Biosecurity Plan for the Sugarcane Industry

A shared responsibility between government and industry

Version 4.0 March 2025

Plant Health AUSTRALIA

CANEGROWERS

Sugar Research Australia

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In referencing this document, the preferred citation is:

Plant Health Australia Ltd 2024 Biosecurity Plan for the Sugarcane Industry (Version 4.0 – 2025) Plant Health Australia, Canberra, ACT.

This project has been funded by AgriFutures using contributions from the Australian Government.

Disclaimer:

Revision history

VERSION NUMBER	DATE	DETAILS
1.0	June 2004	National Sugarcane Industry Biosecurity Plan
2.0	June 2009	Industry Biosecurity Plan for the Sugarcane Industry
3.0	May 2016	Biosecurity Plan for the Sugarcane Industry
4.0	March 2025	Biosecurity Plan for the Sugarcane Industry

Acknowledgements

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

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

Endorsement

The *Biosecurity Plan for the Sugarcane Industry Version 4* was formally endorsed by the Australian sugar industry through Canegrowers and members of the Sugar Industry Biosecurity Committee (SIBC) in November 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 58 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, Fisheries and Forestry (DAFF) 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.

IF YOU SEE ANYTHING UNUSUAL,
CALL THE EXOTIC PLANT PEST HOTLINE
1800 084 881

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LIST OF ACRONYMS

AARSC	Applied Agricultural Remote Sensing Centre
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ACFA	Australian Cane Farmers Association (note ACFA is now QCAR)
ACIAR	Australian Centre for International Agricultural Research
ACPPO	Australian Chief Plant Protection Office
APC	AUSPest*Check*®
APVMA	Australian Pesticides and Veterinary Medicines Authority
ASMC	Australian Sugar Milling Council
AS/NZS	Australian Standard/New Zealand Standard
BICON	Australian Biosecurity Import Conditions Database
BIG	Biosecurity Implementation Group
BRG	Biosecurity Reference Group (now Biosecurity Reference Panel)
BIRA	Biosecurity Import Risk Analysis
BISOP	Biosecurity Incident Standard Operating Procedure
BMP	Best Management Practise
BOLT	Biosecurity On-Line Training
BP	Biosecurity Plan
BRP	Biosecurity Reference Panel
CABI	Centre for Agriculture and Bioscience International
CCEPP	Consultative Committee on Emergency Plant Pests
CPHM	State Chief Plant Health Manager
DAF Qld	Department of Agriculture and Fisheries, Queensland (now DPI QLD)
DAF NT	Department of Agriculture and Fisheries, Northern Territory
DAFF	Department of Agriculture, Fisheries and Forestry
DAWE	Department of Agriculture, Water and the Environment (now DAFF)
DEECA	Department of Energy, Environment and Climate Action, Victoria
DJPR	Department of Jobs, Precincts and Regions, Victoria (now DEECA)
DNRET	Department of Natural Resources and Environment, Tasmania (now NRE Tas)
DPI QLD	Department of Primary Industries, Queensland
DPI NSW	Department of Primary Industries, New South Wales (now DPIRD NSW)
DITT NT	Department of Industry, Tourism and Trade, Northern Territory (now DAF NT and DTBAR NT)
DPIRD NSW	Department of Primary Industries and Regional Development, New South Wales
DPIRD	Department of Primary Industries and Regional Development, WA
DTBAR NT	Department of Trade, Business and Asian Relations, Northern Territory
EPP	Emergency Plant Pest
EPPO	European and Mediterranean Plant Protection Organization
EPPR	Emergency Plant Pest Response
EPPRD	Emergency Plant Pest Response Deed
FAO	Food and Agriculture Organization of the United Nations
GBO	General Biosecurity Obligation
HACCP	Hazard Analysis Critical Control Point

HPP	High Priority Pest
ICA	Interstate Certification Assurance
IGAB	Intergovernmental Agreement on Biosecurity
ILC	Industry Liaison Coordinator
ILO	Industry Liaison Officer
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
LLC	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
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
PIF	Plant Industry Forum
PIFC	Plant Industry Forum Committee
PIRSA	Primary Industries and Regions South Australia
QA	Quality Assurance
QCAR	Queensland Cane, Agriculture & Renewables
QLD	Queensland
QCGO	Queensland Cane Growers Organisation LTD
R&D	Research and Development
RDC	Research and Development Corporation
RD&E	Research, Development and Extension
RVC	Regional Variety Committee
SA	South Australia
SARDI	South Australian Research and Development Institute
SDQMA	Subcommittee for Domestic Quarantine and Market Access (now SMART)
SIBC	Sugar Industry Biosecurity Committee (formed to meet annually for the life of each Biosecurity Plan to review its relevance and implementation)
SMART	Subcommittee on Market Access, Risk and Trade

SNPHS	Subcommittee for Plant Health Surveillance
SPHD	Subcommittee on Plant Health Diagnostics
SPS	Sanitary and Phytosanitary
SRA	Sugar Research Australia
T2M	Transition to Management
TBA	To be announced
TEG	Technical Expert Group (now Technical Review Panel)
TRP	Technical Review Panel
TST	Threat Summary Table
VIC	Victoria
WA	Western Australia
WTO	World Trade Organization

DEFINITIONS

The definition of a plant pest used in this document includes insects, mites, snails, nematodes or pathogens (diseases) that have the potential to adversely affect food, fibre, ornamental crops, bees and stored products, as well as environmental flora and fauna. Exotic pests are those not currently present in Australia. Established 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 should have a High or Extreme overall rating through the Biosecurity Planning process. For more information on risk ratings please refer to page 34.

EXECUTIVE SUMMARY

To safeguard the viability and sustainability of the Australian sugarcane industry, it is important to minimise the risks posed by exotic pests and respond effectively if an incursion does occur. This plan identifies and prioritises exotic plant pests (not currently present in Australia) and established pests of biosecurity concern that could have a significant impact on Australian sugar production and trade. It also provides the Australian sugar industry, governments and other stakeholders with a framework for future biosecurity activities and RD&E investment.

The *Biosecurity Plan for the Australian Sugar Industry (version 4.0)* was developed in consultation with the Sugar Industry Biosecurity Committee (SIBC) and the Biosecurity Reference Panel (BRP), the latter which was formerly referred to as the Sugar Technical Expert Group (TEG). These industry and biosecurity experts were coordinated by Plant Health Australia (PHA) and included representatives from Canegrowers, Australian Sugar Milling Council, Sugar Research Australia, relevant state and territory agencies representing a mixture of plant health and biosecurity experts and industry representatives.

The development of Threat Summary Tables (TST), which constitutes a list of 475 exotic plant pests (invertebrate pests and pathogens) and reviews each species' potential threat that to the sugar industry, was key to the industry biosecurity planning process. Each pest listed was given an overall risk rating based on four criteria; entry potential, establishment potential, spread potential and economic impact. In this biosecurity plan, other pests of biosecurity significance were also identified as good biosecurity practice is beneficial for the ongoing management and surveillance for these pests.

The Biosecurity Plan also details current mitigation and surveillance activities being undertaken and identifies contingency plans, fact sheets and diagnostic protocols that have been developed for the High Priority Pests of the industry. This enables identification of gaps and prioritises specific actions, as listed in the Biosecurity Action Plan. Accomplishment of the strategic activities listed within the Action Plan will improve the industry's biosecurity preparedness and response capability by outlining specific areas of action which could be undertaken through government and industry partnership.

This biosecurity plan is principally designed for decision makers. It provides the industry and government with a mechanism to identify exotic plant pests as well as to address the strengths and weaknesses of the industry's current biosecurity position. It is envisaged that annual reviews of the *Biosecurity Plan* will be undertaken to assess progress against agreed activities, with another formal review conducted in in the future.

The biosecurity plan is a document outlining the commitment to the partnership between the industry and government to improve biosecurity for both the Australian sugarcane industry, and Australia more broadly.

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 37 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 sugarcane industry, 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.

Ensuring the sugarcane industry has the capacity to minimise the risks posed by pests, and to respond effectively to any pest threats is a vital step for the future sustainability and viability of the industry. Through this pre-emptive planning process, the industry will be better placed to maintain domestic and international trade and reduce the 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 sugarcane ndustry is free from specific pests and has systems in place to control and manage biosecurity risks, which assists the negotiation of access to new overseas markets.

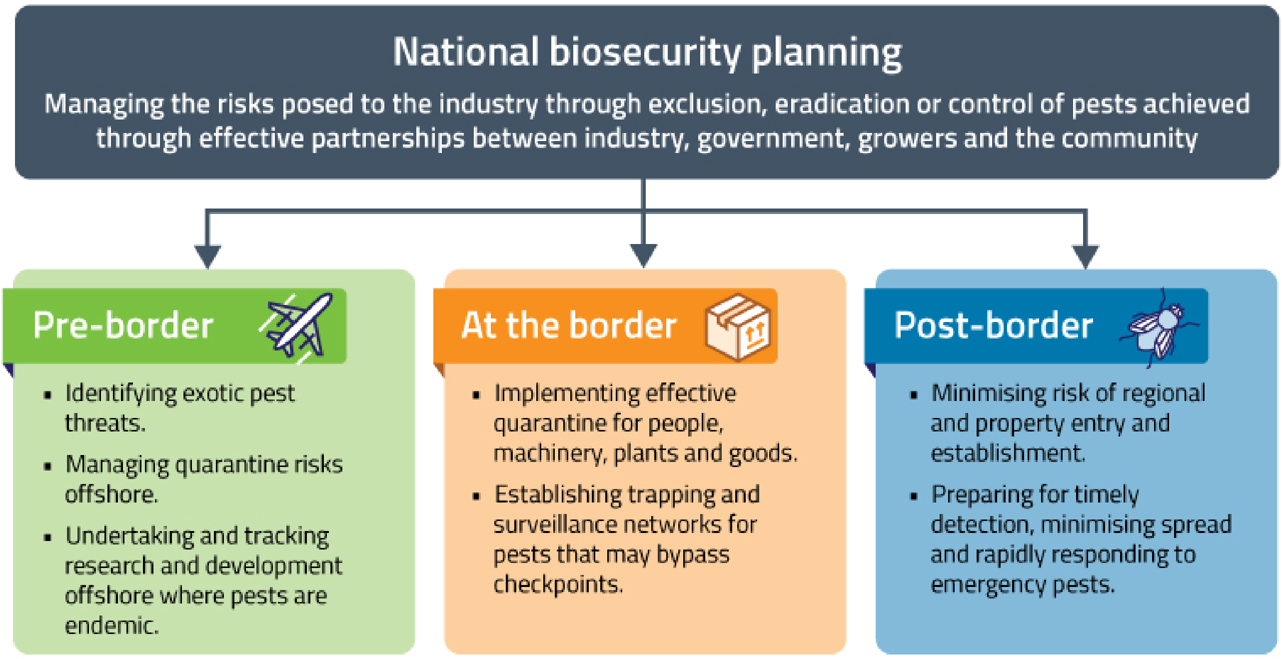

Figure 1. *Industry biosecurity: a shared responsibility.*

SUGARCANE INDUSTRY PROFILE

In the development of this Biosecurity Plan, it is important to understand the profile and context of the sugarcane industry to ensure that the plan can accurately detail relevant industry plant pests and provide the basis for improved preparedness and effective mitigation responses to exotic and established biosecurity threats.

The Australian sugar industry produces raw and refined sugar from sugarcane. In 2022-2023, the Australian Bureau of Statistics estimated 330,000 hectares of sugarcane were grown and 32.6 million tonnes of sugarcane was sold for processing in Australia, with a local value of $1.5 billion (AUD) (ABS 2022-2023). In 2023, the Australian Sugar Milling Council (ASMC) reported that 29.86 million tonnes of cane was crushed, and 4.128 million tonnes of sugar was produced in Australia (ASMC 2023).

Export Markets

Australia is the second largest raw sugar exporter in the world, with over 80% of sugar produced within Australia exported as bulk raw sugar (DAFF 2023). Key export markets include South Korea, Indonesia, Japan and Malaysia (DAFF 2023). In 2023, the Australian Sugar Milling Council (ASMC) valued sugar exports at $2.1 million (AUD) (ASMC 2023).

Key Production Areas

The key production areas for the Australian sugar industry are based along the coastal plains and river valleys on 2,100 km of the eastern coastline between Mossman in far north Queensland and Grafton in northern New South Wales (Figure 2).

Figure 2. *Map of sugarcane farming areas, sugar mills, sugar refineries and bulk sugar terminal ports within Australia (Sugar Nutrition Resource Centre, 2016).*

According to the Australian Bureau of Statistics, as of 2023, Queensland accounts for 96% of sugarcane production in Australia, with the remaining 4% produced in New South Wales (ABS 2022-2023).

In 2023, Queensland represented 85% of Australian sugarcane producing businesses and yielded 31.3 million tonnes of sugarcane sold for processing (ABS 2022-2023). Burdekin in Queensland was the largest sugarcane producing SA2[1] region, with 7.6 million tonnes sold (ABS 2022-2023).

An independent analysis carried out by Australian Sugar Milling Council and Lawrence Consulting determined the Queensland sugar industry contributed $3.8 billion in Gross Regional Product and 19,673 direct and indirect jobs to the Queensland economy in 2020-21 (ASMC 2021a; ASMC 2021b).

Sugarcane Biosecurity Zones

The Australian sugarcane industry has established several biosecurity zones (SBZs) in Queensland and New South Wales to restrict the movement of machines and plant material between production areas (Figure 3). These restrictions exist to stop the entry, establishment and spread of unwanted pests, diseases and weeds which could have a detrimental impact on the industry and Australian sugarcane production.

Sugarcane plant material, which is defined as stalks, billets, leaves, tissue culture plantlets and potted plants, is not permitted to move between different sugarcane biosecurity zones without appropriate biosecurity certificates (SRA 2023).

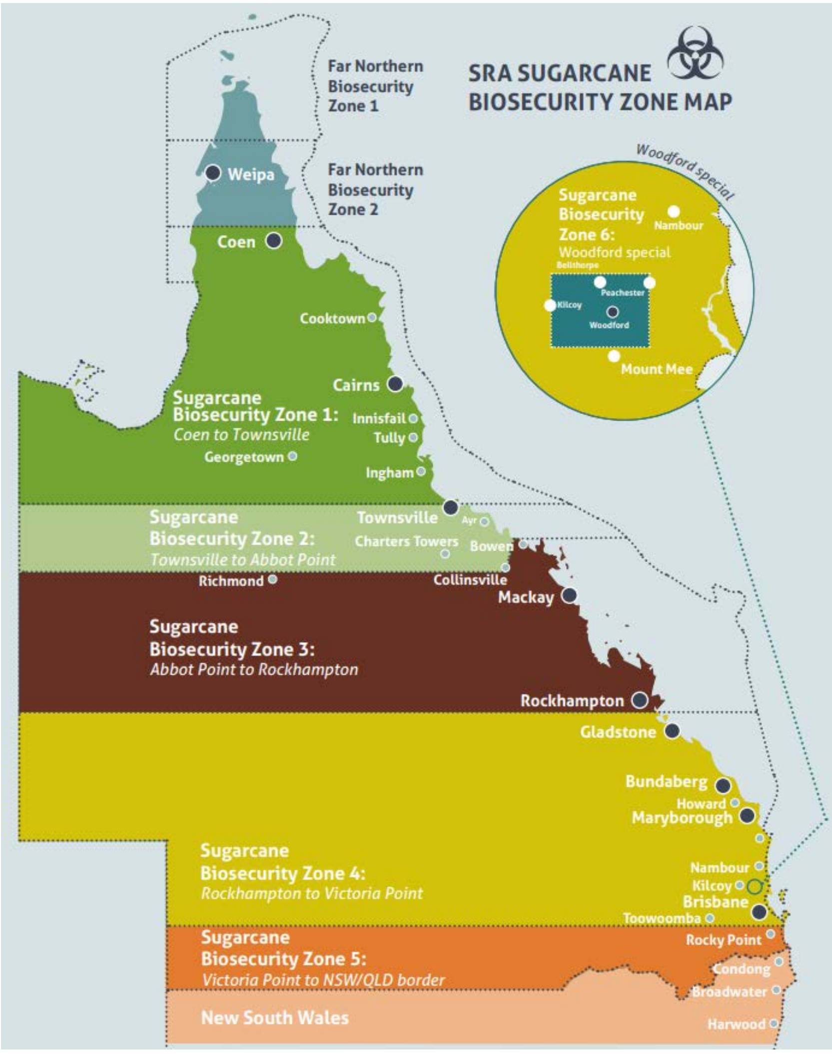

Figure 3. *Sugarcane Biosecurity Zone Map (SRA, 2023).*

[1] Australian Statistical Geography Standard Statistical Area Level 2.

