, Hydrangea, Iguanura geonomiformis, Illicium floridanum, Impatiens hawkeri, Impatiens walleriana, Jasminum sambac, Justicia extensa, Lagerstroemia indica, Laguncularia racemosa, Lantana camara, Lawsonia inermis, Lebronnecia kokioides, Leea guineensis, Lepidium sativum, Licuala grandis, Ligustrum japonicum, Ligustrum* sp., *Litchi chinensis, Ludwigia hyssopifolia, Lysimachia ruhmeriana, Malpighia glabra, Mangifera indica, Manihot esculenta, Manilkara zapota, Markhamia zanzibarica, Mimosa pudica, Mimosa, Mitriostigma axillare, Monanthotaxis obovata, Morus alba, Murraya koenigii, Murraya paniculata, Napoleonaea vogelii, Nelumbo nucifera, Ocimum basilicum, Odontonema tubaeforme, Oenothera lindheimeri, Oncoba spinosa, Paeonia officinalis, Palisota mannii, Passiflora edulis, Passiflora foetida, Pavetta revoluta, Pelargonium graveolens, Pelargonium x hortorum, Pentas lanceolata, Persea americana, Petunia hybrids, Phaseolus vulgaris, Phyllanthus niruri, Phyllanthus urinaria, Pittosporum senacia, Pittosporum tobira, Plerandra elegantissima, Plumbago auriculata, Plumeria rubra, Polyscias ornifolia, Pouteria campechiana, Psidium guajava, Punica granatum, Pyrus communis, Quisqualis indica, Ramosmania rodriguesii, Rhaphiolepis indica, Rhaphiolepis umbellata, Rhododendron* sp., *Richardia brasiliensis, Ricinus communis, Rosa* sp., *Rosa, Rotheca myricoides, Rubus idaeus, Rubus* sp., *Salvia farinacea, Salvia officinalis, Sanchezia oblonga, Saraca indica, Scindapsus pictus, Selenicereus undatus, Sesbania herbacea, Solanum lycopersicum, Solanum melongena, Solanum tuberosum, Stereospermum nematocarpum, Strobilanthes auriculata var. dyeriana, Strobilanthes maculata, Synsepalum dulcificum, Syzygium* sp., *Tabernaemontana divaricata, Tagetes erecta, Tagetes patula, Tamarindus indica, Tarenna alleizettei, Tarenna alpestris, Tecoma fulva, Tephrosia vogelii, Terminalia boivinii, Terminalia mantaly, Terminalia neotaliala, Theobroma cacao, Thunbergia erecta, Thunbergia vogeliana, Tradescantia zebrina, Trichilia havanensis, Trilepisium madagascariense, Trimezia lutea, Turraea floribunda, Vaccinium corymbosum, Vaccinium darrowii, Vaccinium*

myrtillus, Vaccinium, Viburnum odoratissimum, Viburnum suspensum, Vigna radiata, Viola x wittrockiana, Vitis vinifera, Zinnia elegans, Zinnia x marylandica, x Citrofortunella microcarpa (EPPO, 2023).

[466] Israel, Portugal (mainland), Spain (mainland, Islas Canárias), Türkiye, Cote d'Ivoire, Kenya, Uganda, Bangladesh, Brunei Darussalam, China, Hong Kong, India, Indonesia, Iran, Israel, Japan, Malaysia, Maldives, Myanmar, Pakistan, Philippines, Sri Lanka, South Korea, Taiwan, Thailand, Vietnam, Mexico, United States of America (southern states and Hawaii), Barbados, Cuba, Guadeloupe, Jamaica, Puerto Rico, Saint Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Brazil, Colombia, French Guiana, Peru, Suriname, Venezuela, Papua New Guinea, Solomon Islands (EPPO, 2023).

[467] Based on previous tracking of cryptic species, SA 1, SA 2 and EA 1 are considered to have a higher invasion potential (Dickey et al., 2015). Long distance spread via trade is also possible as it is reported being intercepted on produce (EPPO, 2023).

[468] Depending on the cryptic species, the host range varies. Reproduction can occur parthenogenically from one adult. Based on the current distribution of Australian species, it would likely establish in northern Australia (EPPO, 2023).

[469] Movement of adults is facilitated by wind and may occur via human assisted movement (eg. Trade) (EPPO, 2023).

[470] Hot and humid summers favor rapid population growth of S. dorsalis, leading to a reduction of blueberry growth and this can worsen over longer periods of time. Regular insecticide application is required to control populations and add to costs (Panthi et al., 2021). S. dorsalis populations additionally are dominant when found in Rubus and strawberry fields and if untreated yield is negatively impacted (Lahiri et al., 2024).

[471] Soil is probably the primary reservoir for Nocardia strains as they are found in diverse soil types (Nouioui et al., 2022). It is also thought to spread in infested compost and can be carried into the nursery if unsterilized leaf litter is used (Bradbury, 1987).

[472] Usually introduced into new regions in infected nursery material. The pathogen can be dispersed in aerosols and therefore can be carried between canes and adjacent nurseries and orchards in wind-driven rain. It requires wounds as infection sites and may enter through insect feeding wounds or other wound openings (Pulawska, 2010). As a wound-infecting pathogen, it can also be transmitted on orchard equipment such as pruning implements. In a study in Argentina, it was thought that nurseries growing young blueberry plants were spreading agrobacteria via soil (Alippi et al., 2012).

[473] Plants are rarely killed by *R. rubi*, vigor can be reduced, and young plants are more severely affected (Pulawska, 2010).

[474] Specific strains infecting blueberry in the USA presenting BLS symptoms are thought to be slightly different from other *Xylella* strains found in other countries. *Xylella* strains found in elderberry, lupine, almond, blackberry and grape were transmitted to blueberry plants with different disease expression severity (Ferguson et al., 2020).

[475] Specified states in geographic distribution are where BLS has been observed in field. Research has indicated that the strains causing BLS are likely more widespread across the USA (Ferguson et al., 2020). Wider geographic distributions include: *Xf* subsp. *fastidiosa*: Costa Rica, Mexico, United States of America, Israel, Lebanon, Taiwan, Italy, Portugal, Spain (EPPO, 2024). *Xf* subsp. *multiplex*: Argentina, Brazil, Mexico, Paraguay, United States of America, France (transient), Italy, Portugal, Spain (transient) (EPPO, 2023).

[476] Introduction of Xylella fastidiosa to Australia could occur with human assisted movement of infected plant material or with insect vectors. The disease is not carried on or spread by seeds (Plant Biosecurity and Product Integrity, 2018).

[477] When observed in the field infected plants don't tend to rapidly increase in number. Dead plants if not removed from soil may lead to neighbouring plants becoming infected (Brannen et al., 2022).

[478] Infected hosts act as reservoirs. In the spring and early summer, insect vectors (primarily members of the Cicadellidae and Cercopoidea families) transmit the bacterium when feeding on infected plant tissues and then on healthy plants. It is also transmitted through propagation from infected plants. Root grafting may also serve as a potential transmission mechanism (Brannen et al., 2022). *Homalodisca vitripennis*, the main vector of *Xylella* in the USA, has been attributed to spread and will feed on different blueberry cultivars (Tertuliano et al., 2012).

[479] Studies have found that infection of BLS leads to a decline in yield and growth of fruit, as time progresses in future growing seasons plants show further signs of decline (Ferguson et al., 2017).

[480] *Actinidia deliciosa* (kiwifruit), *Allium ampeloprasum* (wild leek), *Amaranthus retroflexus* (redroot pigweed), *Anethum graveolens* (dill), *Apium graveolens* (celery), *Artemisia scoparia, Artemisia vulgaris* (mugwort), *Asteraceae* (daisy family), *Beta vulgaris* (beetroot), *Brassica oleracea* (cabbages, cauliflowers), *Brassica rapa* (field mustard), *Bupleurum tenuissimum, Calendula officinalis* (Pot marigold), *Calystegia sepium* (great bindweed), *Cannabis sativa* (hemp), *Capsicum annuum* (bell pepper), *Carica papaya* (pawpaw), *Catharanthus roseus* (Madagascar periwinkle), *Cephalaria transylvanica, Chenopodium album* (fat hen), *Cichorium intybus* (chicory), *Cirsium arvense* (creeping thistle), *Convolvulus arvensis* (bindweed), *Cuscuta* (dodder), *Cynara cardunculus var. scolymus* (globe artichoke), *Cytisus scoparius* (Scotch broom), *Datura stramonium* (jimsonweed), *Daucus carota* (carrot), *Dianthus barbatus* (sweet williams), *Dianthus deltoides* (maiden pink), *Echinacea purpurea* (purple coneflower), *Echium vulgare* ((common) *viper's-bugloss), Erigeron bonariensis, Eucalyptus camaldulensis* (red gum), *Euonymus japonicus* (Japanese spindle tree), *Euphorbia falcata, Fallopia convolvulus* (black bindweed), *Ficus carica* (common fig), *Fragaria ananassa* (strawberry), *Freesia, Galium, Gomphocarpus physocarpus* (balloon cotton bush), *Helianthus annuus* (sunflower), *Helminthotheca echioides* (bristly oxtongue), *Hibiscus cannabinus* (kenaf), *Hypericum barbatum, Hypericum perforatum* (St John's wort), *Jasmium officinale, Lactuca saligna, Lavandula angustifolia* (lavender), *Lavandula x intermedia, Lepidium draba* (hoary cress), *Linaria vulgaris* (common toadflax), *Lotus corniculatus* (bird's-foot trefoil), *Malus domestica* (apple), *Malva sylvestris, Medicago sativa* (lucerne), *Mentha arvensis* (Corn mint), *Mentha piperita* (Peppermint), *Mercurialis annua, Monarda fistulosa, Nicotiana tabacum* (tobacco), *Oenothera biennis* (common evening primrose), *Paeonia* (peonies), *Paeonia suffruticosa* (Tree peony), *Paeonia tenuifolia, Pastinaca sativa* (parsnip), *Persea americana* (avocado), *Petroselinum* (parsley), *Phaseolus lathyroides* (Phasey bean), *Phaseolus vulgaris* (common bean), *Picris hieracioides* (hawkweed oxtongue), *Pistacia vera* (pistachio), *Pisum sativum* (pea), *Plantago lanceolata* (ribwort plantain), *Plantago major* (broad-leaved plaintain), *Polygonum aviculare* (prostrate knotweed), *Polygonum persicaria* (redshank), *Portulaca oleracea* (purslane), *Potentilla reptans* (sulfur cinquefoil), *Prunus* (stone fruit), *Prunus americana* (American plum), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus domestica* (plum), *Prunus persica* (peach), *Punica granatum* (pomegranate), *Pyrus communis* (European pear), *Ranunculus bulbosus* (bulbous buttercup), *Raphanus sativus* (radish), *Rhododendron* (Azalea), *Rubia peregrina, Rubus fruticosus* (blackberry), *Rumex acetosa* (sour dock), *Salix alba* (white willow), *Salix babylonica* (weeping willow), *Salvia miltiorrhiza, Salvia sclarea, Saponaria officinalis* (soapwort), *Setaria viridis* (green foxtail), *Silene latifolia subsp. alba* (white campion), *Silene vulgaris* (bladder

campion), *Solanum dulcamara* (bittersweet nightshade), *Solanum glaucophyllum, Solanum habrochaites, Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Solanum nigrum* (black nightshade), *Solanum tuberosum* (potato), *Sonchus* (Sowthistle), *Sophora alopecuroides, Sorghum halepense* (Johnson grass), *Syringa vulgaris* (lilac), *Tagetes erecta* (Mexican marigold), *Taraxacum officinale complex* (dandelion), *Thymus vulgaris* (thyme), *Trifolium* (clovers), *Trifolium pratense* (red clover), *Triticum aestivum* (wheat), *Tussilago farfara* (Colt's-foot), *Ulmus glabra* (mountain elm), *Urtica dioica* (stinging nettle), *Urtica urens* (annual nettle), *Vaccinium corymbosum* (blueberry), *Valeriana officinalis* (common valerian), *Vicia villosa* (hairy vetch), *Vinca minor* (common periwinkle), *Viola odorata* (English violet), *Vitex agnus-castus* (chaste tree), *Vitis* (grape), *Vitis vinifera* (grapevine), *Zea, Zea mays* (maize).

[481] Albania, Armenia, Austria, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Jordan, Kyrgyzstan, Moldova, Montenegro, North Macedonia, Poland, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Türkiye, Ukraine, Uzbekistan, Niger, China, India, Iran, Israel, Japan, Jordan, Kyrgyzstan, Lebanon, Saudi Arabia, Taiwan, Tajikistan, Uzbekistan, Chile (EPPO, 2021).

[482] Highly likely to be transported internationally accidentally. Difficult to identify/detect as a commodity contaminant. Also difficult to identify/detect in the field.

[483] When detected in the field in Serbia, it was estimated that over 20% of plants were infected in 2009 and over 50% in 2010 (Starović et al., 2013).

[484] Confirmed vectors of *Ca*' *Phytoplasma solani* include *Hyalesthes obsoletus* (nymphs acquire the phytoplasma from the root system of reservoir plants), *Reptalus panzeri*, *Euscelis incisus*, *Macrosteles laevis* and *Circulifer tenellus*. Many other vectors have been reported and compiled in a compendium for wider use (Mehle et al., 2022; Mitrović et al., 2020). If suitable vectors that feed on blueberry plants in Australia were able to vector the disease this would increase spread.

[485] Diseases associated with '*Candidatus Phytoplasma solani*' ('*Ca. P. solani*') are of great economic importance, causing severe damage on a wide range of crops. Polyphagous insect vectors and wild plants acting as natural reservoir both play a major role in the epidemiology of phytoplasmas directly determining their transmission and persistence in agroecosystems (Mitrović et al., 2022).

[486] Different strains of phytoplasmas causing BBS disease have been identified across north and central America. As diagnostic capability improves other causative groups may be identified (Hammond et al., 2021; Pérez-López et al., 2017; Pérez-López et al., 2019).

[487] BICON import requirements include testing for Phytoplasmas and this may limit available pathways of entry.

[488] Often, infected bushes go undetected because symptoms can be subtle, especially early in the disease, or easily mistaken for other diseases (Hammond et al., 2021).

[489] Pathogen load fluctuates in individual plants, both within and between growing seasons. Evidence of spread between plants was limited. BBS is primarily vectored by *Scaphytopius magdenalsis*, but is also vectored by *S. acutus*, *S. frontalis*, *Empoasca fabae*, *Limotettix corniculus*, *Macrosteles quadrilineatus*, *Graphocephala fennahi* (Hammond et al., 2021; Santos et al., 2023). Risk of spread may depend on the amount of suitable vector species in Australia.

[490] BBS has been observed since the 1900's with vector control leading to lower spread, however in recent years the disease has been reemerging on farms. As several phytoplasma sub-groups have been identified to cause BBS and co-infection can impact symptom severity, this will likely impact response measures used (Bagadia et al., 2013).

[491] Strains of Sr16III-F are present in North America, however the only confirmed host of this strain is *Asclepias syriaca* (milkweed) (Valiunas et al., 2004).

[492] Due to the amount of diseased wild blueberry plants in Lithuania widespread, it is thought that a local vector caused the initial spread (Valiunas et al., 2004).

[493] Referred to as *Gloeocercospora inconspicua* in the 2016 Blueberry BP.

[494] Spots may develop during mid- to late-summer, a few weeks after periods of frequent rainfall, and spores can overwinter in leaf litter (Fulcher et al., 2015).

[495] Rain and overhead irrigation disperse spores as temperatures warm (Fulcher et al., 2015).

[496] Limiting overhead irrigation, pruning, sanitation efforts aid in limiting impact. Plant infection incidence can be limited in subsequent seasons by applying protective fungicides (Fulcher et al., 2015).

[497] Endemic on native blueberry in the Eastern United States, so it is not possible for us to exclude from the environment here (Blueberry BP 2016).

[498] Spores may be spread through wind-dispersal, contaminated pruning tools or feeding insects (Davey, N.D.) with introduction into new plantings possible when vegetative hardwood or softwood cuttings are taken from infected plants (Blueberry BP 2016). Spores can enter host plants through natural openings in bark, pruning cuts or wounds (Davey, N.D.).

[499] Reported to cause post-harvest rot in multiple fruit species (Feng et al., 2024). Main impact on fruit post-harvest (Yu et al., 2018).

[500] Export of infected plants from North America to other countries has been the main source of infection at new sites. Strict import conditions for plant material minimise the risk of entry on plant material.

[501] Natural spore dispersal only occurs over short distances.

[502] Natural spore dispersal only occurs over short distances. Movement of infected plants.

[503] This pathogen can cause significant losses, or else requires a relatively intensive fungicide treatment regime to ensure protection. Twig blight of susceptible blueberry cultivars has been estimated to cause fruit loss of 2-3 pints per bush in North Carolina (USA).

[504] Considered a minor fungal disease. No control is recommended unless disease incidence is high (Oregon State University Extension Service, 2022).

[505] A synonym for Blueberry disease (*Microsphaera vaccinii*) is listed to cause Powdery mildew on azaleas and rhododendrons in Australia, however there is no further information to indicate *E. penicillata* is present in Australia and may need to be reviewed in the future (Botanic Gardens of Sydney, 2023).

[506] Airborne spores released by chasmothecia in the spring infect young leaves. Secondary spores are produced on the leaves and dispersed by wind throughout the summer (Michigan State University, N.D.).

[507] In most cases, has minor impacts on growth and fruit production, primarily causing infected leaves fall off prematurely. In rare cases impacts on growth can be severe. Generally powdery mildew incidence on blueberries is not sufficiently severe to warrant a fungicide

spray (Demchak & Swett, 2023).
[508] Evidence of vector involvement in transmission (Newell et. al, 2023).
[509] Considered economically important because affected fruit are unmarketable (Brewer et. al, 2014; Cline 1998). Reported to result in significant yield losses if not properly managed (Newell et. al, 2023). Reported to cause a highly visible fruit defect that is very difficult to cull from harvested fruit (Blueberry BP 2016).
[510] Referred to as *Gloeosporium minus* in the 2016 Blueberry Biosecurity Plan.
[511] Given its prevalence in the southeastern USA and its environmental requirements, the establishment and spread of *G. minus* requires climatic conditions with warm temperatures (Canadian Food Inspection Agency, 2023).
[512] Can cause fruit rot, causing rot in at least 90% of inoculated berries. It was listed as one of the major fungi isolated from blueberry processor or market samples causing post-harvest losses, present in 2.5% of samples (Canadian Food Inspection Agency, 2023).
[513] *Godronia cassandrae* is now the preferred name of this pathogen with *Fusicoccum putrefaciens* now recognised as a synonym (Sabaratnam, 2012). *Godronia cassandrae* previously described the ascospore-producing sexual stage of the pathogen, whilst *Fusicoccum putrefaciens* described the conidia-producing asexual stage; the latter was historically described as responsible for the development of canker and spread of the disease (Sabaratnam, 2012).
[514] Rain dispersal is reported to be of greater importance for dispersal than wind (Parker & Ramsdell, 1977).
[515] Reported as a common and serious disease of highbush blueberry in the Lower Mainland of the Fraser Valley in British Colombia (Sabaratnam, 2012). Cankers can kill affected branches resulting in reduced yields and weakening of host plants (Sabaratnam, 2012). In severe cases, affected plants may eventually die (Sabaratnam, 2012).
[516] Disease reported to seriously affect growth of blueberry plants, fruit quality and productivity; with crop damage ranging from 15 to 25% (Zhao et. al, 2019).
[517] Egypt, Morocco, Afghanistan, Armenia, Azerbaijan, China, Georgia, India, Iran, Israel, Japan, Kazakhstan, Lebanon, Nepal, North Korea, South Korea, Taiwan, Turkey, Uzbekistan, Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom.
[518] Introduction could occur through the importation of infected fruit as well as of tree material for propagation and breeding. Infection of fruitlets during or shortly after flowering may result in latent infections that often become active again just before or after harvest (Plant Biosecurity and Product Integrity, 2017).
[519] Fungal spores can be spread by wind and rain, and the pathogen can also be spread with infected plant material (Plant Health Australia, 2013). Fruit-to-fruit contact will spread the pathogen within a single tree (Plant Health Australia, 2013).
[520] Long distance transport of brown rot is most likely to occur with the movement of infected plant material or fruit (Plant Biosecurity and Product Integrity, 2017).
[521] Reported to be a problem in the United States of America (Washington) during the 1920s and 1930s but rarely found now, except in British Colombia where it is still considered an economic problem (Oregon State University, 2024).
[522] Unlikely to enter on commercial fruit (Plant Biosecurity and Product Integrity, 2018).
[523] Restricted host range. Considerable evidence exists that pointing insects play a major role in vectoring the conidia from blighted leaves to flowers (Ngugi & Scherm, 2006).
[524] Fungal spores are spread by wind and rain and can be transported longer distances on plant material, equipment, vehicles and people (Plant Biosecurity and Product Integrity, 2018). Spores can also be spread in soil that becomes infected by mummified berries that have dropped to the ground (Plant Biosecurity and Product Integrity, 2018). Spores within berries infected by this pathogen can remain viable in or on the soil for several years (Demchak, 2023; Plant Biosecurity and Product Integrity, 2018).
[525] Reported to be one of the most serious diseases affecting blueberry plants (Plant Biosecurity and Product Integrity, 2018; SOURCE). Crop losses can be severe, depending on environmental conditions and variety susceptibility (Demchak, 2023; Plant Biosecurity and Product Integrity, 2018).
[526] Disease incidence in a Chinese nursery ranged from 40% to 100% in some poorly ventilated areas of the nursery garden (Chen et al., 2010).
[527] Referred to as *Pucciniastrum goeppertianum* in the 2016 Blueberry Biosecurity Plan.
[528] Pest biology and life cycle - This pest requires two hosts (*Abies balsamea* (balsam fir) and Blueberry) to complete its life cycle. Balsim fir needs to be within 400-500 yards of the blueberry plants (Madeiras & Schloemann, 2020). The fungus grows into the bark of the blueberry plants leading to infection of the whole plant (Grabowski, 2019). The fungus lives in the blueberry plant for many years (Grabowski, 2019). Spores are produced on the blueberry witches' broom and are capable of infecting fir trees (Grabowski, 2019).
[529] Requires two hosts (*Abies balsamea* (balsam fir) and Blueberry) to be near each other to complete its life cycle. Balsim fir needs to be within 400-500 yards of the blueberry plants (Madeiras & Schloemann, 2020).
[530] Infection of blueberry plants; specifically leaves and stems, is possible via wind-dispersal of spores produced on infected fir needles (Grabowski, 2019). Infection of fir trees is possible via dispersal of spores produced on blueberry witches' brooms (Grabowski, 2019). Once a blueberry host plant is infected, the fungus becomes systemic and permanent (Madeiras & Schloemann, 2020).
[531] Heavily infected plants produce no fruit, but witches' broom is a relatively minor disease of highbush blueberries, unless it is near balsam fir trees (Abies), the alternate host for the rust fungus and then the disease can be severe (Michigan State University, N.D.).
[532] The fungus overwinters in infected leaves on the ground and in stem lesions (Cline, 2014).
[533] Spores are produced in abundance on new lesions throughout the season (Cline, 2014).
[534] *Abies concolor* (Rocky Mountain white fir), *Calocedrus decurrens* (bastard cedar), *Cedrus deodara* (Himalayan cedar), *Larix decidua* (common larch), *Larix laricina* (American larch), *Picea abies* (common spruce), *Picea engelmannii* (Engelmann spruce), *Picea glauca* (white spruce), *Picea mariana* (black spruce), *Picea pungens* (blue spruce), *Picea rubens* (red spruce), *Picea sitchensis* (Sitka spruce), *Picea spinulosa*, *Pinus albicaulis* (whitebark pine), *Pinus banksiana* (jack pine), *Pinus cembra* (arolla pine), *Pinus contorta* (lodgepole pine), *Pinus coulteri* (big-cone pine), *Pinus halepensis* (Aleppo pine), *Pinus jeffreyi* (Jeffrey pine), *Pinus lambertiana* (big pine), *Pinus mugo* (mountain pine), *Pinus ponderosa* (ponderosa pine), *Pinus resinosa* (red pine), *Pinus strobus* (eastern white pine), *Pinus sylvestris* (Scots pine), *Pinus*

thunbergii (Japanese black pine), *Pseudotsuga menziesii* (Douglas-fir), *Tsuga heterophylla* (western hemlock), *Vaccinium* spp. (blueberries). Only one study reported *Vaccinium* species to a host of this pathogen and described this species to be a secondary pathogen on *Vaccinium* species (Sabaratnam et. al, 2009).

[535] Spores are spread by splashing or dripping water during wet periods in spring and summer when temperatures are 60 to 68 degrees Fahrenheit (Koetter & Grabowski, 2019).

[536] Wide host range, but primarily found affecting grasses and below-ground crops. Hosts include *Abelmoschus esculentus* (okra), *Acer pseudoplatanus* (sycamore), *Agrostis stolonifera* (creeping bentgrass), *Agrostis stolonifera* var. *palustris* (bent grass), *Allium cepa* (onion), *Apium graveolens* (celery), *Arachis hypogaea* (groundnut), *Baccharis halimifolia* (groundsel-bush), *Beta vulgaris* (beetroot), *Brassica oleracea* (cabbages, cauliflowers), *Brassica oleracea* var. *botrytis* (cauliflower), *Brassica oleracea* var. *capitata* (cabbage), *Brassica rapa* subsp. *oleifera* (turnip rape), *Capsicum annuum* (bell pepper), *Casuarina equisetifolia* (casuarina), *Chrysanthemum* spp. (daisy), *Citrullus lanatus* (watermelon), *Citrus sinensis* (sweet orange), *Cucumis melo* (melon), *Cucumis sativus* (cucumber), *Cynodon dactylon* (Bermuda grass), *Daucus carota* (carrot), *Desmodium tortuosum* (Florida beggarweed), *Digitaria decumbens* (pangolagrass), *Digitaria sanguinalis* (large crabgrass), *Diospyros kaki* (persimmon), *Eremochloa ophiuroides* (centipedegrass), *Festuca arundinacea* (tall fescue), *Fragaria* spp. (strawberry), *Glycine max* (soyabean), *Gossypium hirsutum* (Bourbon cotton), *Helianthus annuus* (sunflower), *Hordeum vulgare* (barley), *Ilex* spp. (Holly), *Ipomoea batatas* (sweet potato), *Ipomoea purpurea* (tall morning glory), *Lactuca sativa* (lettuce), *Liquidambar styraciflua* (Sweet gum), *Lolium multiflorum* (Italian ryegrass), *Mentha spicata* (Spear mint), *Ocimum basilicum* (basil), *Oxalis* spp. (wood sorrels), *Paspalum notatum* (Bahia grass), *Pennisetum glaucum* (pearl millet), *Pennisetum purpureum* (elephant grass), *Phaseolus vulgaris* (common bean), *Pinus palustris* (longleaf pine), *Pinus taeda* (loblolly pine), *Pisum sativum* (pea), *Pittosporum tobira* (Japanese pittosporum), Poaceae (grasses), *Rumex crispus* (curled dock), *Saccharum officinarum* (sugarcane), *Schinus terebinthifolius* (Brazilian pepper tree), *Secale cereale* (rye), *Sesbania exaltata* (coffeebean (USA)), *Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Solanum tuberosum* (potato), *Sorghum* sudanense (Sudan grass), *Stenotaphrum secundatum* (buffalo grass), *Trifolium* spp. (clovers), *Triticum aestivum* (wheat), turfgrasses, *Ulmus parvifolia* (lacebark elm), Vaccinium corymbosum (blueberry), Vigna *unguiculata* (cowpea), *Vitis rotundifolia* (Muscadine grape), *Zea mays* (maize), *Zoysia* spp..

[537] Lives in sandy soils mostly impacting turfgrasses, available soil types will impact establishment potential (Zeng et al., 2012).

[538] Wide host range but has mostly been recorded to be economically significant to turfgrasses (Zeng et al., 2012).

[539] Synonyms include *H. gracilis* & *H. similis*.

[540] Sheath nematodes have been found in fields on blueberry roots, but their impact on yield is still minimal/undetermined (Warner, 2022).

[541] *L. diadecturus* feeds externally on plant roots and the most likely pathways for entry are via soil. This may be with plant roots, following movement of soil, or on machinery/equipment. PRMV hasn't been found to persist in the nematode for an extended period of time (Jeger et al., 2017).

[542] *L. diadecturus* only moves short distances (around 1 m). It is a migratory ectoparasite and can feed on several plant species from different families; a wide host range may therefore be assumed (Jeger et al., 2017).

[543] Spread may mainly occur with moist soil or growing media (soil, or soil associated with plants, machinery, tools, shoes, animals, packaging material) or run-off water but not by plants for planting without soil or growing medium. Soil attached to agricultural machinery, tools etc., may contribute to spread but this may be mostly relevant for within field spread or spread to adjacent fields (Jeger et al., 2017).