Sugarcane Variety Development

There are two major species of commercial importance from which modern commercial sugarcane varieties are derived, *Saccharum officinarum* and *Saccharum spontaneum*, the latter which is a wild relative used in breeding programs (CSIRO 2024).

Sugar Research Australia (SRA), the research organisation which represents the Australian sugarcane industry, continues to employ conventional sugarcane breeding and selection processes that involve plant molecular and functional biology alongside transgenic technology to develop new varieties to maximise industry profitability for sugarcane production (SRA 2024a). SRA utilises its extensive germplasm collection to select suitable parent plants possessing valuable traits for cross-pollination, with over 2000 crosses made annually at the Meringa breeding station (SRA 2024a). Guides to currently available varieties are produced on an annual basis and are available on the SRA website[2].

The release of new sugarcane varieties is managed by Regional Variety Committees (RVCs), of which six exist within Australia (5 in Queensland and 1 in New South Wales) (SRA, 2024) (Table 1). A major role of RVCs is to maintain a list of varieties recommended within each sugarcane biosecurity zone (SBZ) (SRA 2024a; SRA 2024b).

Table 1. *List of Regional Variety Committees in Australia.*

REGIONAL VARIETY COMMITTEE (RVC)	SUGARCANE BIOSECURITY ZONE	LOCATION
Northern	1	Coen to Townsville (Queensland)
Herbert	1	Coen to Townsville (Queensland)
Burdekin	2	Townsville to Abbot Point (Queensland)
Central	3	Abbot Point to Rockhampton (Queensland)
Southern	4	Rockhampton to Victoria Point (Queensland)
	5	Victoria Point To NSW/Qld border (Queensland)
New South Wales		

Source: (SRA 2024b)

[2] https://sugarresearch.com.au/growers-and-millers/varieties/

Industry Affiliations

CANEGROWERS

Formed in 1925, the Australian Cane Growers Council Limited, also known as CANEGROWERS, represents approximately 80% of Australian sugarcane growers and is the peak industry body and Plant Health Australia (PHA) representative organisation for the sugarcane industry. Based in Queensland, the state that produces around 96% of Australia's raw sugar, CANEGROWERS' vision is to ensure a secure and profitable future for Australian sugarcane growers (ABS, 2022-2023; CANEGROWERS, 2024).

Sugar Research Australia **(SRA)**

Formed in 2013 as a sugarcane grower and miller owned company, Sugar Research Australia (SRA) is the Industry Services Body and research organisation for the Australian sugarcane industry (SRA 2024c). SRA is an amalgamation of the former Sugar Research and Development Corporation (SRDC) and Bureau of Sugar Experiment Stations (BSES) (SRA 2024c). It is primarily funded through the statutory sugarcane levy paid equally by sugarcane growers and millers, as well as through co-contributions from the Commonwealth Government and grants through other government agencies including the Queensland Department of Agriculture and Fisheries (QDAF) (SRA 2024c). SRA invests in and manages a portfolio of research, development and adoption (RD&A) projects that drive productivity, profitability and sustainability for the Australian sugarcane industry (PHA 2024). The SRA website has information and advice on varieties of sugarcane, farming systems (including soil health and nutrient management), current research programs, pests, diseases and weeds (SRA 2022).

Australian Sugar Milling Council (ASMC)

Founded in 1987, the Australian Sugar Milling Council (ASMC) represents Australia's raw sugar manufacturers and exporters and is an advocate for a range of policy, regulatory and legislative topics that affect the sugar value chain (Queensland Government 2024). The Council began in 1907 as part of an association of farmers and millers called the Australian Sugar Producers Association (Queensland Government 2024). In 1988, the milling and farming contingents of the Association split to become the Australian Sugar Milling Council and Australian Cane Farmers Association (ACFA), respectively (Queensland Government 2024).

Productivity Services

Productivity Services are regional organisations that provide clean seed, services to prevent pest and disease spread and extension advice to growers within each sugarcane district. In most districts, Productivity Services staff have been trained to provide machinery inspections and approvals to move machinery between sugarcane biosecurity zones (PHA 2024).

Grower Collectives

Formed in 1926, Queensland Cane, Agriculture & Renewables (QCAR) is a grower collective that represents Australian sugarcane growers and advocates for sustainable and profitable industry outcomes for members (QCAR 2024).

DOCUMENT OVERVIEW

The Biosecurity Plan for the sugar industry focuses on seven key areas and identifies a range of biosecurity related activities that could be implemented over the life of the Biosecurity Plan (2024-2029) to improve the cane industry's biosecurity preparedness.

1. High Priority Pests and Exotic Pests to Monitor

As part of the Biosecurity Plan's development, a list of all known exotic pests of sugarcane was compiled based on available information, research and scientific expertise provided by industry and government members of the Technical Review Panel (TRP). This list is referred to as the Threat Summary Table (TST) which can be found in 'Appendix 1: Threat Summary Tables' on page 84. The potential biosecurity threat posed by each exotic pest in the TST, summarised as the overall risk rating, was assigned through a process of qualitative risk assessment, covered in detail in the section 'THREAT IDENTIFICATION AND PEST RISK ASSESSMENTS' on page 57. Overall risk was calculated based on the entry, establishment, spread potential and potential economic impact of the pest were it to enter Australia. Whilst entry, establishment and spread are expected to be the same across different industries for the same pest, the economic impact rating is industry specific and is based on evidence of yield loss, reported on sugarcane.

Of the pests in the TST, those with an overall risk rating of high or above were identified as High Priority Pests (HPP's) (Table 2), whilst those with an economic impact risk rating of high or above, but with an overall risk rating less than high, were identified as Exotic Pests to Monitor (EPM) (Table 3). Of the 475 pests in the TST, 29 (~6%) were identified as HPP's and 20 (~4%) were identified as EPM's. High Priority Pests have the potential to pose a significant threat to the Australian sugar industry. Whilst not sufficiently threatening to be considered HPP's, EPM's could cause economic harm to the industry if they were to enter Australian production regions and are therefore highlighted for industry awareness, particularly as risk factors such as geographic distribution and entry pathways may change over time which could elevate their risk profile. Hence, development of the HPP and EPM lists is a key outcome of this Biosecurity Plan as a mechanism to bolster industry preparedness against exotic pest and disease threats.

The identification of HPP's and EPM's will allow government to better prioritise and implement preparedness activities. 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

2. Other Pests of Biosecurity Significance

Another key outcome of this Biosecurity Plan is the identification of Other Pests of Biosecurity Significance for the Australian Sugar industry (Table 4). These are pests which are either currently under quarantine arrangements or which Sugarcane producers already manage. Identification of these pests supports mechanisms to 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.

To be considered as a pest of biosecurity significance, the pest should be economically important to the Sugarcane industry and meet at least one of the following criteria:

- 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 to prioritise investment but did not undergo a formal pest risk assessment.

3. Action Plan

Key to improving industry preparedness is the development of the biosecurity Action Plan (Table 6) which describes the shared biosecurity goals and objectives over the life of the Biosecurity Plan (2024-2029). The Action Plan was developed by a Biosecurity Reference Panel (BRP) comprised of both industry and government representatives. It is intended that the Biosecurity Action Plan is revisited by the BRP regularly to monitor its implementation and when necessary, adapt to changing circumstances.

4. Preparedness for the High Priority Pests

Understanding the current level of preparedness for HPP's of the Australian sugar industry is key to improving industry preparedness against exotic pest and disease threats.

Preparedness is documented in the context of available supporting documents, such as National Diagnostic Protocols (NDPs) and Contingency Plans, and current activities undertaken, such as surveillance (Table 7). This allows industry, governments and Research, Development and Extension (RD&E) agencies to better prepare for these HPPs and align future activities as listed in the Biosecurity Action Plan.

5. 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 sugarcane biosecurity pest threats considered in the biosecurity plan are detailed in Theat Summary Tables (TST) (Appendix 1: Threat Summary Tables) on page 84. From the prioritisation process undertaken in the TST, pests with an overall risk rating of high were identified as High Priority Pests (HPP's).

6. Risk Mitigation and Preparedness

This section provides a summary of activities to mitigate the impact of pest threats, 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.

7. Response Management

This section provides a summary of the processes in place to respond to emergency plant pest (EPP)[3] incursions that would affect the industry. Areas covered in this section include the Emergency Plant Pest Response Deed (EPPRD), PLANTPLAN (outlines the generic approach to response management under the EPPRD), categorisation of pests under the EPPRD and industry specific response procedures and industry communication.

[3] Refer to the PHA website for details planthealthaustralia.com.au/biosecurity/emergency-plant-pests/

PESTS OF BIOSECURITY SIGNIFICANCE OVERVIEW

A key output of this Biosecurity Plan is the identification of pests of biosecurity significance to the Australian sugar industry. These include key exotic pests of the Australian sugar industry, represented by the HPP's and EPM's, as well as 'Other Pests of Biosecurity Significance', which are those currently under quarantine arrangements or already being managed by Sugarcane producers. These pest lists were developed in consultation with industry and government stakeholders and provide information to aid prioritisation of resources for biosecurity risk management.

Of the 472 exotic pests identified in the TST, 29 (~6%) were identified as HPP's and 20 (~4%) were identified as EPM's. The orders Coleoptera (beetles), Lepidoptera (moths and butterflies) and Hemiptera (bugs) were the highest represented orders among the identified exotic pests (**Error! Reference source not found.**). The orders Lepidoptera and Hemiptera were the highest represented orders of those listed as HPP's, whilst the order Lepidoptera was the highest represented order of those listed as EPM's (**Error! Reference source not found.**). Exotic pests identified as HPPs and Exotic Pests to Monitor are listed in Table 2 on page 10 and Table 3 on page 22, respectively.

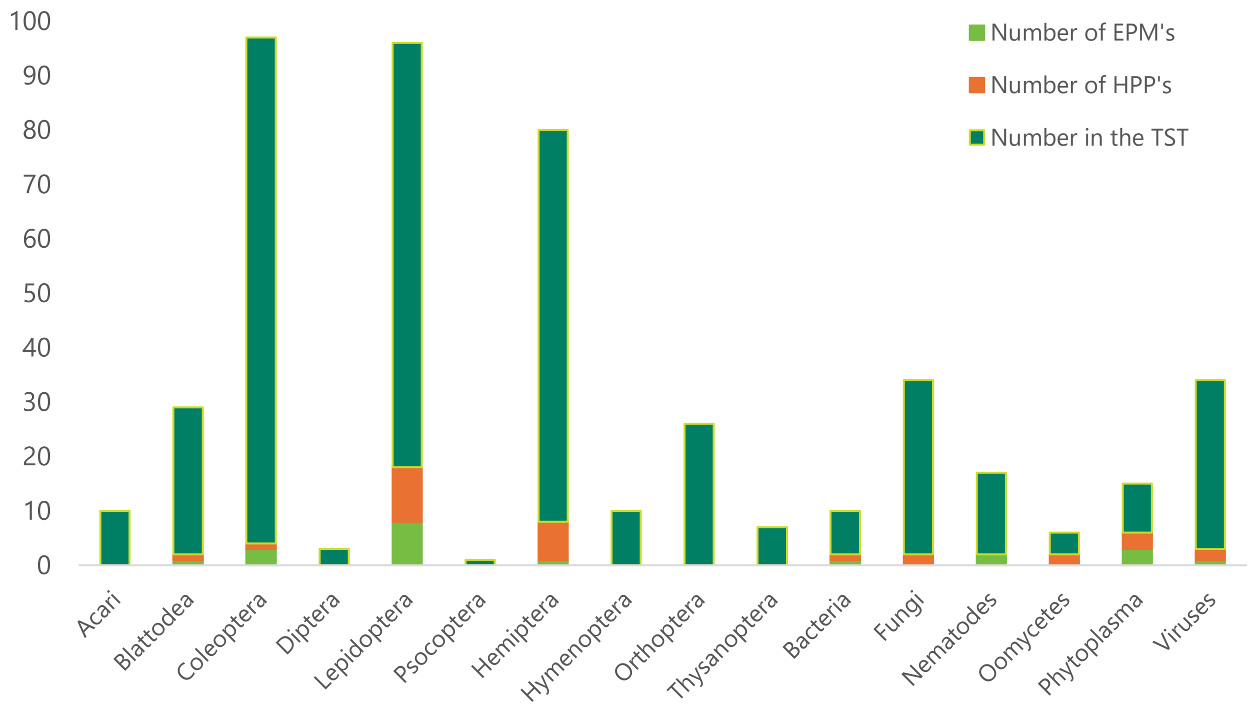

Figure 4. *Number of exotic pests for the Australian sugarcane industry per order in the Threat Summary Table, High Priority Pest list and list of Exotic Pests to Monitor.*

Note: Acari = mites, Blattodea = cockroaches and termites, Coleoptera = beetles, Diptera = flies, Lepidoptera = moths and butterflies, Psocoptera = booklice, Hemiptera = bugs, Orthoptera = grasshoppers and crickets, Thysanoptera = thrips, Oomycetes = water moulds.

Further details on each pest along with the basis for the likelihood ratings are provided in 'THREAT IDENTIFICATION AND PEST RISK ASSESSMENTS' on page 56 and Appendix 1: Threat Summary Tables on page 84. Assessments may change due to increased understanding of pest biology, changes to pest/host interactions, or production methods. These lists may be reviewed on a regular basis through the Biosecurity Reference Panel (BRP).

High Priority Pests of the Australian Sugar Industry

Table 2. *High Priority Pests of the Australian Sugarcane Industry.*

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Blattodea												
Rhinotermitidae	*Coptotermes gestroi*	Asian subterranean termite	Polyphagous. Maize, sugarcane.	Dispersal flights, foraging tubes or damage are usually the first indications of an infestation. [5]	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil, machinery and wood packaging material are the most likely pathways for long distance dispersal.		Marquesas Islands (Pacific Ocean), Mauritius and Reunion (Indian Ocean), Brazil, Barbados other West Indian islands include Antigua, Barbuda, Cuba, Grand Cayman, Grand Turk, Jamaica (Montego Bay and Port Antonio), Little Cayman, Montserrat, Nevis, Providenciales, Puerto Rico (San Juan), St. Kitts, U.S. Virgin Islands (possible), Mexico. Indonesia, Malaysia, Philippines. [6]	MEDIUM	HIGH	HIGH	HIGH [7]	**HIGH**
Coleoptera												
Cerambycidae	*Dorysthenes buquetii* (syn. *Dorysthenes buqueti*)	Sugarcane longhorn stem borer	*Bambusa vulgaris*, *Saccharum officinarum*, Cassava.	Bores into the stalk causing significant damage to the plant; can lead to considerable yield loss.	Local dispersal occurs via flight (up to two kilometres each season). Long distance dispersal occurs through human-assisted movement of eggs, larvae, pupae and adults on plants, within packing materials or wood products.		India, Indonesia, Laos, Malaysia, Myanmar, Thailand.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**

[4] Establishment potential.

[5] Advanced stages of infestation are indicated by the incorporation of nest material ('carton', a mixture of faeces, chewed wood and soil) in hollowed wood or existing structural voids. In severe infestations, *C. gestroi* hollows out wood, leaving only a paper-thin surface. The hollowed wood surface may look blistered or peeled. Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%.

[6] Endemic to Southeast Asia. *C. gestroi* was introduced to other geographic areas including North America and Pacific, Caribbean, South American and Indian Ocean islands.

[7] Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of of canes; losses can be up to 100%.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Lepidoptera												
Crambidae	*Chilo auricilius*	Gold fringed-rice borer	*Sorghum bicolor* (sorghum), *Zea mays* (maize), *Oryza sativa* (rice), Poaceae (grasses), *Saccharum officinarum* (sugarcane).	On sugarcane, damage by *C. auricilius* early in growth kills leaves and may produce 'dead hearts'. [8]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, Bhutan, China, Hong Kong, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam, Papua New Guinea.	HIGH	HIGH	HIGH	EXTREME	**EXTREME**
Crambidae	*Chilo infuscatellus (syn. Chilo tadzhikiellus)*	Yellow top sugarcane borer	Wide host range including *Saccharum officinarum* (sugarcane). [9]	Young larvae eat small holes in leaves, especially in the leaf-sheaths, and at a later stage the growing points are killed. [10]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Afghanistan, Bangladesh, China, India, Indonesia, Myanmar, North Korea, Pakistan, Philippines, South Korea, Taiwan, Tajikistan, Thailand, Uzbekistan, Vietnam, Russia, Papua New Guinea.	HIGH	HIGH	HIGH	EXTREME	**EXTREME**
Crambidae	*Chilo sacchariphagus*	Spotted borer	*Oryza sativa* (rice), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Zea mays* (maize).	Larvae eat through tightly rolled leaves which subsequently unfurl, resulting in characteristic repetitive patterns of small holes; superficial feeding on leaf epidermis produces small 'windowpanes'. [11]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Comoros, Madagascar, Mauritius, Mozambique, Réunion, South Africa, Tanzania, Bangladesh, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Iran, Japan, Laos, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam.	MEDIUM	HIGH	HIGH	EXTREME	**EXTREME**

[8] In older cane there may be no obvious external symptoms, but if leaf sheaths are stripped away, bore holes in the internodes may be apparent. Damaged internodes may show reddening of tissues and may emit a rancid odour. Otherwise, it may be necessary to split canes to find the galleries that have been eaten out by larvae. On rice, symptoms are similar to those of other stem borer species with 'dead hearts' appearing early in crop development and 'white heads' later when normal development of the inflorescence is prevented.