[544] Damage from direct feeding damage to the roots can be less severe than other nematode species, the main impact comes from the transmission of PRMV (EPPO, 2022). PRMV causes leaves to be distorted, malformed, and distributed unevenly across blueberry bushes, further research is needed to determine its impact on yield loss (Saad et al., 2021).

[545] Not considered to be a successful agricultural pest because of limited host range and distribution (Zasada et al, 2010).

[546] *Merlinius joctus* was the most found plant-parasitic nematode in the eastern U.S. in the 50's and 60's however, in controlled experiments this nematode did not appear to be a serious pathogen of blueberry (Zasada et al, 2010).

[547] *Aesculus hippocastanum* (horse chestnut), *Agathis australis*, *Annona cherimola* (cherimoya), *Berberis* spp., *Castanea sativa* (chestnut), *Drimys winteri*, *Fagus grandifolia* (American beech), *Fagus sylvatica* (common beech), *Gevuina avellana* (gevuina nut), *Hedera helix* (ivy), *Ilex aquifolium* (holly), *Leucothoe fontanesiana*, *Leucothoe walteri*, *Liriodendron tulipifera* (tuliptree), *Lomatia myricoides*, *Magnolia* spp., *Magnolia amoena*, *Magnolia campbellii*, *Magnolia cylindrica* (yellow mountain magnolia), *Magnolia delavayi*, *Magnolia doltsopa*, *Magnolia liliiflora* (Lily magnolia), *Magnolia salicifolia*, *Magnolia sargentiana* (Sargent's magnolia), *Magnolia kobus*, *Magnolia sprengeri*, *Magnolia wilsonii*, *Magnolia* x *brooklynensis*, *Magnolia* x *soulangeana*, *Magnolia stellata* (Star magnolia), *Magnolia* x *brooklynensis* (evamaria cucumber tree), *Mahonia* spp. (holly grape), *Michelia* spp., *Michelia doltsopa* (champ), *Nothofagus obliqua* (roble), *Photinia* spp., *Pieris* spp. (Ericaceae), *Pieris formosa*, *Pieris japonica* (Lily-of-the-valley shrub), *Pinus radiata* (radiata pine), *Podocarpus salignus*, *Prunus laurocerasus* (cherry laurel), *Quercus ilex* (holm oak), *Quercus robur* (common oak), *Sequoiadendron giganteum*, *Rhododendron* spp. (Azalea), *Rhododendron catawbiense*, *Rhododendron ponticum* (rhododendron), *Rhododendron ponticum* (rhododendron), *Rhododendron yakushimanum*, *Sequoiadendron giganteum* (giant sequoia), *Vaccinium* spp. (blueberries), *Vaccinium myrtillus* (blueberry).

[548] Infected shoots and leaves of plants become necrotic. Areas of foliage often wilt at the end of the shoots. Leaf necrosis occurs in many infected species, and this leads to plant death (Webber, 2024).

[549] Dispersal methods include moving infected ornamental and nursery plants, contaminated soil on machinery, tools and footwear, leaf litter and infected wood with bark attached (EPPO, 2022). Certified nursery plants may still harbour the pathogen due to lack of disease expression and latent foliar symptoms, soil containing oospores/sporangia and sporulation without necrosis (Denman et al., 2009).

[550] *P. kernoviae* has a wide host range and many ways to disperse to hosts. Oospores of *P. kernoviae* persisted in infested sand for 1 year at various temperatures, up to 30°C. Field studies on the longevity of *P. kernoviae* in the natural environment have shown the pathogen to survive for at least 3 years in leaf litter and soil (EPPO, 2022).

[551] Moves by rain or mist events, wind-blown mists or wind-driven rain-splash, has the potential to move in watercourses and irrigation and it can survive in water. Transportation by humans (for example on shoes or on car tyres) is also possible, as is movement by animals (EPPO, 2022).

[552] The principal hosts of *P. kernoviae* in UK woodland and heathland are rhododendron, especially *Rhododendron ponticum* and *Vaccinium myrtillus*. Hundreds of rhododendron plants in woodlands have been heavily diseased or killed by it, as have areas of *V. myrtillus* in south-west England and Scotland. Control of *P. kernoviae* in *V. myrtillus* has proven difficult without impacting the surrounding environment and the potential impact on commercial blueberry farms is likely to be major (Webber, 2024).

[553] *Abies* spp. (*A. alba* (silver fir), *A. concolor* (Rocky Mountain white fir), *A. grandis* (grand fir), *A. magnifica* (red fir), *A. procera* (noble fir)), *Acer* spp., *A. circinatum*, *A. davidii*, *A. laevigatum*, *A. macrophyllum* (broadleaf maple), *A. pseudoplatanus* (sycamore), *Adiantum* spp. (*A. aleuticum*, *A. jordanii* (California maidenhair fern)), *Aesculus* spp. (*A. californica* (California buckeye), *A. hippocastanum* (horse chestnut)), *Alnus* spp. (*A. cordata* (Italian alder), *A. glutinosa* (European alder), *A. incana* (grey alder)), *Arbutus* spp. (*A. menziesii* (Pacific madrone), *A. unedo* (arbutus)), *Arctostaphylos* spp. (*A. canescens*, *A. columbiana* (Hairy manzanita), *A. glandulosa*, *A. glauca* (Bigberry manzanita), *A. manzanita*, *A. nummularia*, *A. pumila*, *A. sensitiva*, *A. uva-ursi*, *A. virgata*, *A. viridissima*), *Ardisia japonica*, *Artemisia tridentata* (big sagebrush), Azaleas, Berberis aquifolium, Betula pendula (common silver birch), Calluna vulgaris (heather), Calycanthus occidentalis, Camellia spp. (C. japonica (camellia), C. sasanqua (Sasanqua), C. sinensis (tea)), *Castanea sativa* (chestnut), *Castanopsis* spp. (*C. chrysophylla* (Golden chestnut), *C. orthacantha*), *Ceanothus thyrsiflorus* (Blueblossom ceanothus), *Cercis chinensis*, *Chamaecyparis lawsoniana* (Port Orford cedar), *Chamerion angustifolium*, *Choisya ternata* (mexican orange-blossom), *Chrysolepis chrysophylla*, *Cinnamomum camphora* (camphor laurel), *Clintonia andrewsiana*, *Cotoneaster pannosus*, *Corylopsis spicata*, *Cornus* spp. (*C. capitata*, *C. kousa*), *Corylus cornuta* (beaked hazel), *Cryptantha torreyana*, *Cytisus scoparius* (Scotch broom), *Daphniphyllum glaucescens*, *Distylium myricoides*, *Drimys winteri*, *Dryopteris arguta*, *Epilobium ciliatum*, *Eucalyptus haemastoma*, *Euonymus kiautschovicus*, *Fagus sylvatica* (common beech), *Frangula* spp. (*F. californica, F. purshiana*), *Fraxinus* spp. (*F. excelsior* (ash), *F. latifolia*), *Garrya elliptica*, *Gaultheria* spp. (*G. procumbens* (Aromatic wintergreen), *G. shallon* (salal)), *Griselinia littoralis*, *Hamamelis* spp. (witchhazel) (*H. mollis*, *H.* x *intermedia*, *H. virginiana* (Virginian witch-hazel)), *Heteromeles* spp. (*H. salicifolia* (toyon), *H. arbutifolia*), *Ilex* spp. (*I. aquifolium*, *I. chinensis*, *I. latifolia*), *Kalmia* spp. (laurel) (*K. angustifolia*, *K. latifolia* (Mountain laurel)), *Larix* spp. (larches) (*L. decidua* (common larch), *L.* x *eurolepis*, *L. kaempferi* (Japanese larch), *L. marschlinsii* (hybrid larch)), *Laurus nobilis* (sweet bay), *Leucothoe* spp. (*L. axillaris*, *L. fontanesiana*, *L. walteri*), *Lilium* spp. (lily), *Lithocarpus glaber*, *Lonicera hispidula*, *Lophostemon confertus*, *Loropetalum chinense*, *Magnolia* spp. (*M. acuminata, M. cavaleriei, M. delavayi, M. denudata, M. doltsopa, M. figo, M. foveolata, M. grandiflora, M. insignis, M. kobus, M. liliiflora, M. lotungensis, M. maudiae, M. salicifolia, M. stellata* (Star magnolia), *M. wilsonii*, *M.* x *loebneri*, *M.* x *soulangeana*, *M.* x *thompsoniana*), *Maianthemum racemosum*, *Marah fabacea*, *Michelia doltsopa* (champ), *Myristica fragrans* (nutmeg), *Nerium oleander* (oleander), *Nothofagus obliqua* (roble), *Notholithocarpus densiflorus* (Tanoak), *Osmanthus* spp. (*O. decorus, O. delavayi, O. fragrans, O. heterophyllus* (holly olive)), *Osmorhiza berteroi*, *Oxalis* spp. (wood sorrels), *Parrotia persica* (persian ironwood), *Phoradendron* spp. (*P. leucarpum, P. serotinum*), *Photinia fraseri*, *Picea sitchensis* (Sitka spruce), *Pickeringia montana*, *Pieris* spp. (*P. formosa*, *P. hybrids*, *P. japonica* (Lily-of-the-valley shrub)), *Physocarpus opulifolius*, *Pittosporum undulatum* (Australian cheesewood), *Populus deltoides* (poplar), *Prunus* spp. (*P. laurocerasus* (cherry laurel), *P. lusitanica*), *Pseudotsuga menziesii* (Douglas-fir), *Pteris cretica*, *Pyracantha koidzumii*, *Quercus* spp. (*Q. acuta* (japanese evergreen oak), *Q. agrifolia* (California live oak), *Q. cerris* (European Turkey oak), *Q. chrysolepis* (Canyon live oak), *Q. falcata* (red oak), *Q. ilex* (holm oak), *Q. kelloggii* (California black oak), *Q. parvula*, *Q. parvula* var. *shrevei*, *Q. petraea* (durmast oak), *Q. phillyraeoides* (ubame oak), *Q. robur* (common oak), *Q. rubra* (northern red oak)), *Rhamnus* spp. (*R. cathartica* (buckthorn), *R. purshiana* (Cascara buckthorn)), *Rhododendron* spp. (Azalea) (*R. arboreum, R. catawbiense, R. hirsutum, R. impeditum, R. macrophyllum* (Pacific rhododendron), *R. ponticum* (rhododendron), *R. yakushimanum*), *Rhus diversiloba* (Pacific poisonoak), *Ribes laurifolium*, *Rosa* spp. (*R. californica* (California rose), *R. gymnocarpa*, *R. gymnocarpa*, *R. rugosa*), *Rubus* spp. (*R. spectabilis* (salmonberry), *R. ursinus* (boysenberry)), *Salix caprea* (pussy willow), *Sambucus nigra* (elder), *Sarcococca* spp., *Schima* spp. (*S. argentea*, *S. wallichii* (Chinese guger tree)), *Sequoia sempervirens* (coast redwood), *Symphoricarpos* spp. (snowberry), *Syringa vulgaris* (lilac), *Taxus* spp. (*T. baccata* (English yew), *T. brevifolia*, *T.* x *media*), *Torreya californica*, *Toxicodendron diversilobum*, *Trientalis latifolia*, *Tsuga heterophylla* (western hemlock), *Umbellularia californica* (California laurel), *Vaccinium* spp. (blueberries) (*V. arboreum* (Tree huckleberry), *V. intermedium*, *V. parvifolium*, *V. vitis-idaea*, *V. myrtillus*, *V. ovatum* (Box blueberry)), *Vancouveria planipetala*, *Viburnum* spp. (*V. bodnantense*, *V. davidii*, *V. farreri*, *V. hillieri*, *V.* x *bodnantense*, *V. plicatum*, *V. tinus*), *Vinca minor* (common periwinkle).

[554] Dispersal methods include moving infected ornamental and nursery plants, contaminated soil on machinery, tools and footwear, leaf litter and other plant material (EPPO, 2020). Certified nursery plants may still harbour the pathogen due to lack of disease expression and latent foliar symptoms, soil containing oospores/sporangia and sporulation without necrosis (Denman et al., 2009).

[555] *P. ramorum* is able to establish itself on a host plant quickly and can easily survive through harsh climatic conditions (Eyre et al., 2013).

[556] By releasing zoospores, *P. ramorum* can colonize neighbouring plants via water splash, it can also colonize new hosts over greater distances via wind, rain, rivers or streams. Transportation by humans, for example on their shoes or car tyres, is also possible. In nurseries, *P. ramorum* was found in field soil, various substrates, water sediments (e.g. in puddles, sediment runoff, water retention reservoirs), wind carried leaves, plants and plant debris. *P. ramorum* has also been proven to be effectively moved through in green waste (EPPO, 2020).

[557] Nurseries in Europe and North America have been strongly affected. In most cases, when samples from a nursery test positive for *P. ramorum*, quarantine measures are implemented, and host plants are destroyed. This leads to significant extra costs or a change in the plant production (EPPO, 2020).

[558] Pseudococcid mealybugs, soft scale insects, and aphids are the natural carriers of vitiviruses, however, methods of spreading BGMaV have not been determined (Saad et al., 2021).

[559] Symptomatic leaves will have a lower photosynthetic capability, and when co-infected with other viruses, BGMaV appears to still produce mosaic symptoms (Saad et al., 2021). Further research will be needed to determine impact.

[560] It has been found that transmission of the virus via pollen across species is possible via horizontal transmission from pollen grains (Isogai et al., 2020). Cross-species transmission via pollen may increase spread. Grafting has also been found to transmit BLSV (Isogai et al., 2011).

[561] Studies following the discovery of BLSV have found that infected blueberry plants displayed no symptoms, even up to two years following infection. Mild mosaic symptoms have been seen on *N. benthamiana* and chlorotic spots were seen on *C. quinoa* and *L. cylindrica* (Isogai et al., 2011).

[562] Pollen is the main mode of transmission for BlShV, with a low level of transmission by seed (Saad et al., 2021).
[563] The primary mechanism of BlShV transmission tends to be honeybees transferring BlShV-contaminated pollen from infected flowers to flowers on healthy plants (Saad et al., 2021).
[564] The cost for cultivation and production of a perennial crop such as blueberry is significant, hence viral diseases in this crop can be economically devastating. Since replantation to restoration of full yield may require 4–6 years following the removal of an infected field, the more cost-effective alternative is to let the virus run its course through a field, as suggested in the Pacific Northwest of the USA. For these reasons, the best practice would be to avoid introducing BlShV into new planting locations via nursery stock (Saad et al., 2021).
[565] Very limited geographic distribution (Canadian Food Inspection Agency, 2023).
[566] Considered to spread very slowly in the field. May be transmitted between blueberry plants via grafting. Given that most Caulimoviridae viruses are transmitted by insect vectors, it is possible that this viruses could be similarly transmitted (Canadian Food Inspection Agency, 2023).
[567] In the United States of America (Washington) and Canada (British Colombia), a single cultivar, 'Bluecrop', was reported to be affected by the virus with approximately 11% of plants exhibiting fruit drop symptoms. For infected bushes, nearly 100% fruit drop of fruit about 3-5 mm in diameter was reported (Canadian Food Inspection Agency, 2023).
[568] Movement and trade of infected planting material is considered the most significant mode of long-distance spread of BLMoV (EPPO, 2023).
[569] Readily transmissible by pollen; primarily via honeybee movement and seed similar to Cherry leaf roll virus which is another virus in the C. subgroup (Martin et. al, 2012). BLMoV-infected pollen has been shown to survive in hives and to remain infectious for up to 10 days (EPPO, 2023). Although the virus belongs to the genus Nepovirus, nematode or aphid transmissions studies have proven unsuccessful (Martin et. al, 2012).
[570] Movement and trade of infected planting material is considered the most significant mode of long-distance spread of BLMoV (EPPO, 2023).
[571] BLMoV is extremely damaging to *Vaccinium* spp.. In commercial highbush blueberry crops in Michigan, USA, BLMoV causes virtually 100% crop loss within 4-5 years after infection (EPPO, 2023). The BLMoV isolates/strains reported from the South Korea and New York State (USA) attack Vitis spp., but their economic impact on grapevine cultivation remains to be further studied (EPPO, 2023).
[572] In blueberry, virus spread is possible through vegetative propagation of infected stock when producing nursery plants as well as graft-transmissibility. The natural vector of BlMaV is still unknown although other ophioviruses are transmitted via fungal spores which suggests BlMaV could have a similar soilborne vector (Saad et. al, 2021). *Pleotrachelus virulentus* (syn. *Olpidium virulentus*) has been reported to be a vector of BlMaV in blueberry sites in Turkey (Caglayan et. al, 2021).
[573] Infested blueberry bushes have been reported to have lower yields and poor-quality berries with delayed maturity. There is a lack of data on the economic impact of blueberry mosaic disease (Saad et. al, 2021).
[574] Studies suggest that this virus does not infect plants systemically and is not transmitted through vegetative propagation, and that the virus likely does not persist in plants after natural defoliation in autumn (Robinson et. al, 2016).
[575] Research suggests that the virus does not persist following leaf abscission in autumn, which would indicate that the virus does not infect the plants systemically through the vascular system (Robinson et. al, 2016). Therefore, symptoms on individual leaves result from new localised infections likely associated with feeding of a potential vector (Robinson et. al, 2016). It is suspected that this virus could be transmitted by eriophyid mites belonging to the genus *Calacarus* (EPPO, 2013). Note: the genus *Calacarus* occurs in Australia (Atlas of Living Australia, N.D.). Recently shown to not spread through vegetative propagation (Saad et. al, 2021).
[576] Although, no plant mortality has been reported, severe and repeated defoliation has a negative impact on fruit yield (EPPO, 2013).
[577] Although aphids and mealybugs are proposed to be responsible for transmission, there is a lack of experimental or other existing evidence that can support this assumption (Saad et. al, 2021). The unsuccessful identification of a vector suggests the likelihood of vegetative propagation as the mode of virus spread (Saad et. al, 2021).
[578] Infections become systematic and plants are infected for life (Pritts, 2017).
[579] This virus can be transmitted mechanically using infectious transcripts or graft-transmitted to many half-high and southern blueberry cultivars. An aphid *Ericaphous fimbriata* [HPP of blueberries in Australia] has been shown to inefficiently transmit the virus in a nonpersistent manner (Saad et. al, 2021).
[580] In certain cultivars, such as 'Berkeley', the disease can reduce yields and ultimately destroy the plant, while others can continue to produce for some time (Saad et. al, 2021).
[581] Transmitted by aphids, *Illinoia pepperi* which only occurs in the United States of America, has been identified as a vector. It is also graft transmissible (Martin et. al, 2012).
[582] One of the most common viruses affecting cultivated highbush blueberries (*V. corymbosum*), with infected bushes losing up to 25% of their yield (Saad et. al, 2021). In severe cases, the disease leads to extensive losses, because of yield reduction and production of unmarketable fruit (Maetin et. al, 2012).
[583] In international trade, PRMV is only liable to be carried in infected propagating material; accompanying soil may harbour infected seeds and the nematode vector (EPPO, 2002). Soil attached to machinery and vehicles was not considered as an important pathway for viruliferous vectors (EPPO, 2002).
[584] PRMV develops systemic infections in host plants and is transmitted by vegetative propagation techniques (EPPO, 2002). PRMV was shown to be seed-borne in *Vitis labrusca* cv. Concord, *Taraxacum officinale* and *Chenopodium quinoa* (EPPO, 2002). PRMV is not known to be transmitted via pollen (EPPO, 2002). Several nematode species have been recorded as vectors of PRMV including: *Xiphinema americanum* (sensu lato), *Longidorus diadecturus* and *L. elongatus* (EPPO, 2002). The situation is complex concerning *X. americanum* as this has been recognised as a species complex (EPPO, 2002). No information exists about the identity of vector species within *Xiphinema americanum* (sensu lato) for PRMV (EPPO, 2002).
[585] Symptoms on grapevine and peach severe. Blueberry (*Vaccinium corymbosum*) is also susceptible and is a crop undergoing significant development (EPPO, 2002).
[586] Despite the name, this virus rarely occurs naturally in tomatoes but causes serious diseases in other crops. Many different isolates of

TRSV have been found in different hosts and in different geographical areas. Some of those isolates have been reported to be of increased severity. Over a hundred TRSV isolates were characterised serologically and were found to correspond to four distinct serological strains, the most common being NC-38.

[587] *Aeonium* spp., *Ajuga reptans* (carpet bugle), *Ambrosia artemisiifolia* (common ragweed), *Aster* spp., *Astilbe chinensis*, *Capsicum* spp. (peppers), *Capsicum annuum* (bell pepper), *Citrullus lanatus* (watermelon), *Cucumis melo* (melon), *Cucumis sativus* (cucumber), *Cucurbita* spp. (pumpkin), *Cucurbita moschata* (pumpkin), *Cucurbita pepo* (marrow), *Eupatorium purpureum*, *Gladiolus grandifloras*, *Gladiolus* hybrids (sword lily), *Glycine max* (soyabean), *Gossypium hirsutum* (Bourbon cotton), *Nicotiana* spp., *Nicotiana tabacum* (tobacco), *Pelargonium* spp. (pelargoniums), *Phlox subulate*, *Prunus* spp. (stone fruit), *Pueraria montana*, *Pueraria montana* var. *lobata* (kudzu), *Rubus* spp. (blackberry, raspberry), *Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Solanum nigrum* (black nightshade), *Solanum tuberosum* (potato), *Sophora microphylla*, *Vaccinium* spp. (blueberries), *Vaccinium corymbosum* (blueberry), *Vitis* spp. (grape), *Vitis vinifera* (grapevine).

[588] Some strain(s) are present in parts of Australia (Queensland, South Australia and Western Australia) (EPPO, 2022). Tobacco ringspot No. 2 has been reported in South Australia.

[589] Numerous symptomless TRSV infections have been reported in several parts of the world at very low incidence due to the importation of contaminated seeds (for example on ornamentals).

[590] The principal vector of TRSV is nematodes of the *Xiphinema americanum* complex, which is found widespread in Australia. Transmission of TRSV has also been reported for aphids, beetles, grasshoppers, thrips species and spider mites, however, generally, the transmission efficiency of these vectors was low and their significance unclear (EPPO, 2022). Where vectors are present, contaminated seeds (for example on ornamentals) may provide opportunities for spread of the virus to other more susceptible crops.

[591] On blueberries, TRSV causes blueberry necrotic ringspot disease in susceptible cultivars. Infected bushes show a slow and steady decline, which may eventually lead to plant death. The disease has been an important factor in blueberry production in the USA since the 1950s and losses up to a few million USD a year have been reported (EPPO, 2022). Found to not represent an economic threat when found on contaminated seeds (for example on ornamentals).

[592] *A. viennensis* spreads through the entire plant by crawling. It can also crawl from tree to tree. Can cause 30-67 per cent reduction in apple yields.

[593] Including Azalea, Camellia, pear, rice, laurel, quince, loquat, pear, camphor, Cotoneaster, oak, strawberry, guava, holly, Eucalyptus, leatherleaf, *Cleyera* sp., rose apple, Rhododendron, tea, pecan, spruce, silky oak, sweet pepperbush, coffee, silverthorn, Erica, Hibiscus, jasmine, walnut, Juniper, deer grass, Oxalis, Photinia, doghobble, chokeberry, cranberry, Viburnum Beard (2018). Loquat, American Sycamore, Pyracantha, pear and oak have been questioned as true hosts (Qld DPI and NGIA 2019).

[594] Although *Oligonychus ilicis* was reported in Australia (NSW) on Azalea and Camellia the Australian Department of Agriculture, Water and the Environment reports it as eradicated.

[595] Spread with planting material. Has been intercepted in the past.

[596] This species could be wind dispersed from New Zealand to Australia, however, no other spider mite species are known to have spread via this pathway.

[597] Feeding causes leaves to dry out and may cause stems to break and reduce yields. Can be managed using pesticides.

[598] Entry potential is high as Australia is in close proximity to Indonesia.

[599] History of establishment in numerous regions (McQuate and Jameson 2011).

[600] A biosecurity concern due to its broad host range, ease of transport with cultivated plants in soil or roots, and its presence in shipping containers in Australia (Stanaway et al. 2001).

[601] Can cause severe damage. Observations in central Taiwan on arthropod pests of roses showed that *A. sinicus* was one of the 10 most significant species (Wang 1982).

[602] Confirmed hosts include raspberry (red and black), blackberry, other *Rubus* spp. and wild and cultivated roses (Alston 2015; Westcott et al. 2015).

[603] The insect can "dramatically reduce strands of red raspberry canes, and even kill out a planting" (Alston 2015).

[604] *Agrilus ruficollis* causes larval tunnelling. Larvae girdle the stems and cause galls which weaken the plant, reduce berry size and number and can inhibit fruit production (Pfeiffer 2016).

[605] The adult weevils can disperse themselves locally by flight. The most obvious symptoms of damage are partially severed buds hanging from the plants and severed buds on the ground.

[606] Most likely to be transported as a casual contaminant of planting material or fresh fruit.

[607] *Anthonomus bisignifer* has been included in lists of the important pests of agricultural crops in Japan but the complete lack of publications on any aspect of pest status within the past decades suggests that it is of little present concern.

[608] Strawberry is the main host.

[609] This species is often called the "strawberry clipper" because clipped buds are characteristic damage resulting from weevil infestation.

[610] This pest is considered a major pest of strawberries in eastern and north-eastern North-America. In the same regions it is a secondary pest of dewberries and raspberries (CABI 2019)

[611] It is widespread throughout the US.

[612] Overseas yield losses of 50-100 per cent have been reported in strawberries (Mailloux & Bostanian 1993).

[613] This pest is of minor importance on cultivated blackberry, loganberry and raspberry.

[614] The dock bug is herbivorous and feeds on a wide variety of plants from different families.

[615] Adults feed on raspberry and gooseberry.

[616] Fruit can be tainted with foul smelling excrement from beetles feeding nearby (Alcock 2019). Larvae are known to uproot turf, adults feed on ripe fruit (Alcock 2019).

[617] *G. quadrisignatus* are attracted by fermenting fruit and vegetables (bugguide.net/node/view/9684). This species has similar biology, size and shape to *G. fasciatus* and both cause damage to Rubus (Mccoy & Brindley 1961).

[618] Adults feed on ripe fruit and can be found as contaminant in harvested fruit (Mccoy & Brindley 1961).

[619] Georgia, Japan, Korea Kazakhstan, Mongolia, Taiwan, Egypt, Kenya, South Africa, Croatia Tanzania, USA, Spain Tunisia, Canada, Chile Mexico, Peru, China Argentina, Brazil, UK, Colombia, Paraguay, Uruguay, Venezuela, Austria, Belarus, Italy, Belgium, Bulgaria, Denmark, Germany, Greece, France, Latvia, Hungary, Ireland, Sweden, Ukraine, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Switzerland.

[620] Has established in many countries where introduced. It reproduces in both warm and cool environments.

[621] Life cycle from egg to adult can only take a month but more a pest of grapes than berries.

[622] Mainly attacks cultivated roses but sometimes blackberry and raspberry (Arnett et al. 2002).

[623] Larvae develops in the rosehips of various rose species. Primarily a pest of rose.

[624] Can cause significant damage to Rubus plantings resulting in reduced yields, directly feeds on ripe fruit (Martin et al. 2017). Feeds primarily on the white flowers and foliage of *Rubus* spp.

[625] Medium spread potential due to its broad host range. Larvae are root feeders.

[626] Has a similar biology to *M. wickhami*.

[627] There are four different subspecies throughout different parts of North America.

[628] No evidence of direct damage to fruit. Larvae feed on root and adults feed on leaves. Very little research since 1980s.

[629] Adults feed on leaves, larvae pupate in soil.

[630] Distributed in North America eastward of Kansas, particularly destructive in Quebec.

[631] Female beetles puncture cane tips with mouth parts to deposit eggs causing wilting and blackening. Hatching larvae (borers) burrow through cane to the base causing death. Adults feed on tender cane tip epidermis. leaving feeding scars.

[632] Primarily a pest of beech. Where beech is not available, hawthorn and raspberry were the most affected hosts.

[633] Larvae feed exclusively on beech, adult feed on a greater variety of hosts (Sweeney, et al. 2012).

[634] Occurs in highland areas of PNG, so may do well in cooler Victorian climate.

[635] Also impacts fresh flowers and pome fruit in addition to those products listed. Adults feeding causes leaf 'shot-holing'.

[636] Adults feed on leaves and larvae feed on roots.

[637]Becoming more widespread with trade of plants. Most recently detected in Netherlands, Sweden and Norway (Staverlokk 2010).

[638] Absent from Australia (PaDIL) but could do well in Australian climate.

[639] Listed as being incapable of flight (Gratwick 1992)

[640] Eggs can potentially be spread on cuttings. The record in CABI listing this pest as present in erroneous.

[641] Native and widely distributed in western Europe. Now occurs throughout the UK, part of Scandinavia and on the eastern and western edges of the USA and Canada.

[642] Currently absent from Australia, but as a cool season weevil it could establish successfully in south-eastern Australia.

[643] Larvae feed on roots and organic debris and pupate in the soil. There can be up to 4 generations per year in some areas. This species has also been observed affecting containerised azaleas in southeast USA.