[9] Additional hosts include: Avena sativa (oats), *Cymbopogon winterianus* (java citronellagrass), *Cynodon dactylon* (Bermuda grass), *Cyperus rotundus* (purple nutsedge), *Echinochloa colona* (junglerice), *Hordeum vulgare* (barley), *Oryza sativa* (rice), *Panicum* (millets), *Pennisetum glaucum* (pearl millet), *Sorghum bicolor* (sorghum), *Zea mays* (maize).

[10] Symptoms are similar to those produced by other lepidopterous stem borers. The terminal leaves then die and form characteristic dead hearts. Older larvae tunnel in stems eating out extensive galleries and excreting frass, which resembles moist sawdust. Tunnelled stems may break, especially in high winds

[11] Early indications of attack by *C. sacchariphagus* result from feeding by larvae on young leaves. Later in the development of an attack, larvae may kill the growing points, producing characteristic 'dead hearts' formed from the dead, rolled leaves at the growing point. Later, tunnelling in the internodes produces extensive galleries and external holes, from which excreta (frass) exude. Larvae mainly bore into the softer elongating internodes at the tops of canes; this may have several effects, including reduced growth, growth of lateral shoots, constriction of the stem and shortening of internodes at the point of attack, and death of the top, which may kill the whole cane. Six or more larvae may develop in a single internode, but it is usual to find only one or two per internode. Extensive tunnelling may result in stem breakage and lodging. Damage is generally most severe on canes that are growing slowly and is therefore often most apparent during dry periods.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Crambidae	*Chilo terrenellus*	Dark headed rice borer	*Saccharum* spp., other grasses, *Zea mays*, *Oryza sativa*, *Oryza latifolia*, *Eriochloa* spp., *Panicum* spp.	Bores into cane stems, causing significant damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, India, Myanmar, Pakistan, Thailand, Papua New Guinea, Torres Strait Islands.	HIGH	HIGH	HIGH	EXTREME	**EXTREME**
Crambidae	*Chilo tumidicostalis*	Spotted sugarcane stem borer; Plassey borer	Sugarcane.	Stem boring moth, can cause significant damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, India, Pakistan, Thailand.	MEDIUM	HIGH	HIGH	EXTREME	**EXTREME**
Crambidae	*Scirpophaga excerptalis*	Top borer	*Saccharum* spp., *Sorghum halepense*, rice, wheat. Mango.	Early indications of the presence of *S. excerptalis* on sugarcane include the presence of egg clusters on the upper side of the leaves near the growing point. [12]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam, Papua New Guinea, Solomon Islands.	HIGH	HIGH	HIGH	EXTREME	**EXTREME**
Noctuidae	*Sesamia grisescens*	Pink stalk borer	*Saccharum* spp., *Pennisetum purpureum*, *Panicum maximum*.	The young larvae start feeding on the inner tissue of the leaf-sheath and fill the fed section with frass. [13]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Indonesia, Papua New Guinea.	HIGH	HIGH	HIGH	EXTREME	**EXTREME**

[12] The egg clusters are usually 13 mm long and covered by brownish-yellow hairs from the anal tuft of the female adult moth. First-instar larvae eat through the rolled leaves which subsequently unfurl, producing a characteristic, repetitive pattern of small holes. The larvae usually penetrate along the midrib of the leaf into the heart of the plant. They tunnel in the midrib for 24-48 hours and emerge through the upper epidermis. Two or three first- and/or second-instar larvae, and on rare occasions third-instar larvae, can be found in the spindle of the stems. The top shoot becomes withered and stunted, whereas the internodes beneath may produce new leaves. In general, only one mature larva survives in a single stem because of food competition. The larva tunnels into the stem, making a small window near ground level; it then pupates in a cocoon near that opening. Damage is generally most severe in young plants that thrive in a humid environment.

[13] As the larvae grow bigger, they start boring into the stalk near the node of the fully expanded internode. First, they isolate the cabbage section of the stalk and feed gregariously into the meristematic tissue. They kill the growing point, and this results in a 'dead-heart'. Usually the initially infested stalks (those with eggs) may not have enough feed for all the semi-mature larvae and so the larvae migrate to infest other stalks. Large entry holes are made but these do not necessarily result in dead-hearts. However, the bored stalks can easily break in strong winds. The rotting tissues attract saprophytic fungi and the weevil borer, *Rhabdoscelus obscurus*, which cause further damage. Before pupation, the larvae cut an exit hole that is usually 5-10 mm in diameter. Bored stalks usually have a low sucrose content, high levels of impurities and a high fibre content (Eastwood et al., 1998).

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Noctuidae	*Sesamia inferens*	Asiatic pink stem borer; Purple stem borer; Noctuid moth	Oats, barley, rice, millet (*Echinochloa frumentacea*; *Eleusine coracana*; *Pennisetum glaucum*; *Setaria italica*), wheat, sorghum, maize, sugarcane, Johnson grass, Job's tears.	Feeding occurs within the cane stem or base. When a stem is severed it wilts causing a dead heart. Feeding at the base often leads to wilting. These symptoms are common for most stem borers and not unique to *S. inferens*. [14]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, Bhutan, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, North Korea, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand, Vietnam, United States of America (Hawaii), Guam, Papua New Guinea, Solomon Islands.	HIGH	HIGH	HIGH	HIGH [15]	**HIGH**
Pyralidae	*Eldana saccharina*	African sugarcane borer	Wide host range including *Saccharum officinarum* (sugarcane). [16]	Females prefer to oviposit on dry dead leaves and this partly accounts for its tendency to infest mature crops. [17]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Congo, Democratic Republic of the, Congo, Republic of the, Côte d'Ivoire, Equatorial Guinea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Réunion, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe, Saudi Arabia.	LOW	HIGH	HIGH	EXTREME	**HIGH**

[14] It causes damage by consuming the inner side of the stem, which in wheat, causes "dead hearts" at the critical tillering stage with harvest reductions of over 11% reported in India (Chaitanya et. al, 2023).

[15] On 1st October 2024, the Sugarcane Technical Review Panel advised that this species be added to the High Priority Pest list for the Australian Sugarcane industry. To do so, the economic impact risk rating was changed from MEDIUM to HIGH to give an overall risk rating of HIGH (was previously MEDIUM).

[16] Additional hosts include: *Cyperus* (flatsedge), *Cyperus alternifolius* (Umbrella flatsedge), *Cyperus digitatus*, *Cyperus papyrus* (papyrus), *Megathyrsus maximus* (Guinea grass), *Oryza sativa* (rice), *Phragmites australis* (common reed), *Sorghum bicolor* (sorghum), *Typha latifolia* (broadleaf cattail), *Zea mays* (maize).

[17] Eggs hatch after about 6 days and the young larvae feed externally on epidermal tissues before penetrating the stems and eating out galleries; the process of penetration of the stem is aided if there is a crack or other blemish, otherwise they may feed externally until the third instar. The length of larval development is very variable and may take up to two months, and larvae pupate in a silken cocoon within the stems, or else externally behind a leaf sheath. The larva makes an exit hole in the stem prior to pupation which often has a large amount of frass hanging from it (Bosque-Perez and Shulthess, 1998). *E. saccharina* is the most serious sugarcane pest in tropical and sub-tropical Africa, and in situations of high pest pressure total crop failure can result. Damage and consequent crop loss in sugarcane generally increases with crop age. Where crops can be harvested on a 12 month cycle, *E. saccharina* populations and damage tend to be low. Where crops are harvested on a longer cycle, serious crop loss can result. In Swaziland, King (1989) estimated that, on average, every 1% of internodes damaged resulted in 1% loss of sugarcane yield. In South Africa, every 1% of internodes bored results in estimated losses of between 1% and 2% of stalk sucrose content. In Zimbabwe, it was estimated that *E. saccharina* caused losses of 5000 tons of sugar annually. Sampson and Kumar (1985) showed that for every 1% increase in stalk damage there was a corresponding increase of 0.214% in internode damage; however, the damage arose not only from *E. saccharina* but also *Chilo zacconius* and *Sesamia* spp. An economic injury level (EIL) and economic threshold (ET) have been developed in South Africa based on using the synthetic pyrethroid alpha-cypermethrin (Leslie, 2009). EIL was estimated to be between 5.8% and 7.3% of internodes bored, and ET was estimated to be 2% internodes bored, assuming a 40% treatment efficacy.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Pyralidae	*Polyocha depressella (syn. Emmalocera depressella)*	Sugarcane root borer	Sugarcane.	Feeds on infests the root system of sugarcane (does not actually bore into roots). Heavy infestations can cause significant destruction.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, India, Pakistan.	LOW	HIGH	HIGH	EXTREME	**HIGH**
Hemiptera												
Aleyrodidae	*Aleurolobus barodensis*	Sugarcane whitefly	*Saccharum* spp., *Erianthus aurundinaceum*, *Erianthus ciliaris*, *Miscanthus* spp.	Black sooty mould develops on honeydew, reducing photosynthesis and stunting growth. Reportedly reduces yield by up to 90%, depending on size of infestation.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		India, Indonesia, Myanmar, Pakistan, Thailand.	HIGH	HIGH	HIGH	HIGH	**HIGH**
Aphididae	*Ceratovacuna lanigera*	Sugarcane woolly aphid	*Saccharum* spp., *Miscanthus* spp., *Alternanthera sessilis*, *Brachiaria mutica*, *Cynodon dactylon*, *Columella trifolia*, *Digitaria sanguinalis*, *Eragrostis japonica*, *Eclipta prostrate*, *Eleusine* spp.	Can potentially impact leaves and stem, sucks phloem, excretes honeydew enabling the development sooty mould and reduce the plants photosynthetic capability.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Brunei, China, India, Indonesia, Japan, Malaysia, Myanmar, Philipines, Sri Lanka, Taiwan, Thailand, Vietnam.	HIGH	HIGH	HIGH	HIGH	**HIGH**

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Cicadellidae	*Yamatotettix flavovittatus*		Sugarcane.	Consumes leaves and can transmit sugarcane white leaf disease (Thein et. al, 2012).		Vector of Sugarcane white leaf disease (Thein et. al 2012).	China, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Papua New Guinea, Taiwan, Thailand (NSW DPI, n.d.).	HIGH [18]	MEDIUM	HIGH [19]	EXTREME [20]	**HIGH**
Delphacidae	*Eumetopina flavipes (insect only)*	Island sugarcane planthopper	*Saccharum officinarum.*	Adults and larvae feed on the leaves; The insect on its own may cause plant stress, yellowing of the whorl and spindle deformation under heavy pressure, especially in susceptible varieties. [21]	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s).	Vector of Ramu Stunt.	Malaysia, Borneo, Philippines, Papua New Guinea, Indonesia, Solomon Islands, and New Caledonia.	HIGH	HIGH	HIGH	EXTREME	**EXTREME**
Delphacidae	*Perkinsiella vastatrix (as a vector of Fiji leaf gall virus)*	Sugarcane leaf hopper	Sugarcane, sorghum, maize.	Sap sucking: Above ground plant parts. Scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Vector of Fiji leaf gall virus.	Indonesia, Japan (Kyushu), Malaysia, Philippines, Singapore, Taiwan, Thailand, Papua New Guinea.	HIGH	HIGH	HIGH	HIGH [22]	**HIGH**

[18] This species is present in several locations geographically close to Australia including Thailand, China, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Papua New Guinea and Taiwan (NSW DPI, n.d.; Roddee, Wangkeeree & Hanboonsong, 2024).

[19] Wind is reported as the main factor influencing dispersal of this leafhopper species (Thein et. al, 2012). A recent study estimated the mean dispersal distance of *Y. flavovittatus* as 387.5 metres, hence, this species has the potential to spread locally over large distances (Thein et. al, 2012).

[20] On its own in the absence of a vector, this species can cause significant damage to sugarcane by feeding on phloem sap which impedes sugar and organic compound transport in the host plant (Roddee, Wangkeeree & Hanboonsong, 2024). Control methods include crop covering with insect-proof screening (Roddee, Wangkeeree & Hanboonsong, 2024). Resistance to leafhoppers may also be achieved with sugarcane breeding programs (Roddee, Wangkeeree & Hanboonsong, 2024). On 1st October 2024, the Sugarcane Technical Review Panel advised an economic impact risk rating of EXTREME.

[21] Eggs are laid under the leaf epidermis, and this causes local discoloration. However, if the insect transmits the causal agent of Ramu Stunt (a virus), then symptoms of severe stunting, trashy appearance, leaf stripes and mottling and stool death will be manifested in the sugarcane plant (SRA, 2019).

[22] On 1st October 2024, the Sugarcane Technical Review Panel advised an economic impact risk rating of HIGH based on the success of current resistance breeding programs for Fiji leaf gall virus which have helped limit the spread of the virus within Australia. Adoption of resistant varieties would reduce the economic impact caused by the virus. As of 2021-2022, sugarcane varieties with resistances to Fiji leaf gall virus included: SRA33, SRA29, SRA11, SRA4, SRA2, Q249, Q247, Q245, Q242, Q235, Q183, Q151 and Q138 (Sugar Research Australia, 2021).

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Delphacidae	*Perkinsiella vitiensis (as a vector of Fiji leaf gall virus)*	Sugarcane planthopper	*Saccharum* spp.	Sap sucking: Above ground plant parts. Scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Vector of Fiji leaf gall virus.	Fiji, Polynesia, Samoa.	HIGH	HIGH	HIGH	HIGH[22]	**HIGH**
Lophopidae	*Pyrilla perpusilla*	Indian sugarcane leaf hopper, Sugarcane plant hopper	Sugarcane, barley, maize, oats, sorghum, wheat, millet, chickpea, jungle rice, grey fig, barley, guinea grass, honey clover, rice, pea, *Sorghum halepense* (Johnson grass).	Nymphs and adults of *Pyrilla* feed on the sap of leaves which results in drying and withering. [23]	Local dispersal via crawling, flying. Long distance dispersal through infested plant material	Potential vector of Sugarcane Grassy Shoot Phytoplasma (16SrXI-B subgroup).	Afghanistan, Bangladesh, Cambodia, China, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**

[23] The punctures (mainly along the main vein) made by the pest during feeding expose the plant to disease organisms. The insect's feeding habit of sucking phloem sap from leaves and exuding honeydew onto foliage, leading to sooty mould diseases such as *Capnodium* spp., have led to qualitative and quantitative effects on sugar production. *P. perpusilla* is a serious pest of sugarcane in the Orient, but it has also been recorded as a pest of other crops such as rice, wheat, maize and millet. The damage by the pest affects sugar yield and quality. Losses ranging from 2-34% in sucrose content of the cane and from 3-26% in the purity of the sugar have been recorded. Poor growth of seed sets and difficulties in milling cane from affected plants have also been recorded.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Bacteria												
Xanthomonadaceae	*Xanthomonas albilineans (exotic strains- serological groups 2 or 3)*	Leaf scald	*Saccharum* spp.	Partial or total chlorosis of leaves occurs and is accompanied by an inward curling of the leaves (scalding). Affected stalks may be stunted with the development of axillary buds (side shoots) bearing symptoms of the chronic phase. [24]	Local/regional movements may be due to the movement of seed, plants, soil or residues/aerosols from infested fields. Soil, crop residues, and/or infected plants or seeds are the most likely pathway for long distance dispersal.		Benin, Burkina Faso, Cameroon, Chad, Congo, Côte d'Ivoire, Eswatini, Gabon, Ghana, Kenya, Madagascar, Malawi, Mauritius, Morocco, Mozambique, Nigeria, Réunion, South Africa, Tanzania, Zimbabwe, Cambodia, China, India, Indonesia, Japan, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam, Barbados, Belize, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Guatemala, Jamaica, Martinique, Mexico, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States, Fiji, French Polynesia, Papua New Guinea, Argentina, Brazil, Colombia, Ecuador, French Guiana, Guyana, Suriname, Uruguay, Venezuela.	HIGH	HIGH	HIGH	HIGH	**HIGH**