[644] Adult beetles cause most damage. Responsible for making holes in leaves. Can be attracted to host plants by volatiles- attractant based traps under development.

[645] Distribution includes Siberia Mongolia, parts of Scandinavia and mountains of southern Europe.

[646] Prefers cooler conditions. Larvae take two to three years to develop and overwinter in deep soil. They can build up high population densities rapidly in response to favourable conditions. Larvae are sensitive to soil moisture.

[647] Higher organic carbon related to higher larvae densities. Highest root damage occurs in years of higher temperatures and rainfall deficit.

[648] Larvae feed on roots and adults feed on leaves.

[649] Feeds on overripe fruit. Can reach high densities in strawberry fields in the US causing economic damage. No reports of damage to fruit crops in Europe.

[650] Reported to be a minor pest of raspberry.

[651] This species may be a complex of eight species each with its own host range (Hendrichs et al. 2015).

[652] Responds to Capilure/Trimedlure which is used in the National Exotic Fruit Fly Monitoring Program, so it is likely to be picked up as part of this program.

[653] *Ceratitis rosa* has similar environmental requirements to *Ceratitis capitata*, however, it is probably more suited to wetter and/or colder conditions (Meyer et al. 2008)

[654] Minor pest in the cultivation of brambles and raspberries.

[655] *D. suzukii* larvae cause damage by feeding on the pulp inside fruit and berries. The infested fruit begins to collapse around the feeding site. Secondary fungal or bacterial infections may occur and cause rotting.

[656] Widespread in Europe.

[657] Feeding causes wilting to areas above feeding site.

[658] Limited host range.

[659] Feeding damage caused by larvae predisposes canes to colonisation by a range of fungal pathogens.

[660] Host range includes wheat soybean, bean, asparagus, lupins beetroot, lucerne, cucumber, peach, apricot, tomato strawberry, pea sunflower, lettuce, mulberry tree, tobacco, poppies, blackberry, pears, raspberry, sesame, potato, clovers (crimson, purple, white).

[661] *A. lineolatus* can't fly over long distances.

[662] Azerbaijan, Japan, Turkey, Greece, Kazakhstan, Albania, Kyrgyzstan, Tajikistan, Uzbekistan, Canada, USA, Andorra, Austria, Belarus, Belgium, UK, Bulgaria, Bosnia & Herzegovina, Croatia, Iran, Czechia, Spain, Czechoslovakia, Denmark, Estonia, Finland, Former USSR, Italy, Germany, China, Hungary, Ireland, Latvia, France, Russia, Lithuania, Slovenia Luxembourg, Ukraine Macedonia, Moldova, Yugoslavia, Romania, Netherlands, Norway, Poland, Portugal, Slovakia, Switzerland.

[663] Vector of raspberry mosaic disease (virus complex consisting of *Rubus yellow net virus*, *Black raspberry necrosis virus* and *Raspberry leaf mottle virus*, all of which are reported as present in Australia).

[664] Medium in the presence of vectored viruses.

[665] Present in Europe and can vector *Raspberry leaf curl virus* and *Raspberry vein chlorosis virus*.
[666] Vector for *Raspberry leaf curl virus* (Luteovirus). Reported to be an inefficient vector.
[667] Including clover, elder, eggplant, tomato, lucerne, elderberry, Acer, raspberry, lilac, pear, cowpea, grapevine, beans, wisteria, maize, Prunus, pea, holly, apple, walnut, elm soybean, cotton, strawberry, navel orange, hazelnut, cabbage, maple, mulberry, asparagus.
[668] Significant pest in the United States.
[669] Afghanistan, Russia, Azerbaijan, Malta, Bangladesh, China, Georgia, India, Israel, Japan, Korea, Greece Lebanon, Pakistan, Sri Lanka, Taiwan, Mexico Tajikistan, Thailand, Turkey, Uzbekistan, Vietnam, Algeria, Italy Egypt, Morocco, Peru, Spain, Bermuda, USA, Bahamas, Costa Rica, Cuba, El Salvador, Guatemala, Puerto Rico, Argentina, Chile, Colombia, Guyana, Croatia, France, Spain
[670] Minor pest of raspberry.
[671] Leafhoppers can run quite well backwards and sideways besides forward.
[672] Commonly confused with *Ericaphis scammelli* and is likely that *Ericaphis fimbriata* and *E. scammelli* are synonymous (Blackman & Eastop 1984, Foottit et al. 2008, G. Bosio – pers. comm. 2001, V. Eastop – pers. comm. 2002 as cited by Petrovic et al. 2017)
[673] Brazilian ground pearl can cause plant death.
[674] This pest is spread by ant species (*Linepithema humile* and *L. micans*) which are not present in Australia (Nondillo et al. 2014).
[675] Based on interception records the entry potential is considered high
[676] Hosts list continues to grow primarily within ornamental plant species.
[677] The economic impact of *Xylella* with GWSS would be extreme, potentially leading to plant death.
[678] Blackberry is not a major host of GWSS.
[679] Economic impact to berry industry is medium as feeding damage by GWSS without *Xylella fastidiosa* will not lead to berry plant death (Fletcher 2018).
[680] Suitable climate and hosts available in Australia.
[681] In California, more of a problem where growth occurs during warmer months.
[682] Eggs or nymphs could come in on calyxes.
[683] North American species (EPPO 2015). Lygus bug feeding causes leaf tip yellowing and necrosis (Boetel et al. 2005).
[684] This species affects at least 130 economically important plants (Young & Orrey 1986).
[685] This species has a very wide host range with at least 385 known hosts (Young 1986), this would mean that hosts are likely to be available allowing the pest to establish.
[686] Fruit becomes distorted around feeding site. Managed overseas using insecticides.
[687] Damage to crop plants most often recorded on alfalfa, clover, potato, cereals and sugarbeet (Holopainen & Varis 1991).
[688] European species (Holopainen & Varis 1991). Wide host range suggests it could establish in Australia.
[689] Schuh (2013) lists *Macrolophus rubi* (Woodroffe 1957) as junior synonym *of Macrolophus costalis* Fieber, 1858.
[690] This species feeds on foliage but is a predator of some crop pests.
[691] Not much information about the spread potential but only reproduces one generation per year (CABI 2019).
[692] Potential presence of wild hosts (e.g. blackberries) in Australia could sustain it and allow reinfestation into crops, but hosts are limited.
[693] Not much information about the spread potential but only reproduces one generation per year (CABI 2019).
[694] Potential presence of wild hosts (e.g. blackberries) in Australia could sustain it and allow reinfestation into crops, but hosts are limited.
[695] Unconfirmed reports in South America.
[696] Large aggregations feeding on beets can cause wilting but rarely requires control. A pest species, polyphagous and like other *Nysius* spp. is an efficient coloniser.
[697] Vector of *Candidatus* Phytoplasma ulmi and *Xylella fastidiosa* (EPPO 2014).
[698] Overwinter as eggs which could be difficult to detect, and this species occurs in New Zealand (CABI 2019).
[699] The establishment potential is high due to the polyphagous nature of this species and the availability of hosts in Australia (CABI 2019, Yurtserver 2000).
[700] While the feeding damage can cause stunting of berry growth and leaf deformation (CABI 2019). No strawberry viruses are reported to be vectored by this species.
[701] Movement of plant material could spread the pest between areas.
[702] Vectors *Wheat dwarf virus*. No Rubus or strawberry viruses are reported to be vectored by this species so likely not of economic concern to the berry sector.
[703] Vector of citrus stubborn disease (*Spiroplasma citri*). Found on Rubus and strawberry but no evidence that it vectors diseases of Rubus or strawberry.
[704] *Typhlocyba tenerrima* is a synonym of *Ribautina tenerrima* (current name-CABI 2019-CPC). Not much information about this species but is known to occur in New Zealand (CABI 2019-CPC).
[705] This species could easily be introduced unnoticed and establish.
[706] Morin & Evans (2010).
[707] Reported as most severe pest of raspberry in Utah.
[708] Could establish in southern Australia.
[709] Would be restricted to glasshouse environments if established in Southern Australia (mostly prefer wetter habitats).
[710] Would adversely impact existing IPM programs.
[711] Minor pest of blackberry, loganberry and raspberry
[712] Pest of raspberry in Britain, but otherwise on stone fruit in Europe and elsewhere.
[713] Present throughout the Mediterranean region thus could be a high potential for establishment in berry growing regions in southern Australia.
[714] Dispersal is mainly by transportation of infested plant material. The flying activity is often restricted to the night, and migration is limited, especially for females.
[715] Including corn, lucerne, barley, coffee, rice, flax, cabbage, cowpea cauliflower, clover, cotton, cucumber, garlic, lettuce, rye, pea,

Capsicum, potato, sorghum, wheat soybean, tomato, tobacco, strawberry, bean, sunflower.
[716] Unlikely to be hitchhiked on plant material as it lives underground during the day.
[717] Occurs in North and northern South America. In southern South America it has been displaced by *A. robusta*. Cutworm, causes major damage to seedlings.
[718] Including maize, *Rubus* spp, beet, tobacco, potatoes, young coffee, cotton, asparagus bean, cabbage, castor bean, freesia, grape, rye, lettuce, lilium, onions, cabbages, peanut, pepper, potato, radish, spinach, squash, tomato, rice, strawberry.
[719] Moth is a strong flier and transport of infested plant and contaminated soil. Both larvae and pupae can hide within infested ornamental bulbs.
[720] Afghanistan, Austria, Azerbaijan, China, Bangladesh, Bhutan, Georgia, India, Syria, Indonesia, Mali, Japan, UK, Jordan, Turkey, Kazakhstan, Korea, Lebanon, Kyrgyzstan, Malaysia, Mongolia, Pakistan, Angola, Iraq, Nepal, Israel, Namibia, Philippines, Sri Lanka, Taiwan, Algeria, Iran, Tajikistan, Myanmar, Turkmenistan, Yemen, Uzbekistan, Vietnam, Ethiopia, Egypt, Libya, Kenya, Greece, Sudan, Cyprus, Croatia, South Africa, Morocco, Togo, Tanzania, Tunisia, Bulgaria, Belgium, Czechia, Malta, Finland, Spain, Serbia, Denmark, France, Germany, Hungary, Ireland, Italy, Poland, Lithuania, Macedonia, Moldova, Slovakia, Estonia, Netherlands, Norway, Portugal, Romania, Russia, Latvia, Slovenia, Sweden, Switzerland, Ukraine.
[721] High risk of import via infested planting material or in soil contaminating shipments.
[722] Hosted on a wide range of agricultural crops.
[723] There are a few records indicating that the species has been reared from berries.
[724] This species has a wide host range and would be likely to be able to become established.
[725] Larvae are external feeders so are unlikely to spread with fruit. Potentially spread with nursery plants, however, pathway is regulated (see BICON).
[726] Pest outbreaks result in quality and yield losses.
[727] Species distribution is more aligned with cooler temperate regions. Unlikely to cope with Australian summers.
[728] There are few records of it damaging blueberry and strawberry and no records of it damaging *Rubus* spp.
[729] Larvae feed in webbed leaves or flowers and may cause considerable damage to foliage and developing fruit.
[730] Restricted distribution in British Columbia and Washington State.
[731] Possibility of wind dispersal from New Zealand to Australia.
[732] Economic pest of kiwifruit. Also affects apples. This species has been recorded from *Eucalyptus* in New Zealand.
[733] Given the large range of this species into Asian production areas there may be an increased chance of introduction via regulated pathways, hence the entry potential rating.
[734] It is a strong candidate for natural dispersal from New Zealand to Australia. Leaf rolling species that feeds on the leaves of apple.
[735] Polyphagous nature of the species, with *Eucalyptus* recorded as a host in NZ. Note that there are at least two sibling species in NZ which are very difficult to separate on morphology, and usually require molecular differentiation.
[736] Originally from southern Africa, this species has spread to Europe (Glavendekic 2006).
[737] An important pest of carnation in Europe (Vives 1980). Likely pathway for introduction is via cut-flower imports.
[738] Eucalyptus is reported as a larval host, so high potential for establishment. not clear if this is a significant pest of berry crops in its native distribution.
[739] Dispersal behaviour of caterpillars would increase the potential spread of this species should it become established in Australia.
[740] Records of the species on berry crops are scarce and other hosts are preferred.
[741] Widespread in the Northern Hemisphere.
[742]Larvae feed on above ground plant parts and also produce webbing that covers the plant. Larvae can cause allergic reactions in some people.
[743] Afghanistan, Armenia, Azerbaijan, Georgia, Italy, Turkey, Hungary Mauritania, Morocco, Canada, Austria, Syria, Belarus, Iran, Belgium China, USA, Estonia, Croatia, Spain, Serbia, Tunisia, Algeria, Israel, Denmark, France, UK, Germany, Lithuania, Latvia, Malta, Greece, Moldova, Bulgaria Luxembourg, Sweden, Macedonia, Poland, Netherlands, Portugal, Romania, Russia, Slovakia, Switzerland, Ukraine, Papua New Guinea.
[744] Potential for establishment is higher because the species is very polyphagous and has demonstrated ability to establish outside of its natural distribution.
[745] The wide distribution increases the potential for entry on imported produce.
[746] The biology of the species (Gordon et al. 1989) suggests that it would not adapt well to Australian climate except for some montane cropping regions.
[747] Bermuda, Canada, Mexico, USA, Antigua & Barbuda, Bolivia, Bahamas, Barbados, Costa Rica, Dominica, Dominican Republic, El Salvador, Colombia Guadeloupe, Jamaica, Guatemala, Honduras, Martinique, Uruguay Montserrat, Panama, Nicaragua, Puerto Rico, St Kitts & Nevis, St Lucia, St Vincent & the Grenadines, Cuba, Trinidad & Tobago, US Virgin Is, Brazil, Haiti, Argentina, Peru, Ecuador, Paraguay, French Guiana, Suriname.
[748] No obvious pathway for entry into Australia.
[749] Pest status is largely confined to pastures rather than berry crops (e.g. Alford 2012).
[750] The larvae feed on unopened buds and tunnel inside the bud, destroying it. The larvae can cause very extensive damage to plants which may not develop any fruit.
[751] Would only find entry by movement of planting material.
[752] Mostly affects grapevines.
[753] Armenia, Azerbaijan, Georgia, Israel, Jordan, Eritrea, Kazakhstan, Lebanon, Tajikistan, Turkey, Iraq, Turkmenistan, Chile, Uzbekistan, Algeria, Kenya Ethiopia, Serbia Morocco, Malta, UK, Argentina, Albania, Austria, Italy, Belgium, Bulgaria, Croatia, Germany, France, Greece, Slovenia Hungary, Macedonia, Moldova, Switzerland, Ukraine Luxembourg, Poland, Montenegro, Romania Netherlands, Portugal, Slovakia.