[24] Foliar infection induced by airborne inoculum of *X. albilineans* is characterized by cream to yellow stripes starting at the tip or occasionally the margin of the leaf. Three phases are associated with the symptomatology of the disease: latent, chronic and acute phases. Latent infection or the absence of symptoms is a characteristic feature of the disease which occurs in tolerant varieties and under favourable conditions for plant growth. In the chronic phase, a typical white pencil-line stripe (1-2 mm wide) runs from several centimetres to almost the entire length of the leaf. At a later stage, the sharp margins of the stripe may become diffuse, and a red pencil line may be formed in the middle of the stripe. Partial or total chlorosis of leaves occurs and is accompanied by an inward curling of the leaves (scalding). Affected stalks may be stunted with the development of axillary buds (side shoots) bearing symptoms of the chronic phase. A longitudinal section of the stalk shows a reddish discoloration of the vascular bundles, particularly at the nodes. As the disease progresses, lysogenous cavities may be formed and the stalk dies. In the acute phase of the disease, sudden plant death occurs with few or no symptoms.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Fungi												
Phaeosphaeriaceae	*Stagonospora sacchari*	Sugarcane scorch; leaf scorch	*Saccharum* complex species, *Miscanthus sinensis*, *M. floridulus*.	*S. sacchari* attacks the leaves of sugarcane, especially during the critical growth stage 4-5 months after planting. The initial symptoms of leaf scorch are small white to yellowish spots on the leaf blades, 3-8 days after inoculation. [25]	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		South Africa, India, Indonesia, Japan, Philipines, Taiwan, Thailand, Vietnam, Panama, Papua New Guinea, Argentina, Venezuela.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**
Xylariaceae	*Xylaria cf warburgii/Xylaria arbuscula*	Sugarcane root and basal stem rot	*Saccharum* hybrid.	Attack roots and stem, and whole plant.	Spread of microscopic spores by wind, water, soil, through infected plant material.		Indonesia, Taiwan.	HIGH	HIGH	HIGH	HIGH	**HIGH**
Oomycetes												
Peronosporaceae	*Peronosclerospora philippinensis*	Downy mildew	*Zea mays*, *Saccharum* interspecific hybrids, *S. officinarum*, oats, sorghum, maize.	Leaf streaking.	Spread with infected planting material. Wind-borne spores for short distance dispersal, due to short lifespan of spores.		Mauritius, Bangladesh, China, India, Indonesia, Nepal, Pakistan, Philippines, Taiwan, Thailand.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**

[25] Leaf lesions are initially small (0.5-3.0 x 0.3-1.0 mm) and red or brown, with a chlorotic halo. They elongate along the vascular bundles, forming spindle-shaped streaks which coalesce to form large spots (5 x 0.3 to 17 x 1.0 cm), with straw-coloured centres and reddish margins. On older leaves the spots do not usually elongate into streaks. On susceptible varieties, abundant pycnidia were produced on the lesions 5 weeks after inoculation. Multiple and critical point models have been used to predict yield losses. Models based on the area of leaf infected at 9-10 months after planting accurately predicted cane and sugar yield losses at around 30% (Sampang, 1985).

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Peronosporaceae	*Peronosclerospora sacchari*	Sugarcane downy mildew	*Saccharum* complex species, *Zea mays*.	Leaf streaking.	Spread with infected planting material. Wind-borne spores for short distance dispersal, due to short lifespan of spores.		Nigeria, China, India, Indonesia, Nepal, Philipines, Taiwan, Thailand, Vietnam, Fiji, Papua New Guinea, Timor Leste.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**
Phytoplasma												
Acholeplasmataceae (16SrXI -D)	*Sugarcane white leaf phytoplasma (16SrXI inc, 16SrXI-B and 16SrXI-D)*	White leaf of sugarcane (SWLP) (with vector)	Sugarcane.	The first foliar symptoms of sugarcane white leaf (SCWL) disease are cream-coloured or white stripes parallel to the midribs. [26]	Abiotic factors are not involved in natural spread of the sugarcane white leaf (SCWL) phytoplasma. SCWL phytoplasma is naturally transmitted by the leafhoppers *Matsumuratettix hiroglyphicus* and *Yamatotettix flavovittatus* (Matsumoto et al., 1968; Hanboongson et al., 2006). [27]		Bangladesh, Japan, Sri Lanka, Taiwan, Thailand, China.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**
Acholeplasmataceae (16SrXI-B)	'*Candidatus* Phytoplasma sacchari' *16SrXI-B*	Green grassy shoot (with vector)	*Saccharum* spp.	Symptoms of the disease include the bending of leaflets (termed flaccidity), foliar yellowing and marginal necrosis of the older leaves.	Vectors such as *Deltocephalus vulgaris*, *Maiestas portica* and *Cofana unimaculata* can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		India, Sri Lanka, Thailand, Vietnam, Yemen.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**

[26] As the disease progresses, stripes coalesce and extend along the entire leaf blades which appear severely chlorotic, while the vigour of the affected plants steadily decreases The leaves are narrower and smaller than those of healthy plants, with a soft texture and are borne on slender, chlorotic shoots or tufted at the tips of slowly growing shoots. The affected plants are characterized by the excessive development of proliferating tillers with shortened internodes which gives the plants a bushy, broom-like appearance. Severely diseased plant parts fail to set fruits, decline and do not produce millable canes. Losses due to sugarcane white leaf (SCWL) phytoplasma vary greatly depending on the susceptibility of the clones, the weather and other environmental conditions influencing sugarcane growth. In Taiwan, over 60 hectares of sugarcane were abandoned due to both high incidence and severity of SCWL disease whereas incidence of more than 10% occurred in 700 hectares.

[27] Like other phytoplasmas, SCWL agent is not seed-transmissible. However, it may be introduced into new areas through imported vegetative propagating materials such as seed canes, which may carry the pathogen undetected. The use of infected vegetative propagating material is responsible for long-distance movement of the pathogen and intentional introduction into new areas.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Acholeplasmataceae (16SrXI-D)	*'Candidatus* Phytoplasma cirsii' [28]	Grassy shoot (with vector)	*Saccharum* interspecific hybrids, *S. officinarum*.	The disease is characterised by the production of numerous lanky tillers from the base of the affected shoots. [29]	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal. The primary spread of the phytoplasma is through diseased setts and cutting knifes. The pathogen is transmitted secondarily by aphids viz., *Rhopalosiphum maydis*, *Melanaphis sacchari* and *M. idiosacchari. Sorghum* and maize serve as natural collateral hosts.		Vietnam, Thailand, India.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**

[28] '*Candidatus* phytoplasma cirsii' has been identified as the current name for '*Candidatus* phytoplasma (16SrXI-D)' (Zhang et al. 2016). According to Wei & Zhao (2022), '*Ca.* Phytoplasma cirsii' is part of the 16SrXI-D subgroup and a member of the 16SrXI Rice yellow dwarf group of phytoplasmas alongside '*Ca.* Phytoplasma oryzae' and '*Ca.* Phytoplasma sacchari' (Wei & Zhao, 2022). In March 2025, following a recommendation to update the scientific name from the Plant Health Committee and based on evidence presented by Wei & Zhou (2022), including a GenBank accession number that matches that of '*Ca.* Phytoplasma cirsii' identified by Safarova et. al (2016), it was decided to update the

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [4]	Spread potential	Economic impact	Overall risk rating
Viruses												
Acholeplasmataceae	*Sugarcane Ramu stunt (with vector)*	Ramu stunt (SRSV)	*Saccharum* interspecific hybrids, *S. officinarum*.	Whole plant; pale green or yellowish streak on leaves (varying in length); infected cane appears thinner/stunted with abnormal proliferation of the nodes and reduced internode length. [30]	The vector for the causal agent is thought to be the Delphacid planthopper *Eumetopina flavipes* (Kuniata et al., 1994). Natural transmission appears limited to that associated with the insect vector. Planting diseased vegetative material may spread the disease (the vegetative material is sometimes referred to as sugarcane 'seed material'). [31]		Papua New Guinea.	MEDIUM	HIGH	HIGH	EXTREME	**EXTREME**
Potyviridae	*Sugarcane streak mosaic virus (Poacevirus)*	Sugarcane streak mosaic virus (SCSMV)	*Saccharum* spp.	Streaks leaves and restrict growth reducing yield.	Movement and dispersal are largely attributed to aphid vectors.		India, Pakistan, China, Thailand, Vietnam, Indonesia, Myanmar.	MEDIUM	HIGH	HIGH	HIGH	**HIGH**

scientific name from '*Candidatus* phytoplasma (16SrXI-D)' to '*Candidatus* phytoplasma cirsii'. This phytoplasma was previously referred to in this Biosecurity Plan as '*Candidatus* Phytoplasma' 16SrXI-D (potentially F).

[29] Leaves become pale yellow to completely chlorotic, thin and narrow. The plants appear bushy and 'grass-like' due to reduction in the length of internodes premature and continuous tillering. The disease appears nearly two months after planting. The affected clumps are stunted with premature proliferation of auxiliary buds. Cane formation rarely occurs in the affected clumps, if formed, thin with shorter internodes having aerial roots at the lower nodes. The buds on such canes usually papery and abnormally elongated.

[30] The most pronounced symptoms are stunted growth - hence the name Ramu stunt - and plant death (Waller et al., 1987; Eastwood, 1990; Magarey et al., 1996). Initially leaves are shortened, stiff and erect and show either a pale green to chlorotic striping or a broad mosaic pattern (Suma and Jones, 2000). Shoots are often yellow, and the leaves prematurely senesce, giving the crop a trashy, unkempt appearance (Magarey et al., 1996; Suma and Jones, 2000). Leaf patterns vary markedly with variety and crop and are at times uncharacteristic. There is a tendency for asymmetry across the leaf blade with one half showing more definite symptoms. Increased tiller numbers (Magarey et al., 1996) are found in several varieties and some have a grassy shoot appearance, though this is not definitive. Root system restrictions and death (Waller et al., 1987) are also associated with the disease. In some stools, individual tillers may be unthrifty and die while others produce a healthy stalk. In many cases in susceptible varieties, whole stools die giving rise to very large, or total, yield losses (Magarey et al., 1996; Suma and Jones, 2000). Complete ratoon failure has been noted as early as first ratoon.

[31] As vegetative propagation is normal for sugarcane, there is ample opportunity to spread the disease locally, nationally and internationally in this fashion. Spread outside planting material, or independent of an insect vector, is unknown. The vector for the causal agent is thought to be the Delphacid planthopper *Eumetopina flavipes* (Kuniata et al., 1994). Experimentation has shown that individuals of this species may transmit the disease when fed on diseased sugarcane and later transferred to healthy sugarcane plants. Symptoms took from 9 to 12 weeks to first appear. It is not known if the vector can transmit the disease trans-ovarially, or indeed which instars of the vector are able to acquire the causal agent. There are apparently several species of *Eumetopina* in Papua New Guinea; some of these species could transmit Ramu stunt. The disease usually spreads during the wetter times of the year in the commercial cropping area (January-March) (Waller et al., 1987). This most probably corresponds with the incidence of lush crop growth and a rapid build-up in vector population. Natural transmission appears limited to that associated with the insect vector. Traditionally, disease spread may have occurred with transfer of planting material of the domesticated S. officinarum. Spread of the disease in the true seed of sugarcane has not been tested.

Exotic Pests to Monitor

The following table lists exotic pests and pathogens of sugarcane that could cause economic harm to the industry if found to be present in Australian production regions. These pests were considered by the Technical Review Panel (TRP) based on their entry, establishment and spread potential as well as their potential economic impact on the sugar industry were they to enter Australia

Table 3. *Exotic Pests to Monitor.*

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Blattodea												
Rhinotermitidae	*Coptotermes formosanus*	Formosan subterranean termite	Sugarcane, maize, sorghum, peanut, soybean, sweet potato, cassava, fruit trees, and forest trees.	Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%.	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil, machinery and wood packaging material are the most likely pathways for long distance dispersal.		China, Hong Kong, Japan, Taiwan, South Africa, United States of America, Virgin Islands (USA), Marshall Islands and US Minor Outlying Islands.	MEDIUM	HIGH	MEDIUM	HIGH [33]	**MEDIUM**
Coleoptera												
Cerambycidae	*Migdolus fryanus*	Sugarcane rhizome borer	Sugarcane.	Attacks roots, can cause significant damage.	Local dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae, pupae and adults on plants and plant material.		Brazil.	LOW [34]	MEDIUM	MEDIUM	HIGH	**MEDIUM**

[32] Establishment potential.

[33] Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%. In China, the damage rate in severely damaged sugarcane areas is as high as 30–60%, causing widespread sparse seedling and even total yield loss (Huang & Li, 2011). In the middle and later stages of sugarcane growth, *C. formosanus* bores into underground cane stalks, which makes the stem hollow, the leaves yellow or dry, and the plants easily broken or fall over in the wind, leading to the death of the plant and large yield losses (Guo et al., 2014).

[34] This species is not currently present in locations geographically close to Australia.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Dynastidae	*Tomarus subtropicus (syn. Ligyrus subtropicus)*	Sugarcane grub	Sugarcane.	Of primary economic importance. Larvae feed on grass roots; causes significant root reduction on host species resulting in severe production loss.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		United States of America.	LOW[34]	MEDIUM	MEDIUM	HIGH	**MEDIUM**
Scarabaeidae	*Dyscinetus dubius*	Hardback beetle	Poaceae including sugarcane.	Affected plant parts include those above ground. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Saint Vincent and the Grenadines, Guyana.	LOW[34]	LOW	LOW	HIGH	**LOW**
Lepidoptera												
Crambidae	*Diatraea albicrinella*	Sugarcane borer	Sugarcane.	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves. [35]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bolivia, Ecuador, Brazil, Guyana, Peru.	LOW	HIGH	HIGH	HIGH	**MEDIUM**
Crambidae	*Diatraea busckella (syn. Diatraea rosa)* [36]	Sugarcane borer	Sugarcane.	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[35]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Panama, Bolivia, Colombia, Venezuela.	LOW	HIGH	HIGH	HIGH	**MEDIUM**
Crambidae	*Diatraea centrella (syn. Diatraea canella)*	Sugarcane stalk borer	Sugarcane, rice, grasses.	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[35]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bahamas, Cuba, Grenada, Guadaloupe, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Guyana, Suriname, Venezuela.	LOW	HIGH	HIGH	HIGH	**MEDIUM**

[35] Later in the development of the crop, the direct damage in the stalks by tunnelling and breaking thorough the tissues interferes with the movement of nutrients, the distribution of photosynthates and tends to increase the level of fiber in the affected stalk decreasing its weight and value.

[36] *D. rosa* is a synonym (Solis & Metz, 2016).

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Crambidae	*Diatraea grandiosella*	South-western corn borer; Crambid moth	Wide host range including *Saccharum officinarum* (sugarcane). [37]	In sugarcane and maize, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves. [35, 38]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Mexico, United States of America.	LOW	HIGH	HIGH	HIGH	**MEDIUM**
Crambidae	*Diatraea impersonatella*	Sugarcane stalk borer	*Saccharum officinarum* (sugarcane), *Zea mays* (maize).	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves. [35, 39]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Guadeloupe, Trinidad & Tobago, South America (e.g. Brazil).	LOW	HIGH	HIGH	HIGH	**MEDIUM**
Crambidae	*Diatraea magnifactella* [40]		Sugarcane (Box, 1956; Sallam, 2006).	Larvae are reported to feed in sugarcanes of all ages and occasionally cause very serious damage in individual fields with some heavy attacks and infestations observed in some parts of Mexico (Box, 1956).			Mexico (Box, 1956; Sallam, 2006). [41]	LOW [42]	LOW [43]	LOW [44]	HIGH [45]	**LOW**

[37] Additional hosts include: *Pennisetum glaucum* (pearl millet), *Sorghum bicolor* (sorghum), *Sorghum halepense* (Johnson grass), *Sorghum sudanense* (Sudan grass), *Zea diploperennis*, *Zea mays* (maize), Poaceae (grasses).

[38] Larvae feed on leaf tissue, and later on stalk tissue. Early in the season, severe feeding damage to young plants can kill the growing point; a symptom called 'dead heart'. Leaf-feeding results in small circular holes in the early stages of attack and as larval feeding continues, elongated lesions form in which the epidermis (usually the upper surface) is left intact. Larger larvae bore into the stalk and feed upon pith tissue, resulting in stunted growth of the plant. Subsequent generations of *D. grandiosella* cause damage to the sheath, husk, primary ear and ear shoots. By the third instar, larvae migrate down the stalk by tunnelling through the pith. In the northern part of its range (southern and central USA) girdling of the stalk occurs. This constitutes the main borer injury occurring late in the growing season and results in stalk lodging (Wilbur et al., 1943). Larval feeding in the pedicle of the ear can cause ear drop.

[39] *D. impersonatella* feed by scraping the leaf or tunnelling through the midrib during first and second instars. After this, they burrow into the stalk creating galleries where they remain for larval and pupal stages. The damage could result in death of the apical meristem, aerial root growth, lateral sprouts and loss of biomass.

[40] Closely related to *Diatraea considerata*, also endemic to Mexico (Box, 1956). There was previously confusion in the literature between *Diatraea magnifactella* and *D. considerata*, however, the species can be distinguished by their distinctly different larvae (Box, 1956).

[41] Endemic to Mexico (Box, 1956).

[42] This species is not currently present in locations geographically close to Australia, being only reported in Mexico (Box, 1956; Sallam, 2006).

[43] The narrow host range (Sugarcane) presents fewer opportunities for individuals of this species to find suitable hosts on which to feed and establish relative to species that are polyphagous with a wide host range.

[44] A capacity to attack only a narrow range of hosts (Sugarcane) may reduce the potential for this species to spread locally into new areas.

[45] Larvae are reported to feed in sugarcanes of all ages and occasionally cause very serious damage in individual fields with some heavy attacks and infestations observed in some parts of Mexico (Box, 1956). *D. magnifactella* is reported to cause greater amounts of damage to sugarcane than *D. saccharalis* (Box, 1956).

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Crambidae	*Diatraea saccharalis*	Sugarcane stalk borer	*Oryza sativa* (rice), *Panicum dichotomiflorum* (smooth witchgrass), *Paspalum*, Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Sorghum halepense* (Johnson grass), *Zea mays* (maize).	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[35,46]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Antigua and Barbuda, Barbados, Belize, British Virgin Islands, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, U.S. Virgin Islands, United States of Amercia (Alabama, Florida, Louisiana, Mississippi, Texas), Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.	LOW	HIGH	HIGH	HIGH	**MEDIUM**
Noctuidae	*Sesamia poephaga*		Sugarcane, Maize, sorghum, (Sallam, 2006).[47]				West Africa to Sudan, Comoros and Madagascar (Sallam, 2006).	LOW[48]	HIGH	HIGH	HIGH[49]	**MEDIUM**

[46] *D. saccharalis* feed by scraping the leaf or tunnelling through the midrib during first and second instars. After this, they burrow into the stalk creating galleries where they remain for larval and pupal stages. The damage could result in death of the apical meristem, aerial root growth, lateral sprouts and loss of biomass.

[47] Reported as a gramineous borer in western Africa (Hailemichael et. al, 2009).

[48] This species is not currently present in locations geographically close to Australia, being reported in West Africa to Sudan, Comoros and Madagascar (Sallam, 2006). Entry potential reduced considering the species is not found geographically close to Australia.

[49] Reductions in stalk weight and juice quality after internode formation has commenced. The closely related species, *Sesamia inferens* can cause reductions of cane weight up to 57% and 36% reduction in brix (Dey et. al, 2021).

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Hemiptera												
Coccidae	*Pulvinaria tenuivalvata*	Cottony grass scale	Sugarcane.	Sap depletion may lead to wilting, leaf drop, dieback, and stunted growth. As with most sap-sucking insects, the production of honeydew leads to the growth of sooty mould. Early and heavy infestations have resulted in complete yield loss (dependant on size and timing of infestation).	Long distance dispersal via hitchhiking or infested plant material.		Egypt.	LOW	HIGH	HIGH	HIGH	**MEDIUM**
Bacteria												
Xanthomonadaceae	*Xanthomonas axonopodis pv. vasculorum*	Sugarcane gumming disease	*Saccharum* complex species, *Zea mays*, *Dictyosperma* album, *Roystonea* regia, *Areca cathecu*, *Thysanolaena maxima*, *Tripsacum fasciculatum*.	Affected plant parts include leaves and stem.	Local/regional movements may be due to the movement of seed, plants, soil or residues/aerosols from infested fields. Soil, crop residues, and/or infected plants or seeds are the most likely pathway for long distance dispersal.		Africa, Eswatini, Ghana, Madagascar, Malawi, Mauritius, Mozambique, Réunion, South Africa, Zimbabwe, Asia, North America, Antigua and Barbuda, Belize, Cuba, Dominica, Dominican Republic, Guadeloupe, Jamaica, Martinique, Mexico, Panama, Puerto Rico, Saint Kitts and Nevis, Trinidad and Tobago, United States of America, - Colorado, - Illinois, - Iowa, - Kansas, - Nebraska, Papua New Guinea, South America, Argentina, Brazil, - Parana, Colombia, French Guiana.	LOW	HIGH	HIGH	HIGH	**MEDIUM**

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Nematodes												
Heteroderidae	*Heterodera zeae*	Maize cyst nematode; Corn cyst nematode	Wide host range including *Saccharum officinarum* (sugarcane). [50]	Root system (presence of cysts on the roots, the proliferation of roots, and/or shallow root systems), aboveground structures (yellowing, poor tillering, stunting, patchy growth, smaller heads, and/or shrivelled grains). In general, as is the case with other plant parasitic nematodes, the disease is characterized by patches appearing in the field; in these the infested plants exhibit poor unthrifty growth, are stunted and are pale green in colour. The root system is also poorly developed. [51]	The main way cyst nematodes spread locally is via motile nematodes or cysts in the soil. Water and irrigation may facilitate spread. Soil, plants with residual soil, and equipment could spread this nematode over long distances. Cysts can persist in suitable environments for months to years.		Egypt, Afghanistan, China, India, Indonesia, Iran, Iraq, Nepal, Pakistan, Thailand, Greece, Portugal, United States of America.	MEDIUM	HIGH	MEDIUM	HIGH	**MEDIUM**
Longidoridae	*Longidorus laevicapitatus*	Needle nematode	Sugarcane.	Can cause damage by feeding on root cells and through the transmission of nepoviruses.	Soil, plants, plant products/materials and/or equipment could spread this nematode long distances.		Brazil, Argentina.	LOW	MEDIUM	LOW	HIGH	**LOW**

[50] Additional hosts include: *Abelmoschus esculentus* (okra), *Allium cepa* (onion), *Avena sativa* (oats), *Beta vulgaris* (beetroot), *Brassica oleracea* var. *capitata* (cabbage), *Carica papaya* (pawpaw), *Cicer arietinum* (chickpea), *Citrus*, *Citrus limon* (lemon), *Cocos nucifera* (coconut), *Glycine max* (soybean), *Gossypium* (cotton), *Hordeum vulgare* (barley), *Lagenaria siceraria* (bottle gourd), *Malus domestica* (apple), *Mangifera indica* (mango), *Musa* (banana), *Oryza sativa* (rice), *Pinus gerardiana* (Himalayan edible pine), Poaceae (grasses), *Prunus persica* (peach), *Psidium guajava* (guava), *Punica granatum* (pomegranate), *Setaria italica* (foxtail millet), *Solanum melongena* (aubergine), *Solanum tuberosum* (potato), *Sorghum bicolor* (sorghum), *Sorghum sudanense* (Sudan grass), *Triticum aestivum* (wheat), *Vicia faba* (faba bean), *Vigna radiata* (mung bean), *Zea mays* (maize), *Zea mays* subsp. *mexicana* (teosinte).

[51] As well as being stunted, the infested maize plants have also been reported to have retarded leaf emergence with reduced fresh and dry weights.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Phytoplasma												
Acholeplasmataceae (16SrXI -D)	*Sugarcane white leaf phytoplasma (16SrXI inc, 16SrXI-B and 16SrXI-D)*	White leaf of sugarcane (SWLP) (without vector)	Sugarcane.	The first foliar symptoms of sugarcane white leaf (SCWL) disease are cream-coloured or white stripes parallel to the midribs. As the disease progresses, stripes coalesce and extend along the entire leaf blades which appear severely chlorotic, while the vigour of the affected plants steadily decreases. [52]	Abiotic factors are not involved in natural spread of the sugarcane white leaf (SCWL) phytoplasma. SCWL phytoplasma is naturally transmitted by the leafhoppers *Matsumuratettix hiroglyphicus* and *Yamatotettix flavovittatus* (Matsumoto et al., 1968; Hanboongson et al., 2006). [53]		Bangladesh, Japan, Sri Lanka, Taiwan, Thailand, China.	LOW	LOW	LOW	HIGH	**LOW**
Acholeplasmataceae (16SrXI-B)	'*Candidatus* Phytoplasma sacchari' *16SrXI-B*	Green grassy shoot (without vector)	*Saccharum* spp.	Symptoms of the disease include the bending of leaflets (termed flaccidity), foliar yellowing and marginal necrosis of the older leaves.	Vectors such as *Deltocephalus vulgaris*, *Maiestas portica* and *Cofana unimaculata* can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		India, Sri Lanka, Thailand, Vietnam, Yemen.	LOW	LOW	LOW	HIGH	**LOW**

[52] The leaves are narrower and smaller than those of healthy plants, with a soft texture and are borne on slender, chlorotic shoots or tufted at the tips of slowly growing shoots. The affected plants are characterized by the excessive development of proliferating tillers with shortened internodes which gives the plants a bushy, broom-like appearance. Severely diseased plant parts fail to set fruits, decline and do not produce millable canes. Losses due to sugarcane white leaf (SCWL) phytoplasma vary greatly depending on the susceptibility of the clones, the weather and other environmental conditions influencing sugarcane growth. In Taiwan, over 60 hectares of sugarcane were abandoned due to both high incidence and severity of SCWL disease whereas incidence of more than 10% occurred in 700 hectares.

[53] Like other phytoplasmas, SCWL agent is not seed-transmissible. However, it may be introduced into new areas through imported vegetative propagating materials such as seed canes, which may carry the pathogen undetected. The use of infected vegetative propagating material is responsible for long-distance movement of the pathogen and intentional introduction into new areas.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Acholeplasmataceae (16SrXI-D)	*'Candidatus* Phytoplasma' 16SrXI-D (potentially F)	Grassy shoot (without vector)	*Saccharum* interspecific hybrids, *S. officinarum*.	The disease is characterised by the production of numerous lanky tillers from the base of the affected shoots. Leaves become pale yellow to completely chlorotic, thin and narrow. The plants appear bushy and 'grass-like' due to reduction in the length of internodes premature and continuous tillering. [54]	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal. The primary spread of the phytoplasma is through diseased setts and cutting knifes. The pathogen is transmitted secondarily by aphids viz., *Rhopalosiphum maydis,Melanaphis sacchari* and *M. idiosacchari*. Sorghum and maize serve as natural collateral hosts.		Vietnam, Thailand, India.	LOW	LOW	LOW	HIGH	**LOW**

[54] The disease appears nearly two months after planting. The affected clumps are stunted with premature proliferation of auxiliary buds. Cane formation rarely occurs in the affected clumps, if formed, thin with shorter internodes having aerial roots at the lower nodes. The buds on such canes usually papery and abnormally elongated.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [32]	Spread potential	Economic impact	Overall risk rating
Viruses												
Acholeplasmataceae	Sugarcane Ramu stunt (without vector)	Ramu stunt (SRSV)	*Saccharum* interspecific hybrids, *S. officinarum*.	Whole plant; pale green or yellowish streak on leaves (varying in length); infected cane appears thinner/stunted with abnormal proliferation of the nodes and reduced internode length. [55]	The vector for the causal agent is thought to be the Delphacid planthopper *Eumetopina flavipes* (Kuniata et al., 1994). Natural transmission appears limited to that associated with the insect vector. Planting diseased vegetative material may spread the disease (the vegetative material is sometimes referred to as sugarcane 'seed material'). As vegetative propagation is normal for sugarcane, there is ample opportunity to spread the disease locally, nationally and internationally in this fashion. [56]		Papua New Guinea.	MEDIUM	LOW	LOW	EXTREME	**MEDIUM**

[55] The most pronounced symptoms are stunted growth - hence the name Ramu stunt - and plant death (Waller et al., 1987; Eastwood, 1990; Magarey et al., 1996). Initially leaves are shortened, stiff and erect and show either a pale green to chlorotic striping or a broad mosaic pattern (Suma and Jones, 2000). Shoots are often yellow, and the leaves prematurely senesce, giving the crop a trashy, unkempt appearance (Magarey et al., 1996; Suma and Jones, 2000). Leaf patterns vary markedly with variety and crop and are at times uncharacteristic. There is a tendency for asymmetry across the leaf blade with one half showing more definite symptoms. Increased tiller numbers (Magarey et al., 1996) are found in several varieties and some have a grassy shoot appearance, though this is not definitive. Root system restrictions and death (Waller et al., 1987) are also associated with the disease. In some stools, individual tillers may be unthrifty and die while others produce a healthy stalk. In many cases in susceptible varieties, whole stools die giving rise to very large, or total, yield losses (Magarey et al., 1996; Suma and Jones, 2000). Complete ratoon failure has been noted as early as first ratoon.

[56] The vector for the causal agent is thought to be the Delphacid planthopper *Eumetopina flavipes* (Kuniata et al., 1994). Experimentation has shown that individuals of this species may transmit the disease when fed on diseased sugarcane and later transferred to healthy sugarcane plants. Symptoms took from 9 to 12 weeks to first appear. It is not known if the vector can transmit the disease trans-ovarially, or indeed which instars of the vector are able to acquire the causal agent. There are apparently several species of *Eumetopina* in Papua New Guinea; some of these species could transmit Ramu stunt. The disease usually spreads during the wetter times of the year in the commercial cropping area (January-March) (Waller et al., 1987). This most probably corresponds with the incidence of lush crop growth and a rapid build-up in vector population. Traditionally, disease spread may have occurred with transfer of planting material of the domesticated S. officinarum. Spread of the disease in the true seed of sugarcane has not been tested. Spread outside planting material, or independent of an insect vector, is unknown.

Other Pests of Biosecurity Significance

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

To be considered as a pest of biosecurity significance, the pest should be economically important to the Sugarcane industry and meet at least one of the following criteria:

- 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.

Table 4. *Other Pests of Biosecurity Significance for the Australian Sugarcane Industry.*

Common name (Scientific name)	**Hosts**	**Impact on crop**	**Distribution in Australia**	**State movement controls or markets impact by pests**	**Notifiable in NSW or QLD?**[57]	**Comments**
Coleoptera						
Sugarcane weevil borer (*Rhabdoscelus obscurus*)	*Saccharum* spp., palm species	The larvae of the borer live in the stalk causing deterioration and loss of weight in stalks. This reduces yield and sugar content and sugar quality.	Central and Northern Queensland.		No (NSW) No (QLD)	Weevil borer is partially controlled by resistant varieties. Insecticide can be used in severe infestations. Biosecurity zones and restrictions on the movement of sugarcane plant material and contaminated machinery in Queensland are designed to prevent the spread of this pest. For more information see https://sugarresearch.com.au/sugar_files/2017/02/IS13073-Sugarcane-weevil-borer.pdf
Bacteria						
Ratoon stunting disease *(Leifsonia xyli subsp. xyli)*	*Saccharum* spp.	RSD has no external symptoms. The bacteria live in the xylem cells where they restrict water flow. Small red/brown dots can be seen in nodes. RSD can cause losses of 20-60%. Losses are greater during periods of moisture stress.	All sugarcane growing regions of Australia except the Ord River in Western Australia.		No (NSW) No (QLD)	Control of RSD involves the use of disease-free planting material from approved seed schemes, on-farm plant source inspections, diagnostic laboratories and good crop hygiene. Hot water treatment is used to establish disease-free planting material. General biosecurity zone regulations assist in preventing spread of this disease to growers who have eliminated the disease from their farms and to approved seed plots. For more information see https://sugarresearch.com.au/sugar_files/2017/02/RSD-IS13007.pdf
Leaf scald (*Xanthomonas Xanthomonas albilineans serotype 1)*	*Saccharum* spp.	*X. albilineans* can remain latent in some varieties for long periods (> 12 months) while showing no symptoms. Stress can trigger the infected plant to pass from the latent phase to the chronic phase. Chronic infection results in chlorotic (white) stripes and patches of chlorotic tissue on	All sugarcane growing regions of Australia, except the Ord River in Western Australia[58].		No (NSW) No (QLD)	Control of leaf scald involves the use of disease resistant varieties, disease-free planting material from approved seed schemes and good crop hygiene. Biosecurity zones and restrictions on the movement of sugarcane plant material and contaminated machinery in Queensland are designed to prevent the spread of this disease. For more information see https://sugarresearch.com.au/sugar_files/2017/02/Leaf-scald-IS13002.pdf

[57] For New South Wales, Schedule 2 of the Biosecurity Act 2015 lists ‘prohibited matter’, meaning plant pests and diseases that are notifiable. For Queensland, prohibited matter affecting plants is listed in Part 7 of the Biosecurity Act 2014.
[58] Major epidemics of leaf scald have occurred in the Central and Burdekin regions. The disease is rare in the Bundaberg region.