[754] It is a pest of southern countries.
[755] Prefers dry conditions with high temperatures.
[756] Note female *Lymantria dispar dispar* (the European strain) are winged but not capable of flight.
[757] Afghanistan, Armenia, Azerbaijan, China, Japan, Lebanon, Syria, Mongolia, India, Iran, Taiwan, Turkey, Iraq, Uzbekistan, Algeria, Canada, USA, Austria, Belarus, Belgium, Bulgaria, Croatia, Israel Finland, France, UK, Germany, Greece, Hungary, Italy, Spain, Macedonia, Moldova, Sweden, Netherlands, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Switzerland.
[758] Mostly spread between areas by trade.
[759] Larvae defoliate host plants. Asian strain (*Lymantria dispar asiatica*) is more damaging than European strain (USDA 2016).
[760] Can be spread on containers and ships as egg masses.
[761] Larvae defoliate host plants.
[762] The tropical distribution would limit impact on the majority of berry industry.
[763] Not many native hosts available for establishment. The pest prefers cool temperatures climates and would be destructive if established in these areas in Australia.
[764] There are two similar species here, *Oleuthreutes concinnana* and *O. furfuranum*.
[765] *O. bruceata* is restricted to northern US and Canada, while *O. brumata* has the broader distribution and is invasive in the US.
[766] *O. brumata* should be regarded as the more significant threat, but both are restricted to cool temperatures which would limit damage in Australian environments.
[767] As per Troubridge and Fitzpatrick (1993), species distribution is restricted to Canada and USA. Adults are nocturnal and females are wingless.
[768] Ranked similar to the gypsy moth *Lymantria* spp. but rated lower in terms of establishment potential, as the females are wingless and egg masses occur where females pupate.
[769] Larvae can defoliate host plants. This species is widespread and can inhabit a vast number of different habitats.
[770] Larvae are unlikely to be moved in plant material and survive to pupate, while the species has a large host range, it has a preference for Poaceae.
[771] In the US *P. marginata* is reported to cause loss of plant vigour, yield and can lead to plant death and increased susceptibility to pathogen attack.
[772] Including Rubus, strawberry, maple, blueberry, tomato, Capsicum, maize cabbage, potato, grapevine, cherry passionfruit, alder, beetroot, lettuce, artichoke, lucerne, tobacco, onion, avocado, fir.
[773] This species cannot survive in cold winter temperatures. They are exceptional flyers and able to fly long distances with wind assistance.
[774] It is a major agricultural pest throughout the world, particularly herbaceous crops.
[775] Flies at night and is attracted to light. Caterpillars feed gregariously on host leaves and can cause quite severe defoliation.
[776] Native to New Zealand (Gilligan and Epstein 2014F). It is possible that this species could enter Australia via natural dispersal from New Zealand.
[777] Leaf rolling species.
[778] Despite the name "mulberry caterpillar" this species doesn't seem to have a major impact on mulberry or other berry crops.
[779] Including alder, blackberry, rose, raspberry, yellow berry, blueberry, strawberry, pear, apple, almond hazel, hornbeam, walnut dogwood, myrtle hawthorn, cherry, apricot, thornapple, ash, nectarine.
[780] Those species would not survive in the Australian climatic conditions with the exception of some mountain regions in the south. Very unlikely to establish in berry production regions.
[781] Suitable climate and hosts exist for the establishment of this pest. The main damage is caused by larvae destroying buds in spring.
[782] Damage caused by the young larvae on apple and pear trees is usually regarded as superficial and unimportant. Controlled using insecticides overseas.
[783] Recorded as a host, no information on impact of this armyworm.
[784] Benin, Cameroon, Gabon, Nigeria, Cuba, Bermuda, Mexico, USA, Antigua and Barbuda, Bahamas, Barbados, Costa Rica, Dominican Republic, El Salvador, Grenada, Panama, Honduras, Jamaica, Argentina Nicaragua, Puerto Rico, Saint Lucia and Vincent, Trinidad and Tobago, Brazil, Chile, Colombia, Ecuador, French Guiana, Peru, Guyana, Paraguay, Suriname, Uruguay, Venezuela.
[785] including okra, onion, amaranth, celery, pepper, snapdragon, peanut, *Citrus*, asparagus, grass, beetroot, tea, sugarbeet, fig, cabbage, coffee, cauliflower, lily, *Chrysanthemum*, watermelon, jute, pumpkin, carrot, carnation, wild strawberry, daisy, soybean, sweet potato, lettuce, avocado, tobacco, rice, plum, spinach, cocoa, grapevine and maize.
[786] Bahrain, Israel, Jordan, Lebanon, Syria, Benin Turkey, United Arab Emirates, Yemen, Iran, Algeria, Angola, Italy, Congo, Sudan, Chad, Botswana, Guinea, Cameroon, Cape Verde, Comoros, Egypt, Iraq, Oman, Ethiopia, Gambia, Ghana, Sao Tome, Guinea, Kenya, Libya, Portugal, Mali, Cyprus, Madagascar, Malawi, Namibia, Tunisia, Morocco, Mauritania, Mauritius, Nigeria, Mozambique, Niger, Rwanda, Senegal, Togo, Seychelles, Somalia, Tanzania, Spain, Uganda, Zambia, Zimbabwe, France, Greece.
[787] Eggs can potentially be spread on cuttings.
[788] including corn, asparagus, beet, canola, melon, carrot, cucumber, lettuce, onion, rhubarb, turnip, rutabaga, sweet, tomato, bean, cabbage, peach, watermelon, lentil, lucerne, cotton, potato blackberry, clover, grape, pea, raspberry, wheat, sorghum, potato, soybean, sunflower.
[789] Occurs from southern Canada south through Central America to South America (Capinera 2014). Larvae can skeletonize leaves (Capinera 2014).
[790] Other species in the genus have shown the ability to establish outside of their natural distribution. Damage to berry crops limited to loss of leaf area, unlikely to be severe.
[791] Unlikely to enter unless moved in living plants and planted out near berry plants.
[792] There is only one report of *Trichoplusia ni* on pineapple from Malaysia.
[793] including *Acer, Aesculus, Malus, Broussonetia, Carya, Castanea,* Cotoneaster, *Ilex, Cydonia, Fagus, Fraxinus, Juglans, Lonicera, Prunus,*

Ligustrum, Punica, Olea, Rubus, Tilia, Robinia, Syringa, Rhododendron, Ribes, Salix, Ulmus, Viburnum, Quercus. More of a pest of woody tree species.

[794] Iraq, Israel, Japan, Korea, DPR, Lebanon, Syria, Libya, Taiwan, Turkey, Egypt, Algeria, Morocco, Canada, USA, Austria, Belgium, Bulgaria, UK, Cyprus, Portugal, Italy, Malta, Spain, Denmark, France, Netherlands, Norway, Poland, Romania, Iran, Sweden, Switzerland, Serbia, Slovakia, Slovenia, Switzerland, Ukraine.

[795] Armenia, Azerbaijan, Kuwait, Turkey, Latvia, Uzbekistan, Algeria, Egypt, USA, Albania, Austria, India, Georgia Belgium, Italy, France Bulgaria, Croatia, Iran, Sweden, Switzerland Spain Denmark, Estonia, Germany, Greece, Hungary, Moldova, Slovenia, Netherlands, Norway, Portugal, UK, Romania.

[796] Not likely to spread easily to new areas. Non-invasive and is thought to be declining throughout its range.

[797] Native to the United States also occurs in Bermuda and the Bahamas (Arthurs et al. 2015).

[798] Potentially spread with the movement of infested plant material. However, the pathway is regulated.

[799] Feeding causes distortion of fruit, and growing points (Arthurs et al. 2015). High impact pest of blueberries in Florida causing fruit dehydration, fruit damage and reduction in fruit set.

[800] Cannot overwinter in Minnesota.

[801] In the US thrips injury is uncommon, but occasionally destroys entire crops.

[802] No records of being intercepted at the border (DAWE group pest risk analysis document, 2017).

[803] Bangladesh, Georgia Japan, Korea, Israel, Mongolia, Taiwan, Pakistan, Philippines, Qatar, Thailand, Spain, Turkey, Algeria, Italy, Croatia, Canada, USA, Greenland, Albania, Austria, Belgium, Iran, Czechia, India, China, Estonia, Denmark, Finland, France, Germany, Iraq, Greece, Hungary, UK, Netherlands, Norway, Poland, Portugal, Russia, Romania, Sweden, Switzerland, Bulgaria, Ukraine, NZ.

[804] Tiny size and eggs inside plant material means it could enter on plant material, however, pathway is regulated (see BICON).

[805] Its current reported distribution suggests that there are similar environments in parts of Australia that would be suitable for its establishment and spread.

[806] Flower thrips cause distortion of fruit, discolouration and reductions in quality (Buxton & Easterbrook 1988). Multiple papers report damage to strawberries causing deformed fruit.

[807] Reported as feeding on the flowers and leaves. Oviposition on fruit causes the formation of "pansy spots", which are large (up to 12 mm) discoloured spots on the surface of the fruit.

[808] Likely to be managed using similar chemicals that are currently used to manage established thrips such as western flower thrips.

[809] Feeding by thrips causes premature wilting of flower parts and blossom drop in blackberry and raspberry (CABI 2019)

[810] Imported flowers provide a pathway for entry. Host include *Alstroemeria* and *Chrysanthemum* (both of which are imported into Australia). Known to be frequently intercepted at the border (DAWE group pest risk analysis document, 2017).

[811] Highly polyphagous. Little information on damage to *Rubus* and strawberries.

[812] Occurs commonly in warm, humid climates.

[813] Local spread on a strawberry producing property could be high but between properties and within the community is low.

[814] Vectored by *Euscelis* spp. and *Macrosteles* spp. leafhoppers (Converse, 1987).

[815] Leaf hoppers move by wind dispersal. Could also spread through illegal movement of propagation material.

[816] China, India, Brazil, Indonesia, Japan, Korea, Peru, Italy, Lebanon, Malaysia, Myanmar, Taiwan, Thailand, Turkey, Iran, South Africa, Spain, Bermuda, Canada, Mexico, USA, Cuba, Belgium Guatemala, UK, St Vincent & the Grenadines, France, Argentina, Belarus, Colombia, Czechia, Finland, Germany, Greece, Hungary, Lithuania, Poland, Portugal, Russia, Ukraine.

[817] Leaf hoppers move by wind dispersal. Could also spread through illegal movement of propagation material.

[818] China, India, Brazil, Indonesia, Japan, Korea, Peru, Italy, Lebanon, Malaysia, Myanmar, Taiwan, Thailand, Turkey, Iran, South Africa, Spain, Bermuda, Canada, Mexico, USA, Cuba, Belgium Guatemala, UK, St Vincent & the Grenadines, France, Argentina, Belarus, Colombia, Czechia, Finland, Germany, Greece, Hungary, Lithuania, Poland, Portugal, Russia, Ukraine.

[819] Economic impact depends on region and location.

[820] *Candidatus* phytoplasma rubi is vectored by *Macropsis* leafhoppers including *M. fuscula*. Once *M. fuscula* acquires Rubus stunt phytoplasma it can vector the pathogen all its life.

[821] Could enter through infested cut flowers or dispersal of leafhoppers.

[822] Rubus strains are host specific, they are pathogenic on brambles but not apple and pear.

[823] Armenia, Egypt, Japan, USA Jordan, Algeria, Lebanon, Ireland, Kazakhstan, Korea, Turkey, Serbia, Italy Finland, Morocco, Tunisia, Bermuda, Canada, Mexico, Estonia, NZ, Albania, Guatemala, Spain, France, Israel, Latvia, Belarus, Belgium, Cyprus Bulgaria, Croatia, Switzerland, Denmark, Norway Germany, Greece, Hungary, Lithuania, Poland, Moldova, Austria, Luxembourg, Montenegro, Syria Netherlands, Iran.

[824] *E. amylovora* can survive on the outside of the plant for weeks at a time prior to infection. There are import restrictions in place to reduce the risk of this pathogen entering Australia through imports. If it entered it could establish quite well.

[825] The high health strawberry runner scheme for strawberries will help limit over-wintering of fire blight on strawberry farms.

[826] The economic impact for strawberry exporters could be high due to the absence of fire blight in some of our export markets.

[827] Can survive in the absence of a host. This bacterium can also be transported by honey bees. No bacterial control and recently recorded in strawberry.

[828] Requires a transmissible tumour inducing plasmid to cause galls.

[829] Only occasionally reported on Rubus and not considered a serious pathogen (CABI)

[830] The taxonomy of this species is poorly understood.

[831] This disease is rare.

[832] Diseased strawberry plants generally bear no or little fruit. However, the strawberry witches' broom is rare.

[833] Infected plants bear conspicuous symptoms and as plants are readily removable, rouging of diseased plants is a practical measure for controlling disease incidence.

[834] The present economic importance of the disease in North America is very minor.