Common name (Scientific name)	Hosts	Impact on crop	Distribution in Australia	State movement controls or markets impact by pests	Notifiable in NSW or QLD?[57]	Comments
		leaves and burning at leaf tips. In some susceptible varieties, leaf scald can cause the sudden death of whole stools.				
Fungi						
Sugarcane smut *(Sporisorum sacchari)*	*Saccharum* spp., limited infection of *Rottboellia* and *Imperata*	Smut infects through buds and the fungus grows in association with the meristems in plants. Infected plants produce a characteristic whip-like structure from the meristem and are severely stunted with thin stalks. Severely affected plants can die.	All sugarcane growing areas of Australia.		No (NSW) No (QLD)	Control of smut is primarily by resistant varieties. Breeding resistant varieties is essential for continued viability of the industry and growers should not plant susceptible varieties. For more information see https://sugarresearch.com.au/disease/smut/
Oomycetes						
Pachymetra root rot (*Pachymetra chaunorhiza*)	*Saccharum* spp.	Pachymetra root rot attacks the primary roots of plants and causes a soft flaccid rot of these roots. Root systems are restricted which can cause yield losses of up to 40%. Plants can tip out of the ground causing loss of plants at harvest and processing problems at the sugar mills due to excessive levels of soil.	All sugarcane growing areas of Australia but has limited distribution in some districts, particularly in the Burdekin region where it has only been recorded on a few farms.		No (NSW) No (QLD)	The only economically viable control method is to use disease resistant varieties. General biosecurity zone regulations assist in preventing spread of this disease to regions with limited distribution of the disease. For more information see https://sugarresearch.com.au/sugar_files/2022/02/2022_Pachymetra-Root-Rot_F.pdf
Viruses						
Fiji leaf gall (*Fiji disease virus FDV)*	*Saccharum* spp.	Fiji leaf gall can cause severe stunting, profuse tillering and death of plants. Leaves are often shorter than normal and have a ragged edge, giving the appearance that an	Central and southern Sugarcane growing regions of Australia.	Under Queensland legislation, it is an offence to move sugarcane from the southern districts, where FLG is present,	No (NSW) Yes (QLD)[60]	Three species of planthoppers in the genus *Perkinsiella* are demonstrated vectors of FDV: *P. vitiensis, P. vastatrix* and *P. saccharicida*[61]. Other *Perkinsiella* species may also be vectors[61]. The vector, *Perkinsiella saccharicida*, occurs throughout all sugarcane

[60] Regarded as a notifiable disease under Queensland State Government Plant Protection Regulations.

Common name (Scientific name)	**Hosts**	**Impact on crop**	**Distribution in Australia**	**State movement controls or markets impact by pests**	**Notifiable in NSW or QLD?**[57]	**Comments**
		animal has bitten the top of the plant. The leaves can be darker green in colour than healthy leaves. The growing point often dies, causing side-shooting on stalks. Stunting is particularly severe in ratoon crops and when infected stalks are planted[59].		to northern districts[61]		growing regions of Queensland and New South Wales[61]. A study reported greater vector competency of the northern population of *Perkinsiella saccharicida* which means the disease could spread more rapidly in northern Queensland than where it currently exists in Southern Queensland[61]. *P. thompsoni,* of unknown vector potential, occurs in the Ord River Irrigation Area (ORIA) of Western Australia[61]. Due to the presence of the vector, *Perkinsiella saccharicida,* in northern Queensland, absence of the disease in northern Queensland is hypothesised to be due to natural geographic barriers and strict quarantine restrictions on sugarcane movement in Queensland[61]. Fiji leaf gall is a notifiable disease under Queensland state government legislation. Control is by resistant varieties and disease-free planting material. Biosecurity zones and restrictions on the movement of sugarcane plant material and contaminated machinery in Queensland are designed to prevent the spread of this disease. It is currently managed in Queensland and NSW through the compulsory use of resistant cultivars[61]. Resistance to Fiji leaf gall (previously Fiji disease) is a prerequisite for all cultivars of sugarcane released in central and southern Queensland and New South Wales[62]. Resistance breeding programs have shown success in managing the impact of the virus. For more information see https://sugarresearch.com.au/disease/fiji-leaf-gall/
Sugarcane striate mosaic-associated virus (*Sugarcane striate mosaic-associated virus*)	*Saccharum* spp.	The symptom that characterises this disease is short, fine striations on the leaves. Striations can vary in number from a few to so many that the greater part of the leaf blade is covered. The striations are a lighter green than the normal leaf colour	Burdekin district of Queensland.		No (NSW) Yes (QLD)	The only economically viable control method is to use disease resistant varieties. Regularly obtaining disease-free seed and planting the seed can on areas that are free of the disease are important in management of the disease. Biosecurity zones and restrictions on the movement of sugarcane plant material and contaminated machinery in Queensland are designed to prevent the spread of this disease. For more information see https://bps.net.au/cms/wp-content/uploads/2013/11/171007_Sugarcane_striate_mosaic_IS13127.pdf

[59] The presence of galls on the underside of the leaf blade and midrib is a characteristic of this disease. The galls vary in size from 1 mm to 200 mm in length.
[61] Ridley, A.W., Dhileepan, K., Johnson, K.N., Allsopp, P.G., Nutt, K.A., Walter, G.H. & Croft, B.J. (2006) Is the distribution of Fiji leaf gall in Australian sugarcane explained by variation in the vector *Perkinsiella saccharicida*?, Australasian Plant Pathology, 35, 103-112. http://dx.doi.org/10.1071/AP06011
[62] Croft, Barry J., James, Anthony, Ridley, Andrew, & Smith, Grant R. (2004) Developing methods to screen sugarcane varieties for resistance to Fiji leaf gall. In Hogarth, D. (Ed.) *Proceedings of the 2004 Conference of the Australian Society of Sugar Cane Technologists (ASSCT).* Australian Society of Sugar Cane Technologies, Australia.

Common name (Scientific name)	**Hosts**	**Impact on crop**	**Distribution in Australia**	**State movement controls or markets impact by pests**	**Notifiable in NSW or QLD?**[57]	**Comments**
		and appear on the youngest leaves first. This disease can cause death of plants and failure of ratoon crops.				
Sugarcane mosaic virus Strain A (*Sugarcane mosaic virus Strain A*)	*Saccharum* spp.	This disease is characterised by a mosaic pattern of various shades of green to yellow on the leaf. The symptoms are most obvious in young rapidly growing leaves. Infected plants can suffer yield losses of 20-30% in ratoons.	Recorded in all sugarcane growing regions in Queensland and NSW but is currently restricted to the Southern region, particularly the Bundaberg and Childers districts.		No (NSW) Yes (QLD)	The only economically viable control method is to use disease resistant varieties. It is also important to obtain disease-free seed. Biosecurity zones and restrictions on the movement of sugarcane plant material and contaminated machinery in Queensland are designed to prevent the spread of this disease. For more information see https://sugarresearch.com.au/sugar_files/2022/02/Mosaic_2022_D.01.pdf

Action Plan for the Australian Sugarcane Industry

Following pest prioritisation and preparedness analysis undertaken as part of the biosecurity planning process by the Sugar Technical Review Panel (TRP) and the Sugar Biosecurity Reference Panel (BRP), an Action Plan was developed for the Australian Sugarcane industry to document the industry's priorities with regards to biosecurity.

The Action Plan identifies current and future activities, goals and objectives for the Australian Sugarcane industry, governments, and other stakeholders to support biosecurity preparedness over the life of the Biosecurity Plan (2024-2029). It is intended that the Action Plan is monitored and reviewed regularly.

The Action Plan outlines the strategies and activities that may be implemented over the life of the plan through the efforts of the sugar industry, Queensland Cane Growers Organisation Ltd (Canegrowers), Australian Sugar Milling Council, Sugar Research Australia, PHA, government and other stakeholders.

The Biosecurity Action Plan comprises a list of potential biosecurity actions mapped to key strategy areas where industry and government should align their biosecurity efforts. Note that actions may require additional funding to be sourced prior to commencement.

The key priority areas of the Biosecurity Action Plan align with the key priority areas of the National Biosecurity Strategy 2022-2032.[63] There are five strategy areas in this Action Plan (**Figure 5.** The current five strategy areas included in this Action Plan. Incorporated in the current five strategy areas, are the eight strategy areas previously included in the Implementation Table from the most recent previous Biosecurity Plan for the Australian Sugarcane Industry (Version 3.0 (2016))(**Figure 6**).

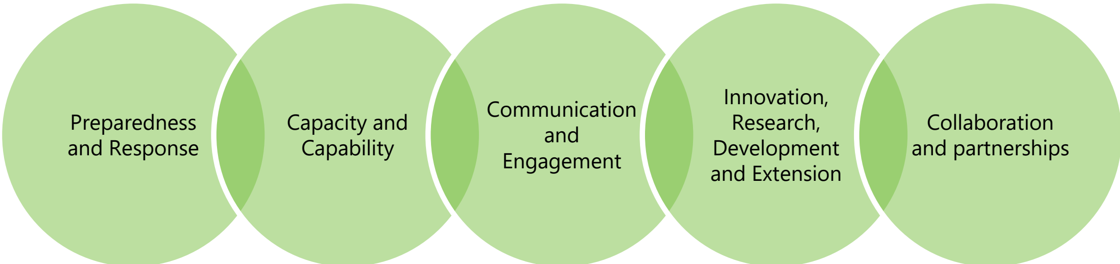

Figure 5. *The current five strategy areas included in this Action Plan.*

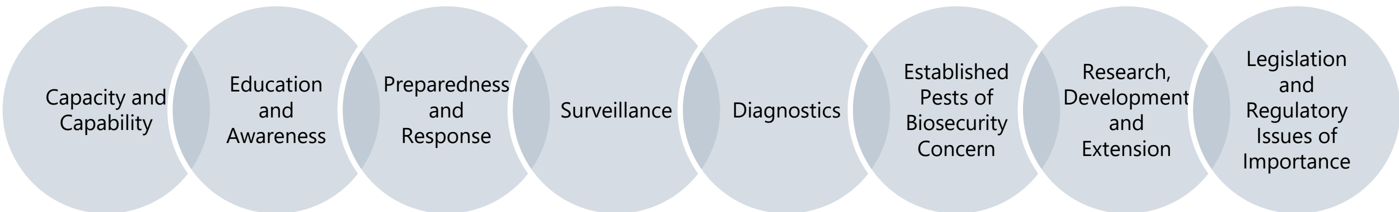

Figure 6. *The eight strategy areas previously outlined in the Implementation Table from the most recent Biosecurity Plan for the Australian Sugarcane Industry (Version 3.0 2016).*

The Action Plan highlights both activities that are currently underway and those activities 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.

This Plan has been developed in recognition that biosecurity is a shared responsibility between industry, government, and other stakeholders. For this reason, the Biosecurity 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.

The following Action Plan has been produced as a collaborative effort between CANEGROWERS, Sugar

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

Research Australia (SRA), the Australian Sugar Milling Council (ASMC), Productivity Services and all other grower collectives.

- CANEGROWERS is the industry peak body and Plant Health Australia (PHA) representative organisation for the sugarcane industry. CANEGROWERS is a Plant Industry Member of PHA and is also a signatory to the Emergency Plant Pest Response Deed (EPPRD).
- Sugar Research Australia (SRA) is an industry owned company funded by a statutory levy that invests in and manages a portfolio of research, development and adoption (RD&A) projects that drive productivity, profitability and sustainability for the Australian sugarcane industry. SRA is also an Associate Member of PHA.
- Productivity Services are regional organisations that provide clean propagating material ('seed'), services to prevent pest and disease spread and extension advice to growers within each sugarcane district. In most districts, Productivity Services staff have been trained (as accredited certifiers) to provide machinery inspections and approvals to move machinery between sugarcane biosecurity zones, under the *Biosecurity Act 2014*.

The Sugarcane industry recognises the need to work with Australian federal, state and territory governments to help reduce the potential for incursions of emergency plant pests that could adversely impact production, domestic and international trade, regional economies and the environment. The industry is also strongly committed to ensuring that responses to any pest incursions are undertaken as effectively as possible to minimise costs and other impacts to growers, the sugarcane industry, other plant industries, government parties and the wider community.

Biosecurity is a shared responsibility and the Biosecurity Action Plan, formerly referred to as the Implementation Table, has been produced to assist with the coordination of actions and resources in the Australian biosecurity system.

In summary, this plan aims to:

- Build upon the themes outlined in the Intergovernmental Agreement on Biosecurity (IGAB)[64] and the National Plant Biosecurity Strategy (NPBS)[65] by providing a clear line of sight between the development of the Biosecurity Plan and broader plant health policy and legislation.
- Provide focus and strategic direction for plant biosecurity activities relating to the Australian Sugarcane Industry over a five-year period from 2022-2027 (i.e. the life of this Biosecurity Plan).
- Prove specific recommendations for potential biosecurity activities identified by key stakeholders to improve biosecurity preparedness for pest threats.

Implementing the specific actions listed in the Biosecurity Action Plan will not only strengthen the sugar industry, but also the broader national plant biosecurity system. Future versions of this plan will also track progress on the actions described.

Strategic Alignment

CANEGROWERS strongly supports the industry-owned RD&E organisation, SRA. SRA is the major funder and provider of research and development in the sugarcane industry, and advocates adequate funding, which is sourced from grower and miller levies, as well as the Australian and Queensland governments. The activities outlined in this Action Plan are aligned with the strategic priority areas outlined in both the SRA Strategic Plan (2021-2026)[66] and Priority 4 'Biosecurity Preparedness' of the SRA Ten-Year R&D Plan (2024-2034)[67].

[64] For more information visit agriculture.gov.au/animal-plant-health/pihc/intergovernmental-agreement-on-biosecurity
[65] For more information visit planthealthaustralia.com.au/national-programs/national-plant-biosecurity-strategy/
[66] https://sugarresearch.com.au/sugar_files/2023/09/SRA-Strategic-Plan-2021-2026-update-Digital.pdf
[67] https://sugarresearch.com.au/sugar_files/2024/06/SRA-10-Year-RD-Plan-2024-2034.pdf

Table 5. *Acronyms used in this Action Plan.*

ACRONYM	DEFINITION
AARSC	Applied Agricultural Remote Sensing Centre
ACFA	Australian Cane Farmers Association (note ACFA is now QCAR)
APVMA	Australian Pesticides and Veterinary Medicines Authority
ASMC	Australian Sugar Milling Council
BISOP	Biosecurity Incident Standard Operating Procedures
BOLT	Biosecurity OnLine Training
BP	Biosecurity Plan
BRP	Biosecurity Reference Panel
DAFF	Commonwealth Department of Agriculture, Fisheries and Forestry
DPI QLD	Department of Primary Industries, Queensland
DPIRD NSW	Department of Primary Industries and Regional Development, New South Wales
EPPR	Emergency Plant Pest Response
EPPRD	Emergency Plant Pest Response Deed
GBO	General Biosecurity Obligation
ILCs	Industry Liaison Coordinator
ILOs	Industry Liaison Officers
PBRI	Plant Biosecurity Research Initiative
PHA	Plant Health Australia
PIF	Plant Industry Forum
PIFC	Plant Industry Forum Committee
NAQS	Northern Australian Quarantine Strategy
NDP	National Diagnostic Protocol
NSP	National Surveillance Protocol
QCAR	Queensland Cane, Agriculture & Renewables
RDC	Research and Development Organisation
RD&E	Research, Development and Extension
RVC	Regional Variety Committee
SIBC	Sugar Industry Biosecurity Committee (formed to meet annually for the life of each Biosecurity Plan to review its relevance and implementation)
SNPHS	Subcommittee on National Plant Health Surveillance
SPHD	Subcommittee on Plant Health Diagnostics
SRA	Sugar Research Australia
TRP	Technical Review Panel
TST	Threat Summary Table