[835] A high relative humidity of 95 per cent is required for infection (Ferrante & Scortichini 2018). The establishment potential is medium as this pest has a limited host range and there are relatively dry conditions in Australia.
[836] Normal crop hygiene practices should limit the spread of infected plant material.
[837] Ferrante and Scortichini (2018) report typical symptoms of bacterial leaf blight so some loss would be expected.
[838] The pathogen is very widespread throughout the world, and it has previously entered Australia and was subsequently eradicated (McGeehan & Fahy 1976, and Gillings et al. 1988).
[839] It has a limited host range, but a wide geographic range.
[840] The bacterium has a requirement of low daytime temperatures and low night-time temperatures and high humidity for disease initiation (Maas 1998). Spread potential is high in runners.
[841] *X. fastidiosa* can be transmitted on bulbs, tubers, corms, rhizomes, flowers, inflorescences, calyxes, fruit, leaves, branches, stems and shoots of host plants. This species is graft transmissible.
[842] There are many insect vectors of *Xylella* overseas, but glassy winged sharpshooter is identified as the greatest threat due to its large size and once GWSS acquires *Xylella*, the bacteria can survive in gut indefinitely. *Xylella* is graft transmissible.
[843] *Xylella fastidiosa* is present in many countries and may enter Australia through infected vectors (including on air currents).
[844] *Xylella fastidiosa* is vectored by the exotic leafhopper *Homalodisca vitripennis*, however, it is suspected that endemic leafhoppers can vector this pathogen.
[845] including apple, European pear, *Acacia* spp., *Acer* spp., kiwifruit, cedar, European alder, birches, cypress, *Citrus*, fig, ash, maple, olive, pecan, chestnut, hazel, walnut, almond, *Prunus* spp., privet, ornamental apple, rose, *Eucalyptus*, oak, pine, mulberry blackcurrant, fir, plum, cherry, grapevine, *Rubus* spp., blueberry.
[846] China, Georgia, Iran, Japan, Syria, Korea, Turkey, Congo, Kenya, Morocco, Nigeria, Réunion, Sao Tome & Principe, South Africa, Tanzania, Tunisia, Uganda, Canada, Mexico, USA, Colombia, Albania, Austria, Belarus, Bosnia & Herzegovina, Italy, Bulgaria, Croatia, Czechia, UK, Poland, Denmark, Germany, Greece, Hungary, Ireland, Lithuania, Portugal, Romania, Ukraine, Luxembourg, France Macedonia, Spain, Netherlands, Serbia, Russia, Slovenia, Switzerland.
[847] A lot of soil needs to be moved to increase its chances of entry.
[848] Australia's environment is suitable for the establishment of *Armillaria mellea*.
[849] China, Japan, Korea Turkey, Canada, Greenland, Italy, Mexico, India, Albania, Andorra, Austria, Belgium, UK, Czechia, Denmark, France, Finland, Germany, Greece, Poland, Switzerland, Serbia USA, Ireland, Russia, Netherlands, Spain, Sweden, Norway, Portugal, Slovakia, Slovenia, Romania.
[850] This species has a huge network of rhizomorphs that permeate below the ground and can spread easily (Hagle 2010).
[851] *A. mellea* is more frequently isolated from diseased tissue than *A. ostoyae* in Italy and USA (Prodorutti et al. 2009).
[852] Suitable environment for establishment.
[853] Can spread through spores on people and planting material.
[854] *Botrytis pseudocinerea* cannot be easily distinguished from the established species *B. cinerea* (Walker et al., 2011). Grey mould can be a problem, but it can be controlled to an extent depending on the weather.
[855] Reported to severely reduce yields of blackberry in the United States. Takes about four years to establish.
[856] Not much information is available on this disease and it's found only in the USA.
[857] Blackberry is the most common host. Can easily spread in an orchard.
[858] Could have a high yield loss as it affects fruit and flowers
[859] Secondary pathogen of damaged of stems. Not considered a major pathogen overseas.
[860] Can be severe in wet weather, but generally does not have a major impact.
[861] In substrate it is not an issue but is an issue on *Rubus* grown in soil.
[862] Including cotton, lucerne, avocado, olive, apple, pear, fig grains, peanuts, soybeans, elm, common beans, almond, walnut, pistachio, *Rubus* spp., *Prunus* spp., grapevine, poplar, oak.
[863] The economic impact is medium for hydroponic Rubus.
[864] The species that causes strawberry red stele root rot (*Phytophthora fragariae*, previously *Phytophthora fragariae var. fragariae*) is not present in Australia, but the species that affects *Rubus* spp., causing Rubus root root (*Phytophthora rubi* previously *Phytophthora fragariae var. rubi*) is present in Australia.
[865] Spores can spread through water and soil. Long distance spread can occur through infested planting material such as farming tools or equipment and infected nursery stock.
[866] India, Israel, Japan, Lebanon, Taiwan, Egypt, NZ, Canada, Mexico, USA, Chile, Ecuador, Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Ireland, Lithuania, Sweden, Ukraine, Luxembourg, Syria, Netherlands, Italy, Norway, Serbia, UK, Slovakia, Slovenia, Russia, Switzerland.
[867] The organism is present in countries where strawberry fruit is imported (e.g. NZ).
[868] It does not express in warm seasons but explodes under cooler conditions within seasons and can devastate crops.
[869] If an undetected incursion happened in one of the strawberry nurseries the pathogen could be rapidly spread Australia-wide.
[870] If an incursion occurred in a strawberry nursery, the economic impact for fruit growers would be extreme.
[871] The airborne spores are not very resilient and so can't survive on clothes for long.
[872] The disease is severe between the temperature range of 18-26 degrees Celsius.
[873]Diseased material will probably be detected in post entry quarantine. Cane spots are a symptom of dry-berry disease on boysenberries (Larumm 2019).
[874] Crop hygiene may limit the spread of the pathogen.
[875] McKeen (1959) reports of low to high level losses of loganberries to dryberry disease. One report from 1982 is of a 50 per cent loss and another report from 1940 estimates 30 per cent of crop destruction.
[876] As per Maas (1998) this pathogen has a global distribution. There is a possibility that it could already be in Australia. ALA (2019) shows a record of *Rhizopus sexualis* in the mycology collection catalogue of the Royal North Shore hospital (NSW). However, it is

uncertain if the fungus was isolated in Australia.
[877] It is unlikely for any imported and infected fruit to come in contact with growing crops.
[878] Airborne spores produced by typical *Rhizopus* species could travel to new geographic locations. Maas (1998) also states that *Rhizopus* spores may be carried by insects.
[879] Not many reports of losses caused by this fungus. Levels in the field could be controlled by spraying.
[880] Entry would most likely be via plant material as soil is unlikely to be on the pathway. Found in North and Central America, Europe and parts of Asia, thus capable of spreading between countries.
[881] Establishment is medium due to broad host range.
[882] Spores from fruiting bodies can produce hyphae that can infect seedlings. Removal of diseased seedlings can help minimize the spread of the fungus to healthy seedlings.
[883] Symptoms will not develop unless a chilling requirement is met.
[884] Would have to come on propagating canes and not be picked by DAWE. Only found in Europe and North America. Natural spread is localised.
[885] Would be expected to establish within a crop and adjacent berry producing properties. It is unlikely to disperse naturally between non-adjacent farms.
[886] Feral blackberries are widespread in Victoria where Rubus crops are grown. Spores spread by splash dispersal via spore masses cirrihi. Cirrhi are conidia in mucilage and can be produced by the pathogen under high humidity (Martin et al. 2017). Mucilage could make the spore masses sticky and provide protection from dehydration and sanitisers.
[887] Spread by airborne spores and wind. There are native raspberries, although not as prolific as feral blackberries-which may or may not be hosts.
[888] Pest is not visible to the naked eye but is usually visible under the microscope.
[889] Including okra, maples, carrot, beetroot, corn, melon, potato cucumber, pea, peanut, grape, cauliflower, blueberry, basil, strawberry, onion, lettuce, peanut, potato, watermelon, eggplant, *Citrus*, cotton, tomato, maize.
[890] Wide host range, migratory parasites, but restricted to sand soil types.
[891] Particularly turf, onion and potato have high potential to spread this nematode.
[892] Nematode species are quite commonly intercepted and seem to travel reasonably well.
[893] Bangladesh, India, Indonesia, Japan, Korea, Brazil, Egypt Guinea, Malaysia, Myanmar, Nepal, Pakistan, Portugal Philippines, Taiwan, Singapore, Iran, Sri Lanka, USA, Ghana, Thailand, Vietnam, Ivory Coast, Niger, Gambia, Nigeria, Madagascar, China, Mauritania, Senegal, Sierra Leone, Costa Rica, El Salvador, Argentina, Guyana, Venezuela.
[894] This species is seen to be quite capable of establishing in a wide range of environments.
[895] Medium impact because of associated viruses.
[896] First reported from North America (Norton and Hoffman 1975).
[897] Spread with the movement of infested soil. Impact due to acting as a vector of Tomato black ring and other viruses.
[898] India, Kazakhstan, Pakistan, Tajikistan, Turkey, Uzbekistan, Vietnam, South Africa, Canada, USA, Austria, Belgium, NZ Bulgaria, Czechia, Denmark, Estonia, Finland, UK, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Moldova, Sweden, Netherlands, Spain, Norway, Poland, Portugal, Romania, Slovakia, Ukraine, Switzerland.
[899] This nematode is a vector to several plant viruses including *Raspberry ring spot virus* and *Tomato black ring virus*.
[900] India, Pakistan, Mali, Benin, Burkina Faso, Cameroon, Ivory Coast, Gambia, Ghana, Guinea, Kenya, Nigeria, Senegal, Sudan, Tanzania, USA, Barbados, Cuba, Brazil, Dominica, Trinidad & Tobago, Costa Rica, Jamaica, Dominican Republic, Guadeloupe, Haiti, Guatemala, Puerto Rico, Martinique, Venezuela.
[901] This nematode is a vector to several plant viruses including the raspberry ringspot virus and tomato black ring virus.
[902] 40-50 per cent reduction in root and top growth of raspberry plants reported.
[903] Economic impact is medium if vectoring *Strawberry latent ringspot virus*.
[904] Vectors *Arabis mosaic virus* (present in Australia) and *Strawberry latent ringspot virus* (exotic).
[905] Has entered Australia previously and been eradicated.
[906] Economic impact is medium if nematode is vectoring *Arabis mosaic virus* (in Australia) and/or *Strawberry latent ringspot virus*.
[907] Reported to cause moderate root damage affecting cane height, however, impact does not appear to be as severe as *P. rubi* which is present in Australia.
[908] Very little is known.
[909] Only known to occur in the USA.
[910] *Blackberry calico virus* causes minor impacts on fruit yield and quality. However, in combination with *Raspberry bushy dwarf virus* it can cause droplet abortion and misshapen fruit.
[911] No efficient control measure other than avoidance. Can be transmitted over long distances through wind currents and bees.
[912] Only known to be found in the USA.
[913] Vector is unknown. Transmission experiments with aphids and mites have been unsuccessful. BVY has major effects in plants co-infected with Blackberry yellow vein-associated virus.
[914] Most prevalent amongst blackberry viruses.
[915] Only known to be found in the USA. Vector is present in Australia.
[916] It is symptomless, but plant will show symptoms when affected by two viruses at the same time such as the *Raspberry bushy dwarf virus*.
[917] Said to have a devastating impact on blackberry. Has no known economic importance on other plants. Difficult to determine identity of virus as a type isolate is not available.
[918] Depends on movement of plant material by growers on field.
[919] Referred to as blackline in cherry and walnut.
[920] *Cherry leaf roll nepovirus* has been isolated from necrotic spots on *Vaccinium darrowii*, however, it has not been proven to cause

disease in this host as Koch's postulates were completed using a second host (*Nicotiana occidentalis*) (Woo, et al. 2012).
[921] China, Iran, Austria Lebanon, Syria, Italy, Turkey, Egypt, Peru, Tunisia, Canada, NZ USA, Albania, Spain, Belgium, Bosnia & Herzegovina, Serbia, Bulgaria, Croatia, Czechia, France, Germany, Greece, Hungary, Moldova, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Finland, Switzerland.
[922] Cherry leaf roll virus has been recorded in Australia, however, many strains exist which are not present in Australia including blackberry, red raspberry, cherry and walnut infecting strains.
[923] Wide host range and symptomless on some hosts providing time for the virus to establish in new areas.
[924] Vector is present in Australia.
[925] Causes crumbly fruit.
[926] Vector needs to feed on infested plant for two hours before acquiring the virus.
[927] Vectored by *A. rubicola* in raspberry and *A. rubifolii* in blackberry.
[928] Medium economic impact for raspberry; Unknown for other *Rubus* cultivars.
[929] Would need to come in through planting material or infected aphid from northern hemisphere.
[930] Medium economic impact for raspberry; Unknown for other *Rubus* cultivars.
[931] This virus was first described as *Rubus chlorotic mottle virus* (Sobeomovirus) (Kado 1971).
[932] Several insects have been proposed as vectors for the virus, including the green peach aphid (*Myzus persicae*), the garden fleahopper (*Halticus bracteatus*) (Bennett and Costa, 1961), the pea leafminer (*Liriomyza huidobrensis*) (Costa eF. 1958), the beet leafhopper (*Circulifer tenellus*), onion thrips (*Thrips tabaci*) (Hardy and Teakle, 1992) and the mirid (*Cyrtopeltis nicotianae*) (Gibb and Randles, 1988). It is transmitted in a non-persistent manner.
[933] There are a few strains, most of which do not seem to infect *Rubus* spp.
[934] Several insects have been proposed as vectors for the virus, including the green peach aphid (*Myzus persicae*), the garden fleahopper (*Halticus bracteatus*) (Bennett and Costa, 1961), the pea leafminer (*Liriomyza huidobrensis*) (Costa et al., 1958), the beet leafhopper (*Circulifer tenellus*), onion thrips (*Thrips tabaci*) (Hardy &Teakle, 1992) and the mirid (*Cyrtopeltis nicotianae*) (Gibb and Randles, 1988). It is transmitted in a non-persistent manner.
[935] There are a few strains, most of which do not seem to infect *Rubus* spp.
[936] Vectored by *Amphorophora idaei* and *Amphorophora agathonica*.
[937] This virus causes minor symptoms on its own but is a major component of the complex that causes raspberry vein-banding mosaic disease, which severely affects plant vigour and yield.
[938] Vectored by *Amphorophora idaei* and *Amphorophora agathonica*.
[939] This virus causes minor symptoms on its own but is a major component of the complex that causes raspberry vein-banding mosaic disease, which severely affects plant vigour and yield.
[940] Vectored by the two exotic nematode species, *Xiphinema diversicaudatum* and *X. coxi*. Has been reported once on rhubarb in South Australia. However, there have been no records of this virus in Australia ever since and its natural vector is absent from Australia and it is considered eradicated.
[941] Has established successfully in many countries in environments similar to Australia; has a wide host range and can be asymptomatic in hosts, providing time to establish in new areas.
[942] Causes no obvious symptoms on its own, but can cause severe symptoms in combination with other viruses.
[943] Vectored by the two exotic nematode species, *Xiphinema diversicaudatum* and *X. coxi*. Has once been reported in rhubarb in South Australia. However, there have been no records of this virus in Australia ever since and its natural vector is absent from Australia and it is considered eradicated.
[944] Virus requires aphid vectors for transmission; not transmitted by contact between plants, by pollen or through seed.
[945] Vectored by *Amohorophora agathonic. A. parviflori, Macrosiphum davidsonii* and *M. maxima*.
[946] Virus requires aphid vectors for transmission; not transmitted by contact between plants, by pollen or through seed.
[947] Vectored by *Amohorophora agathonic. A. parviflori, Macrosiphum davidsonii* and *M. maxima*.
[948] Mechanical inoculation such as grafting, seed, or by pollen to the pollinated plant. The impact of the virus depends on virus isolate, plant genotype, and environmental conditions.
[949] Vectored by *Longidorus attenuatus* and *L. elongadus*.
[950] The calculation of the overall impact both with and without nematode vectors is very low.
[951] Detected once in SA, considered eradicated.
[952] Legally imported strawberries are tested for this virus in PEQ so the entry risk is reduced. Can be symptomless on many hosts.
[953] Response to infection varies according to cultivar and duration of infection. Between 10 and 80 per cent of raspberry canes are reported to be partially or completely killed three years after becoming infected.
[954] *Wineberry latent virus* has a complicated, unclarified relationship with blackberry calico disease.
[955] Originally isolated from a single symptomless plant but has been found subsequently in *Rubus* spp. with blackberry calico symptoms. Not listed by the International Committee on Taxonomy of Viruses.
[956] *Wineberry latent virus* as a complicated, unclarified relationship with blackberry calico disease.
[957] Originally isolated from a single symptomless plant but has been found subsequently in *Rubus* spp. with blackberry calico symptoms. Not listed by the International Committee on Taxonomy of Viruses.