Table 6. *Action Plan for the Australian sugarcane industry.*

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
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.	• ASMC • CANEGROWERS • Grower collectives • PHA • SRA		
	1.2 Where possible, develop requests for categorisation under the Emergency Plant Pest Response Deed (EPPRD), for submission to PHA, to support preliminary risk assessment of exotic pests of priority to the Australian sugarcane industry.	Categorisation of one or more priority pests to the Australian sugarcane industry.	Increase ability for rapid response to incursions of exotic pests of priority to the Australian sugarcane industry and implementation of response and cost-sharing arrangements under the EPPRD.	• ASMC • CANEGROWERS • Grower collectives • Other affected industry parties • PHA • SRA	As a signatory to the EPPRD, the Australian Cane Growers' Council Ltd. may initiate categorisation requests for pests to PHA. CANEGROWERS commits to ensuring appropriate industry technical experts will be available to participate in future meetings of the Categorisation Group to consider either pest categorisation or funding weight calculations for Emergency Plant Pests (EPPs) with multi-industry impacts. Pest categorisation will be next reviewed concurrent with the current Biosecurity Plan (2022-2027), and then refined on an annual basis. Of the 28 high-priority pests identified in the current Sugarcane Industry Biosecurity Plan, seven have been categorised in Schedule 13 of the EPPRD. During 2016-2020, CANEGROWERS and SRA aimed to develop the following categorisation requests: • Downy mildew *(Peronosclerospora philippinensis)* • Grassy shoot phytoplasma • *Chilo* spp. (including *C. auricilius, C. infuscatellus, C. sacchariphagus, C. terrenellus* and *C. tumidicostalis*) • African sugarcane stalkborer (*Eldana saccharina*) • Root borer (*Polyocha depressella (syn. Emmalocera depressella))* • Top borer (*Scirpophaga excerptalis*) • Sugarcane planthopper/Island sugarcane planthopper (*Eumetopina flavipes*) • Sugarcane planthoppers (P. *vastatrix* and *P. vitiensis*) • Leaf scald (*X. albilineans*) • Sugarcane woolly aphid (*C. lanigera*) • Sugarcane pyrilla (*P. perpusilla*) The above pests and diseases are yet to be categorised under the EPPRD as of October 2024.	2022-2027 (Annual review)
	1.3 Ensure the Owner Reimbursement Costs (ORC) Framework and cost calculations are current and appropriate.	Current ORC framework and cost structure.	ORC framework and costs structures remain relevant to key industry sectors.	• ASMC • CANEGROWERS • Grower collectives • PHA • SRA	In 2007, CANEGROWERS developed an Evidence Framework for Owner Reimbursement Costs (ORCs) for the Sugarcane Industry. In 2017, CANEGROWERS worked with PHA to review the Evidence Framework for ORCs for the Sugarcane industry. CANEGROWERS continues to work with PHA to review this framework as appropriate.	Ongoing (review as appropriate)
	1.4 Participate in future simulation	Participation in future	Increased understanding of	• ASMC	A CANEGROWERS workshop is scheduled for early 2025 as preparation for	

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
	exercises that test the preparedness and response of the biosecurity system to exotic pest and/or pathogen incursions.	simulation exercises with the aim of running an industry wide simulation exercise with PHA to demonstrate the preparedness of the industry and government(s) to an emergency response.	roles and activities related to preparedness and response to exotic pest and/or pathogen incursions.	• CANEGROWERS • Grower collectives (including QCAR) • PHA • Productivity Services • State and territory governments (DPIRD NSW, DPI QLD) • Sunshine Sugar • SRA	future simulation exercises.	
	1.5 Understand current surveillance programs and develop an industry surveillance strategy that links industry and government surveillance efforts.	Maintain an industry surveillance strategy that links industry and government surveillance efforts.	Increased industry biosecurity awareness and preparedness that supports early detection of key exotic pests and an improved knowledge of geographic spread of established pests.	• ASMC • CANEGROWERS • Commonwealth government • Grower collectives • SNPHS • SPHD • State and territory governments (DPIRD NSW, DPI QLD) • SRA	In 2016, an industry workshop was held to develop a surveillance strategy for the sugarcane industry informed by government and industry activities. Between 2016-2017, preliminary trials of industry surveillance data capture with Productivity Services and SRA research plantings were conducted. Following this, in 2017, CANEGROWERS and SRA investigated the development of an online industry surveillance data capture system (e.g. an app) and incorporation of surveillance recording with Smartcane. An app was trialled and developed but not adopted. Currently excel spreadsheet templates are used by growers for recordkeeping.	Ongoing
	1.6 Undertake a regular desktop review/stocktake which evaluates the limitations of current and potential surveillance programs and identify tools or methods that may address identified limitations.	Risk analysis report.	Increased industry biosecurity awareness and ability for the detection of exotic pests.	• ASMC • CANEGROWERS • Grower collectives • PHA • SRA • State and territory governments (DPIRD NSW, DPI QLD)	Training and resources for extension and field staff including development of Exotic pest ID tool (pictures, description), to ensure early identification.	2025 (within 12 months)
	1.7 Maintain support for continued improvement of diagnostics for key pests.	New or improved diagnostic protocols and methods.	Increased accuracy and rapid diagnosis of pests/pathogens will provide greater opportunity for eradication and/or management.	• ASMC • CANEGROWERS • Collaborating industries • Grower collectives • Other R&D groups • Research providers • SPHD • SRA • State and territory governments (DPIRD NSW, DPI QLD) • Universities		Ongoing
	1.8 Plant sentinel sugarcane plants with lower resistance to viruses and insects (e.g. moth borers) to monitor potential movement.	Reports of pests novel to trial crop growing sites in Indonesia and Papua New Guinea.	Increased awareness of pests and diseases affecting sugarcane that may be of biosecurity concern to	• SRA	As part of stem borer resistance breeding programs, trial crops are grown overseas in Indonesia and Papua New Guinea. Pests detected on these crops that are new to the region (within Indonesia and Papua New Guinea) will be	

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
			Australia.		reported to SRA by contracted researchers. A new project[68] announced in August 2024 will see sugarcane varieties propagated in plantations across the Indonesia archipelago monitored for their resistance to a range of pests and diseases in a frontline biosecurity effort to protect sugarcane production in Australia.	
	1.9 Review the availability of crop protection products available 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.	• APVMA • ASMC • CANEGROWERS • Commercial companies • Commonwealth government • Grower collectives • SRA • State and territory governments (DPIRD NSW, DPI QLD)	Crop protection products are utilised as a control mechanism for insect pests. Note: Most diseases of sugarcane are not managed by crop protection products alone, or at all, and rely on a combination of hygiene practices, variety selection, fallow management, and use of clean seed of approved varieties. Disease management in sugarcane relies heavily on an integrated approach. CANEGROWERS liaise with APVMA regarding permits as required. The availability of crop protection products is to be regularly reviewed as chemical treatments change.	
	1.10 Maintain an understanding of relevant biosecurity legislation and regulations in all states/territories.	Regular legislation and regulation updates.	Any specific state/territory or discordant requirements identified. Increase industry awareness of legislation and regulations impacting their businesses.	• ASMC • CANEGROWERS • Grower collectives • Productivity Services • Regional Variety Committees (RVCs) • SRA	Following the enactment of legislation under the Biosecurity Act (2014), industry and government continue to work together and promote General Biosecurity Obligation (GBO) and conduct training for industry representatives on current regulations.	Ongoing
	1.11 Continue to encourage the certification and adoption of best biosecurity practice principles.	Adoption of relevant certification(s), GBO and best management practice guidelines (Smartcane).	Growers continue to adopt latest certifications, ensure compliance and high-quality production.	• ASMC • CANEGROWERS • Grower collectives • PHA • Productivity Services/Productivity Service companies • RVCs • SRA	CANEGROWERS and SRA continue to work collaboratively to incorporate biosecurity best practice guidelines and the GBO into existing industry best management practice guidelines including the SmartCane BMP Program (www.smartcane.com.au) in Queensland and Bonsucro in New South Wales, and to investigate development of online training modules to test knowledge. The Smartcane BMP Program is an industry-led best management practice system for cane growing across Queensland and provides a mechanism for growers to demonstrate their sound farming practices and to identify options for further innovation and improvement. Productivity Service companies, which are regional organisations that provide clean seed and services to prevent pest and disease spread, also provide extension advice to growers within each sugarcane district. In most districts, Productivity Services staff have been trained to provide machinery inspections and approvals to move machinery between sugarcane biosecurity zones thereby encouraging adoption of best biosecurity practice.	Ongoing
2. Capacity and Capability	**2.1** Form and maintain a Sugarcane Industry Biosecurity Reference Panel.	A Biosecurity Reference Panel is formed and meets regularly.	The Sugarcane industry maintains its focus on exotic pests and diseases and appropriate	• ASMC • CANEGROWERS • Commonwealth government • Grower collectives	As part of the current Sugarcane Biosecurity Plan (2022-2027) project, a Biosecurity Reference Panel (BRP) was assembled in 2023 to guide development of the Threat Summary Table (TST) and inform risk ratings applied to exotic pests of significance to the Australian sugarcane industry.	Ongoing

[68] https://sugarresearch.com.au/new-frontline-in-the-biosecurity-battle-to-protect-australian-sugarcane-industry/

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
			preparedness activities.	• PHA • Productivity Services • SRA • State and territory governments (DPIRD NSW, DPI QLD)	BRP members involved in TST review may also referred to as the Technical Review Panel (TRP), which itself was formerly the Technical Expert Group (TEG). BRP members have also contributed to the formation of the 'Implementation Group' charged with developing an Action Plan for the industry, with representation from the existing Sugar Industry Biosecurity Committee (SIBC) that was established to meet annually over the life of each Biosecurity Plan to review its relevance and implementation. The BRP, incorporating SIBC members, will continue to be actively involved through annual review of the Biosecurity Plan over the life of the current project (2022-2027).	
	2.2 Ensure CANEGROWERS, SRA and Productivity Services key personnel receive appropriate biosecurity training (e.g., EPPRD, Biosecurity OnLine Training (BOLT)) and maintain awareness of relevant biosecurity legislation and regulations in all states/territories.	Regular refresher training.	Improve understanding of biosecurity activities and preparedness for all levels of decision making.	• ASMC • CANEGROWERS • Grower collectives (including QCAR) • PHA • SRA • State and territory governments (DPIRD NSW, DPI QLD) • Sunshine Sugar	In 2016, PHA conducted half-day EPPRD training to members of CANEGROWERS, SRA, AMSC, ACFA (now QCAR) and Sunshine Sugar. In 2017, PHA conducted a 1-day training workshop for ILOs and ILCs in major growing areas, such as cane grower district managers. CANEGROWERS and SRA continue to pursue training opportunities with PHA on an as needs basis. A general ILO training workshop is scheduled for 24th October 2024 in Cairns, QLD, and a representative from SRA who is a communications professional is registered to attend. Disease identification workshops are held bi-annually at the SRA Woodford Pathology Farm where variety screening is conducted.	Ongoing
	2.3 Ensure key personnel receive Industry Liaison Officer (ILO) training as required.		Two people per growing region receive ILO training (of participants from SRA, District Managers are preferred to receive ILO training or Productivity Services staff) within the next two years; with one person from each region in the first 12 months and a second person from each region in the subsequent 12 months.	• ASMC • CANEGROWERS • Grower collectives • PHA • Productivity Services • SRA	Industry Liaison Officer (ILO) training is aimed at technical staff from the Productivity Services or SRA as well as the peak industry body signatory to the Emergency Plant Pest Response Deed (EPPRD), particularly those who would be involved in an industry liaison role. The training is designed to provide participants with the necessary skills and knowledge to effectively respond to biosecurity emergencies and support plant industries. ILOs are essential during emergency plant pest responses, serving as the link between the Incident Management Team and the affected industry party. ILO training is scheduled for Cairns on 24th October 2024. Other ILO training sessions are offered in the interim period in other states throughout Australia on a rotating basis, with training in Cairns due to be held again in 2026. More information on ILO workshops and help with registration can be obtained from PHA's training team via email at training@phau.com.au. A representative from SRA who is a communications professional is registered to attend the general ILO training workshop scheduled for 24th October 2024 in Cairns, QLD.	2026
	2.4 Maintain a suite of training programs and modules for all sectors of the industry (e.g., EPPRD training for Board directors, Industry Liaison training for industry staff).	Appropriate training programs and modules targeting industry.	Industry training programs delivering biosecurity aware staff and industry personnel with the capability to contribute to improved biosecurity preparedness and response.	• ASMC • CANEGROWERS • Grower collectives • PHA • SRA • State and territory governments (DPIRD NSW, DPI QLD)	Disease identification workshops are held bi-annually at the SRA Woodford Pathology Farm where variety screening is conducted.	Every 2 years or on as needs basis

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
	2.5 Undertake an analysis of research and development capacity within the sugarcane industry and develop a strategy to address gaps.	Research and development capacity analysis.	The Australian sugarcane industry understands current R&D capacity and has a strategy to address future needs.	• ASMC • CANEGROWERS • Commonwealth government • Grower collectives • SRA • State and territory governments (DPIRD NSW, DPI QLD)	SRA has a ten-year R&D plan [69] in place from 2024 to 2034. Also, as part of the 'Capability assessment of the Sugarcane industry' project managed by SRA, capability assessments were undertaken by DPI QLDin 2017 and 2019, with a current assessment in progress that is due Q2 2025. Industry Planning Engagement Sessions are conducted on an annual basis by SRA to broader industry stakeholders.	
	2.6 Support addressing gaps in biosecurity preparedness by collaborating with other industries, governments, and other stakeholders.	Collaborative biosecurity network.	Improved biosecurity preparedness for exotic pest incursion by industry and government.	• ASMC • All Grower collectives • PBRI • PHA • SRA	In 2016, CANEGROWERS undertook a project to establish a PHA levy and a positive Emergency Plant Pest Response (EPPR) levy to invest in critical biosecurity projects to prepare for an exotic pest incursion. The industry also has involvement with the Plant Biosecurity Research Initiative (PBRI) and the ARC Training Centre in Plant Biosecurity; the latter whose partner organisations include Sugar Research Australia, Herbert Cane Productivity Services Limited and Burdekin Productivity Services Limited.	Ongoing
	2.7 Determine what surveillance programs, diagnostics and management options are available for both high priority and emerging plant pests.	Identified programs, protocols and management options.	Improved systems for early detection, efficient diagnosis and management of exotic pests.	• ASMC • All Grower collectives • PHA • SPHD • SRA • Productivity Services • Satellite technologies e.g. Applied Agricultural Remote Sensing Centre (AARSC) [70]	SRA has an ten-year R&D plan in place from 2024 to 2034 and will continue to review current surveillance programs, diagnostics and management options available for both high priority and emerging plant pests and diseases.	Ongoing
3. Communication and Engagement	**3.1** CANEGROWERS maintains an industry database which holds current contact information for sugarcane managers and key industry stakeholders.	Current and maintained industry contact database.	Improved communication outcomes for biosecurity matters/incidents.	• ASMC • CANEGROWERS • Grower collectives • SRA • Productivity Services		Ongoing
	3.2 CANEGROWERS delivers an effective industry communications program with multiple delivery methods which has the capacity to deliver biosecurity relevant information.	Communications program including but not limited to, newsletters, articles, social media. CANEGROWERS will share with other parties, relevant biosecurity information and associated communications.	Sugarcane industry is well informed on the range of issues impacting on industry and business	• CANEGROWERS • Grower collectives • Individual milling companies • Productivity Services • SRA	SRA and CANEGROWERS maintain frequent and ongoing communication with industry, including: • *Cane Matters* – a magazine (electronic and hard-copy) that has been published on a quarterly basis since 2022 and is an amalgamation of the former *Milling Matters* and *CaneConnection* magazines. *Cane Matters* services the industry and provides information to growers and millers, including on current work in the biosecurity space.	Ongoing

[69] https://sugarresearch.com.au/sugar_files/2024/06/SRA-10-year-RD-Plan-2024-2034-Digital.pdf

[70] The Applied Agricultural Remote Sensing Centre (AARSC) is a team based at the University of New England (UNE) in Armidale, NSW, that conducts remote sensing projects across a number of agricultural and horticultural industries. https://www.une.edu.au/research/research-centres-institutes/applied-agricultural-remote-sensing-centre

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
					• *CaneClips*- a compilation of short videos which cover a range of topics, online webinars and industry updates. Grower focused information on biosecurity is also communicated in the Biosecurity Manual, the current version which is available on the SRA website. SRA also communicates relevant biosecurity information through various channels as required. Productivity Service companies, which are regional organisations that provide clean seed and services to prevent pest and disease spread, also provide extension advice to growers within each sugarcane district.	
	3.3 Prepare articles on biosecurity and key pests (exotic and established) for publication in industry journals and website.	Articles and any other relevant material in relation to biosecurity.	Industry stakeholders are informed on pests, current management practices and research activities.	• CANEGROWERS • Grower collectives • Individual milling companies • PHA • Productivity Services • SRA • State and territory governments (DPIRD NSW, DPI QLD)	**Information Sheets:** Between 2016-2020, SRA reviewed SRA dossiers on exotic mothborers and developed and reviewed information sheets on the following pests which were published on the SRA website: • Ramu stunt (Tenuivirus) • Downy mildew (*Peronosclerospora philippinensis, P. sacchari*) • Grassy shoot and Whiteleaf phytoplasma • Sugarcane streak mosaic virus (Poacevirus) • Leaf scorch (*Stagonospora sacchari*) • Leaf scald (*Xanthomonas albilineans*) • *Chilo* spp. (including *C. auricilius, C. infuscatellus, C. sacchariphagus, C. terrenellus* and *C. tumidicostalis*) • Top borer (*Scirpophaga excerptalis*) • Pink stalk borer (*Sesamia grisescens*) • African sugarcane stalkborer (*Eldana saccharina*) • Sugarcane planthopper/Island sugarcane planthopper (*Eumetopina flavipes*) • Sugarcane planthoppers (*Perkinsiella vastatrix* and *P. vitiensis*) • Sugarcane pyrilla (*Pyrilla perpusilla*) • Root borer (*Polyocha depressella*) • Sugarcane whitefly (*Aleurolobus barodensis*) and • Sugarcane woolly aphid (*Ceratovacuna lanigera*) SRA will continue to maintain the currency of the above information sheets and develop new information sheets where required. **Field Guides:** Two field guides, *Diseases of Australian Sugarcane* and *Pests of Australian Sugarcane*[71], contain the latest information on established and exotic pests and diseases for the Australian sugarcane industry. These guides are also available as free e-books and are currently undergoing review as of October 2024.	Ongoing