Berry Sector Biosecurity Reference Panel meeting #5 minutes
20th October 2025 10:30am-1:00pm (AEDT)

Attendees	**Stephen Quarrell** Plant Health Australia (Chair) **Rebecca Powderly** Plant Health Australia (secretariat) **Angela Atkinson** Berries Australia **Elisse Nogarotto** Department of Energy, Environment and Climate Action (Victoria) **Gaius Leong** Department of Primary Industries and Regional Development (NSW) **Grace Lamont** Fruit Growers Tasmania **Joanne Mackie** Department of Energy, Environment and Climate Action (Victoria) **Leonie Martin** Department of Primary Industries and Regional Development (NSW) **Simon Neil** Berries Australia **Wendy Morris** Berries Australia **Zac Hemmings** Department of Primary Industries and Regional Development (NSW)
Apology	**Nichole Hammond** Department of Primary Industries and Regional Development (WA) **Shannon Mulholland** Department of Primary Industries and Regional Development (NSW) **Tonya Wiechel** Department of Energy, Environment and Climate Action (Victoria)
Others invited	**Angela Monks** Department of Natural Resources and Environment (Tasmania) **Chris Pittock** Department of Energy, Environment and Climate Action (Victoria) **David Cousins** Department of Primary Industries and Regional Development (WA) **Fiona Constable** Department of Energy, Environment and Climate Action (Victoria) **Joshua Fanning** Department of Energy, Environment and Climate Action (Victoria) **Kyla Finlay** Department of Energy, Environment and Climate Action (Victoria) **Mee-Yung Shin** Department of Energy, Environment and Climate Action (Victoria) **Melinda Simpson** Department of Primary Industries and Regional Development (NSW) **Paul Cunningham** Department of Energy, Environment and Climate Action (Victoria) **Rachel Mackenzie** Berries Australia **Sandy Shaw** Berries Australia

The meeting commenced at 10:30am.

1. **Welcome and Introductions**
2. **An explanation of the Biosecurity Plan (BP) and Biosecurity Reference Panel (BRP) meeting processes**

The Chair – Stephen Quarrell, welcomed the meeting. It was noted that this is the fifth and final BRP meeting of the Berry Sector Biosecurity Plan project.

3. **Report on Actions from previous Reference Panel Meeting**

The previous BRP meeting's actions were reviewed and accepted by the meeting participants. Action items from the previous meetings that were still in progress were addressed.

Action	Responsibility	Update
PHA to contact Scott Mattner from VSICA research regarding *Macrophomina vaccinii*.	PHA	The Chair noted that he had made attempts to contact Scott Mattner following the previous BRP. Angela Atkinson will follow up with Scott out of session (**Action**).

4. Review the High Priority Pest (HPP) list, Preparedness table and discuss Other Pests of Biosecurity Significance table.

The meeting discussed the HPP list and noted that as *Xylella* spp. has various subspecies impacting a variety of host plants with multiple vectors. Over multiple years of industry Biosecurity Plan development, some entry, establishment and spread ratings have resulted in minor differences as new information becomes available.

Action: PHA will cross-reference *Xylella* spp. ratings in the Berry Biosecurity Plan with other industries. A footnote will also be included to acknowledge the complexities of native vectors in Australia.

Gaius Leong noted that some growers in NSW had major mite damage on their crops and *Acalitus vaccinii* was suspected to be the cause. *A. vaccinii* has not been found in Australia but is a concern for the industry. The current overall risk rating of *A. vaccinii* is Medium.

Action: PHA to investigate *A. vaccinii* further and determine if the economic risk rating should be increased.

Zac Hemmings asked if Oriental fruit fry was in the Threat Summary Table for any of the berry industries. It was noted that this species is not in the TST for any of the three berry industries.

Action: PHA to investigate if any berry crops are a host for Oriental fruit fly.

The meeting discussed the Preparedness Table.

Japanese beetle – Members of the BRP were unsure if surveillance of bumblebees in Victoria was ongoing.

Action: Elisse Nogarotto to follow up on if bumblebee surveillance is still active in Victoria using Japanese beetle lures.

Spotted Winged Drosophila (SWD) – Angela Atkinson noted that previous work done by Cesar on SWD is no longer available online.

Action: PHA to investigate if these SWD resources can be located and send findings to Angela Atkinson.

The meeting discussed the Other Pests of Biosecurity Significance table. Green snail (*Cantareus apertus*) and Late leaf rust (*Aculeastrum americanum*) were identified as potentially having state movement controls impacting the movement of berries domestically. It was also noted by Wendy Morris that some established pests and diseases are self-managed by growers to control localised spread, however, these are not official movement restrictions.

Action: PHA to investigate movement controls of Green snail and Late leaf rust and add these species to this table if relevant.

The Australian distribution of *Macrophomina phaseolina* was discussed, it was noted that *M. phaseolina* may not be in Tasmania. It was also noted that in Victoria surveys have been done to determine the spread at a localised level. While there are no formal movement restrictions, growers implement movement restrictions to minimise local spread.

Action: PHA to investigate if *M. phaseolina* is present in Tasmania.

Angela Atkinson asked if Varroa mite is included on the Other Pests of Biosecurity Significance table and it was explained that Varroa mite was only included in the honey bee Biosecurity Plan. Other biosecurity plans have included information, where relevant, on pollination pests.

Action: PHA to send Angela Atkinson Varroa mite information to determine if it is relevant information for the Biosecurity Plan.

The inclusion of Red Imported Fire Ant (RIFA) was also discussed and was agreed upon to be added to the Other Pests of Biosecurity Significance table.

Action: PHA to add RIFA into the Other Pests of Biosecurity Significance table.

5. Review the Biosecurity Action Plan

The BRP discussed the Action Plan, actions with no changes were taken as read. The below actions with changes required have been recorded in the updated Action Plan.

Action 1.2 – It was noted by Angela Atkinson that the Food Standards Australia New Zealand (FSANZ) updates have been implemented in Victoria and WA at a local council level is also progressing. It was also noted by Gaius Leong that ~90% of growers in NSW are Freshcare certified.

Action: Angela Atkinson to follow up on the progress of NSW to implement the updated standards.

Action 1.3 – Confirmation is required regarding Spotted Winged Drosophila (SWD) surveillance.
Action: PHA to contact Paul Cunningham or Tim Hurst to confirm if this surveillance is still ongoing.

Action 1.5 – Added activity that Angela Atkinson participated in the planning exercise for *Xylella fastidiosa* held in Mildura in September 2025.

Action 1.7 – Angela Atkinson noted that Curtin University in WA has ongoing research on botrytis fungicide resistance in berries following a project conducted in 2021-2022.[1]
The Chair also highlighted the Arthropod Pesticide Resistance Database (APRD), published by Michigan State University, as an additional resource.[2]

Action 1.8 – Further activities were expanded on including acknowledging grower managed fruit fly surveillance on farm, particularly in Victoria. Angela Atkinson also noted that a Hort Frontiers funded project on area-wide management of Queensland fruit fly (Q-fly) may also be receiving additional funding, this is still to be determined.

Action 1.9 – Added that Subcommittee on Plant Health Diagnostics (SPHD) have also been investigating non-Australian National Diagnostic Protocol (NDP) equivalents, however this process may still be ongoing.

Action 2.1 – Added that new Industry Development Officers (IDOs) hired by Berries Australia will be undertaking Industry Liaison Officer (ILO) training.

Action 2.2 – Added that a variation to RB21000 is being considered to include additional funding to investigate IPM control of bronze leaf beetle in Rubus.
Added a Hort Frontiers project lead by QDPI on the use of UV-C to control powdery mildew in crops.
Added Hort Innovation project - Improving management of chilli thrips in blueberry and Rubus (MT24009).[3]
Angela Atkinson noted that a Hort Innovation project MT24009 is addressing *Scirtothrips dorsalis* (introduced).

Action 2.3 – Leoni Martin noted that NSW DPIRD are hosting two Xylella focussed workshops in December 2025.

Action 3.2 – Added that in addition to ongoing articles on HPPs of berries being released by NSW DPIRD, the latest Berry plant protection guide 2025-26 has been published.

Action 3.3 – Added that new entrants are engaged via newsletters, articles on the Berries Australia website and other outputs from the Berries Australia marketing and communications team.
Action 5.2 – Added project codes to this action to acknowledge business-as-usual activities including MT24009[4], MT23003[5], MT18004[6].

[1] https://berries.net.au/wp-content/uploads/2025/03/ABJ-Ed22-Autumn-2025-STR-Western-Australian-Botrytis-fungicide-resistance-study.pdf
[2] https://www.pesticideresistance.org/index.php
[3] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt240092/
[4] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt240092/
[5] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt23003/
[6] https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt18004/

6. Workshop – Berry Sector Biosecurity Future Needs

As this is the final BRP of the Review of the biosecurity plan for the berry sector (MT18004) project, the meeting discussed the priorities of the berry sector from 2026 and beyond. As the Biosecurity Plan for the berry sector encompasses the three berry industries, the Threat Summary Table (TST) and therefore HPP lists are larger than those developed for a single industry.

The meeting discussed the implications of an HPP entering Australia and a potential response options. It was noted by the Chair that a pest or pathogen's HPP status does not impact the categorisation of an Emergency Plant Pest (EPP) under the Emergency Plant Pest Response Deed (EPPRD). The identification of HPPs from the wider TST allows the Peak Industry Body to prioritise funding into research, development of preparedness resources and raise awareness of major threats to the broader industry.

Future needs of the berry sector included:

- Due to industry concerns regarding their ability to sustainably fund incursion Response Plans, a review of the HPP's eradication likelihood based on their biology etc. is needed. This was deemed a priority. This information would be used in the event of an incursion by Berries Australia representatives within the CCEPP and the NMG to determine Berries Australia's support and/or investment in future responses.
- The development of Biosecurity Incident Standard Operating Procedure (BISOP) is urgently needed to assist Berries Aust. during future incursions.
- Owner Reimbursement Cost (ORC) frameworks need to be developed. It was noted that work had commenced on the Rubus ORC framework during the Varroa incursion, but this has yet to be finalised and an ORC framework for strawberries has not been developed. Due to funding constraints with the blueberry industry, ORCs are unlikely to be developed.
- Updating the Rubus and strawberry elements of the Biosecurity Plan developed in 2020, to bring them in line with PHA's revised data standards there were used within the blueberry TST development in 2024.
- Exotic pest management review documents that provide understanding of how HPPs are managed internationally to improve industry resilience to future incursions and streamline any future post-incursion Transition to Management activity.
- Strategic Agrichemical Review Process (SARP) focussing on exotic species was also highlighted as key area of focus for the berry sector to enable rapid Emergency and Minor use Permit development during and post incursion. This activity could leverage information gathered during the Exotic Pest Management reviews.
- Industry Liaison Officer training for all IDOs as some have yet to undergo this training. PHA delivers ILO training to signatories of the EPPRD free of charge.

Additionally, it was noted by Angela Atkinson that Berries Australia is currently in the process of developing a MoU with PHA to direct PHA-levy funds to biosecurity activities. The activities that will be included within the MoU have yet to be determined.

7. Other Business

It was noted by the Chair that this is the final BRP meeting of the project. The Chair thanked the BRP members for their continued contribution and dedication to the Biosecurity Plan for the berry sector.

8. Close

Meeting closed at 12:55 pm.

TABLE OF ACTIONS FROM MEETING

Action	Responsibility	Status (31/10/25)
Angela Atkinson to follow up with Scott Mattner regarding research on *Macrophomina vaccinii*.	Angela Atkinson (Berries Australia)	Ongoing.
PHA will cross-reference Xylella spp. ratings in the Berry Biosecurity Plan with other industries. A footnote will also be included to acknowledge the complexities of native vectors in Australia	Plant Health Australia (PHA)	Complete – Historical ratings of *Xylella* spp. have varied as new information is published. A footnote has also been incorporated.
PHA to investigate *A. vaccinii* further and determine if the economic risk rating should be increased.	Plant Health Australia (PHA)	Complete – rating has been amended to High. This is reflective of the footnotes included in the TST. The overall risk rating remains as Medium.
PHA to investigate if any berry crops are a host for Oriental fruit fly.	Plant Health Australia (PHA)	Complete – Research indicates that members of the Fragaria, Rubus and Vaccinium species are not preferred hosts of Oriental fruit fly[7],[8]. Incidences of infestation have been observed in no-choice experiments[9].
Elisse Nogarotto to follow up on if bumblebee surveillance is still active in Victoria using Japanese beetle lures.	Elisse Nogarotto (AgVic)	Complete – AgVic continue to conduct routine surveillance for bumblebees using the Japanese Beetle lures.
PHA to investigate if these SWD resources can be located and send findings to Angela Atkinson.	Plant Health Australia (PHA)	Complete – Information has been forwarded to Angela Atkinson (22/10/25).
PHA to investigate movement controls of Green snail and Late leaf rust and add these species to this table if relevant.	Plant Health Australia (PHA)	Complete – Movement restrictions are in place for Green snail, this has been added as a listing to the Other Pest of Biosecurity Significance table. No restrictions were found for Late leaf rust.
PHA to investigate if *M. phaseolina* is present in Tasmania.	Plant Health Australia (PHA)	Complete - *M. phaseolina* doesn't appear to be found in Tasmania, geographic distribution has been updated.
PHA to send Angela Atkinson Varroa mite information to determine if it is relevant information for the Biosecurity Plan.	Plant Health Australia (PHA)	Complete – Information has been forwarded to Angela Atkinson (22/10/25).
PHA to add RIFA into the Other Pests of Biosecurity Significance table.	Plant Health Australia (PHA)	Complete.
Angela Atkinson to follow up on the progress of NSW to implement the updated standards.	Angela Atkinson (Berries Australia)	Ongoing.
PHA to contact Paul Cunningham or Tim Hurst to confirm if SWD surveillance is still ongoing.	Plant Health Australia (PHA)	Complete – Confirmed that surveillance is still ongoing (31/10/25).

[7] https://www.aphis.usda.gov/sites/default/files/off-hostlist.pdf
[8] https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/ddi.13172
[9] https://academic.oup.com/jee/article-abstract/104/2/566/2199637