[71] https://sugarresearch.com.au/sugar_files/2022/02/Diseases-of-Australian-Sugarcane_Fieldguide_2022_web.pdf, https://sugarresearch.com.au/sugar_files/2021/08/Pests-of-Australian-Sugarcane_Fieldguide_2019_D.01.pdf

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
					To support early detection, field guides require updating to clearly describe the 7 categorised threats as per Schedule 13 of the EPPRD.	
	3.4 Promote, disseminate, and demonstrate benefits of biosecurity to industry.	New Sugarcane Farm Biosecurity Manual, workshops.	Increased knowledge and awareness of industry stakeholders of biosecurity and on-farm biosecurity measures. Once new Farm Biosecurity Manual complete, distribute to growers through awareness activities in growing regions.	• ASMC • CANEGROWERS • Grower collectives • PHA • Productivity Services • State and territory governments (DPIRD NSW, DPI QLD) • SRA	SRA and CANEGROWERS continues to deliver biosecurity awareness and education workshops in major growing regions to inform growers about pest and disease best management practices as well as the latest in research undertaken by the industry; in particular SRA which is the technical group specialising in research and development for the Australian sugarcane industry. In August 2024, PHA provided a survey to seek input on the new Farm Biosecurity Manual. SRA facilitated circulation of the survey to Sugarcane Regional Managers, agronomists, Productivity Services groups and other stakeholders, enabling participation and provision of feedback from industry stakeholders. The Manual is currently being progressed. Once the new Farm Biosecurity Manual is completed, it will be distributed to growers through awareness activities in growing regions.	Ongoing
	3.5 Ensure industry, particularly new entrants, are aware of the Emergency Plant Pest Response Deed (EPPRD), the ORC framework and the implications for the industry and business.	Articles and/or training of industry members and staff.	Improve understanding of biosecurity activities and preparedness for industry members and staff by ensuring new entrants are undertaking training on the EPPRD and ORC framework and relevant courses available on the Biosecurity Training Hub.	• ASMC • CANEGROWERS • Grower collectives • PHA • SRA	A suggestion was made for an SRA representative to present on the EPPRD to Regional Variety Committees (RVCs) (held on an annual basis). SRA and CANEGROWERS could investigate the Industry Resource Toolkit, developed by PHA, as a tool to aid communications and awareness of the EPPRD.	Ongoing
4. Innovation, Research, Development and Extension	**4.1** Review and prioritise Sugarcane biosecurity RD&E annually and identify opportunities for collaboration and cross-sectoral investment.	A Sugarcane biosecurity RD&E program that addresses key issues challenging the industry.	Effective RD&E implemented to address industry biosecurity issues.	• ASMC • CANEGROWERS • Commonwealth government • Grower collectives • Industry representatives • Research organisations • SRA • State and territory governments (DPIRD NSW, DPI QLD)	During 2016-2020, SRA explored a mechanism to feed in biosecurity R&D priorities into the SRA investment planning process. SRA continues to ensure identified biosecurity R&D priorities are prioritised within the overall R&D portfolio. SRA has developed a 10-year R&D plan (2024-2034) [72] which is updated annually.	Ongoing on an annual basis
	4.2 The sugarcane industry monitors investment and delivery of biosecurity preparedness and response readiness.	Resource availability matches resource need.	The sugarcane industry maintains the ability to fund appropriate biosecurity preparedness activities.	• ASMC • Grower collectives • Industry stakeholders • SRA	Investment driven by SRA as the lead.	Ongoing

[72] Sugar Research Australia has developed a 10-year R&D plan 2024-2034: https://sugarresearch.com.au/sugar_files/2024/06/SRA-10-year-RD-Plan-2024-2034-Digital.pdf

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
				• State and territory governments (DPIRD NSW, DPI QLD)		
	4.3 Investigate innovative technologies including but not limited to rapid in-field diagnosis of key pests and pathogens and resistance breeding.	Rapid in-field diagnostics tools, disease-resistant varieties and improved understanding of new and emerging technology.	More rapid diagnosis of pests and pathogens will assist growers to implement the most suitable eradication or management program.	• ASMC • CANEGROWERS • Grower collectives • Other research providers (including CSIRO) • Private venture • SRA • State and territory governments (DPIRD NSW, DPI QLD) • Universities	SRA plays an essential role in the biosecurity management and preparedness of the sugarcane industry. This includes overseeing national sugarcane breeding programs and the development of disease resistant varieties, improving the capability for the identification of high priority pest and pathogen species by morphological and molecular techniques, as well as conducting or assisting with surveys for sugarcane pests and diseases in neighbouring countries, such as Papua New Guinea and Indonesia.	Ongoing
	4.4 Maintain support for continued improvement of diagnostics for key pests.	New or improved diagnostic protocols and methods.	Increased accuracy and rapid diagnosis of pests/pathogens will provide greater opportunity for eradication and/or management.	• ASMC • CANEGROWERS • Collaborating industries • Grower collectives • Other research providers (including CSIRO) • Private venture • SPHD • SRA • State and territory governments (DPIRD NSW, DPI QLD) • Universities	CANEGROWERS and SRA are committed to the actions required to implement the Sugarcane Industry Action Plan. This includes developing and finalising National Diagnostic Protocols, fact sheets and contingency plans/dossiers for all HPPs and a range of other biosecurity preparedness activities. During 2016-2020, SRA worked with SPHD to review, develop and submit final National Diagnostic Protocols (NDPs) for endorsement on several invertebrates and pathogens. As of October 2024, 6 NDPs are in draft and 1 NDP is endorsed.	2027
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.	• ASMC • CANEGROWERS • Commonwealth government • Grower collectives • Initiatives including NapCARN • SRA • State and territory governments (DPIRD NSW, DPI QLD)	Tripartite meeting between ASMC, CANEGROWERS, SRA and the Federal Department of Agriculture, Fisheries and Forestry (DAFF).	Ongoing
	5.2 Build and maintain strong networks between industry, biosecurity researchers and regulators.	Contact list[73] for industry engagement.	Improved communication outcomes between industry, government and universities to establish	• ASMC • CANEGROWERS • Commonwealth government • Grower collectives	SRA has a contact list that facilitates their industry engagement. Industry Planning Engagement Sessions are conducted by SRA and presented to broader industry stakeholders on an annual basis.	Ongoing

[73] Professional networks for diagnostics and surveillance professionals exist and are represented by the National Plant Biosecurity Diagnostic Network (NBPDN) (https://www.plantbiosecuritydiagnostics.net.au/) and the Plant Surveillance Network (PSNAP)(https://www.plantbiosecuritydiagnostics.net.au/, https://plantsurveillancenetwork.net.au/), respectively.

BIOSECURITY PLAN STRATEGY	ACTION	OUTPUT	OUTCOME	POTENTIAL PARTNERS	CURRENT ACTIVITIES	TIMEFRAME
			relationships prior to a biosecurity incursion(s).	• Initiatives including NapCARN • Other researchers • PBRI • SRA • State and territory governments (DPIRD NSW, DPI QLD) • Universities		
	5.3 Support gaps in biosecurity preparedness to be addressed through collaboration with industries, governments, universities and other research and education providers.	Action Plan for the Australian Sugarcane industry.	Current Action Plan for the Australian Sugarcane industry is available to industry to support their preparedness against a biosecurity incursion.	• CANEGROWERS • Commonwealth government • Industry stakeholders (including ASMC and Grower collectives) • SRA • State and territory governments (DPIRD NSW, DPI QLD)		Ongoing on an annual basis
	5.4 Facilitate and maintain an international network of sugarcane technical specialists who can contribute to growth of knowledge and skills within the Australian sugarcane industry.	Sugarcane pest and disease network.	Improved capability and capacity to manage both established and exotic pests.	• ASMC • CANEGROWERS • Grower collectives • Individual milling companies • SRA • Universities • DPI QLD • CSIRO	SRA has strong links with sugar R&D groups in overseas countries to become familiar with and learn how to manage priority exotic pests and diseases.	Ongoing
	5.5 Engage in initiatives to improve preparedness and response to cross sectoral pests and or diseases.	Cross sectoral research and preparedness activities.	Shared investment into RD&E and improved biosecurity staff experience and collaborative networking.	• ASMC • CANEGROWERS • Grower collectives • PBRI • SRA		Ongoing

Preparedness for High Priority Pests of the Australian Sugar Industry

The following table identifies the current preparedness for High Priority Pests (HPPs) of the Australian Sugarcane Industry. Preparedness is documented in the context of available supporting documents, such as National Diagnostic Protocols (NDPs) and Contingency Plans, and current activities undertaken, such as surveillance. This allows industry, governments and Research, Development and Extension (RD&E) agencies to better prepare for these HPPs and align future activities as listed in the Biosecurity Action Plan.

Table 7. *Documents and activities currently available for High Priority Pests of the Australian sugar industry.*

SCIENTIFIC NAME	COMMON NAMES	NATIONAL DIAGNOSTIC PROTOCOL (NDP)[74]	SRA[75] MOLECULAR DIAGNOSTIC TEST(S)	SURVEILLANCE PROGRAMS[76]	FACT SHEETS	CONTINGENCY PLAN	NATIONAL PRIORITY PLANT PEST (NPPP)	EPPRD CATEGORY	POTENTIAL COLLABORATORS[77]
Blattodea									
Coptotermes gestroi	Asian subterranean termite	None	-	-	Yes - DAFF[78], LUCID[79]	-	Yes NPPP 29	None	Plantation Timber[80]
Coleoptera									
Dorysthenes buquetii (syn. Dorysthenes buqueti)	Sugarcane longhorn stem borer	None	-	-	-	-	No	None	-
Lepidoptera									
Chilo auricilius	Gold fringed-rice borer	Draft NDP in development (Chilo group)	-	NAQS target species[81, 82].	Yes - SRA[83], LUCID[84,]86, Farm Biosecurity101	Yes[89]	Yes NPPP-36	None	Grains (Maize and Sorghum), Rice

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[74] A list of current endorsed and draft National Diagnostic Protocols is maintained by the National Plant Biosecurity Diagnostic Network: http://www.plantbiosecuritydiagnostics.net.au/app/uploads/2021/04/List-of-National-Diagnostic-Protocols_November-2023.xlsx

[75] Sugar Research Australia

[76] Incorporates surveillance program information published in the 2020 National Plant Biosecurity Status Report: https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/2020-National-Plant-Biosecurity-Status-Report.pdf

[77] Industries listed in this column identify these pests within their biosecurity plans.

[78] DAFF factsheet on Subterranean termites: https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/plant/subterranean-termites

[79] LUCID factsheet: https://apps.lucidcentral.org/ppp/text/web_full/entities/asian_subterranean_termite_384.htm

[80] Hosts described as living and dead trees, timber in service as well as any material containing cellulose. i.e. paper etc.

[81] Included in the Northern Australia Quarantine Strategy (NAQS) December 2019 target list.

[82] Included in the Northern Australia Quarantine Strategy (NAQS) July 2021 target list.

[83] Sugar Research Australia factsheet on Exotic borers: https://sugarresearch.com.au/sugar_files/2017/02/Exotic_Borers_IS15001.pdf.

[84] LUCID factsheet: https://apps.lucidcentral.org/pppw_v12/text/web_mini/entities/rice_goldfringed_borer_410.htm

SCIENTIFIC NAME	COMMON NAMES	NATIONAL DIAGNOSTIC PROTOCOL (NDP)[74]	SRA[75] MOLECULAR DIAGNOSTIC TEST(S)	SURVEILLANCE PROGRAMS[76]	FACT SHEETS	CONTINGENCY PLAN	NATIONAL PRIORITY PLANT PEST (NPPP)	EPPRD CATEGORY	POTENTIAL COLLABORATORS[77]
Chilo infuscatellus (syn. Chilo tadzhikiellus)	Yellow top sugarcane borer	Draft NDP in development (Chilo group)	-	NAQS target species[81,82].	Yes - SRA83, DPIRD NSW[85], LUCID86, Farm Biosecurity101	Yes89	Yes NPPP-36	None	Grains (Barley, Maize, Millet, Oats, Sorghum), Rice
Chilo sacchariphagus	Spotted borer	Draft NDP in development (Chilo group)	-	NAQS target species[81,82].	Yes - SRA83, LUCID[86], DPIRD NSW[87], DAFF91, Farm Biosecurity101	Yes89	Yes NPPP-36	None	Grains (Maize, Sorghum), Rice
Chilo terrenellus	Dark headed rice borer	Draft NDP in development (Chilo group)	-	NAQS target species[81,82].	Yes - SRA83, LUCID86,[88], DAFF91, Farm Biosecurity101	Yes89	Yes NPPP-36	None	-
Chilo tumidicostalis	Spotted sugarcane stem borer; Plassey borer	None	-	-	Yes - SRA83, Farm Biosecurity101	Yes[89]	Yes NPPP-36	None	-
Scirpophaga excerptalis	Top borer	Draft NDP in development	-	NAQS target species[81,82].	Yes - SRA83, LUCID86, Cesar Australia[90], DAFF[91], Farm Biosecurity101	Yes89	Yes NPPP-36	None	Rice
Sesamia grisescens	Pink stalk borer	None	-	NAQS target species[81,82].	Yes - SRA83, DAFF91, LUCID[92], Farm	Yes[89]	Yes NPPP-36	Yes (2)	-

[85] NSW DPI factsheet: https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/yellow-top-borer
[86] LUCID factsheet: https://keys.lucidcentral.org/keys/v3/the-caterpillar-key/key/caterpillar_key/Media/Html/entities/crambidae.htm
[87] NSW DPI factsheet: https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/sugarcane-borer
[88] LUCID factsheet: https://apps.lucidcentral.org/pppw_v12/text/web_mini/entities/sugarcane_borer_277.htm
[89] Contingency Plan: https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Chilo-species-CP-2002-2.pdf
[90] Cesar Australia factsheet: https://www.plantbiosecuritydiagnostics.net.au/app/uploads/2022/08/Sugarcanetopborer_FactSheet.pdf
[91] DAFF factsheet: https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/plant/stem-borers-sugarcane
[92] LUCID factsheet: https://apps.lucidcentral.org/ppp/text/web_full/entities/sugarcane_pink_borer_278.htm

SCIENTIFIC NAME	COMMON NAMES	NATIONAL DIAGNOSTIC PROTOCOL (NDP)[74]	SRA[75] MOLECULAR DIAGNOSTIC TEST(S)	SURVEILLANCE PROGRAMS[76]	FACT SHEETS	CONTINGENCY PLAN	NATIONAL PRIORITY PLANT PEST (NPPP)	EPPRD CATEGORY	POTENTIAL COLLABORATORS[77]
					Biosecurity101				
Sesamia inferens	Asiatic pink stem borer; Purple stem borer; Noctuid moth	None	-	NAQS target species[81],[82].	Yes - SRA83, LUCID[93]	-	No	None	Grains (Maize, Millet, Oats, Sorghum, Wheat, Barley), Rice, Vegetable (Poaceae)
Eldana saccharina	African sugarcane borer	None	-	-	Yes - SRA83, Farm Biosecurity101	Yes[89], [94]	Yes NPPP-36	None	Grains (Maize, Millet, Sorghum)
Polyocha depressella (syn. Emmalocera depressella)	Sugarcane root borer	None	-	-	Yes – Farm Biosecurity[101]	Yes[89]	No	None	-
Hemiptera									
Aleurolobus barodensis	Sugarcane whitefly	None	-	NAQS target species[81].	-	-	No	Yes (3)	-
Ceratovacuna lanigera	Sugarcane woolly aphid	Endorsed NDP-43[95]	-	NAQS target species[81],[82].	Yes - LUCID[96]	-	No	None	-
Eumetopina flavipes (insect only)	Island Sugarcane planthopper	None	-	NAQS target species[81],[82].	Yes - SRA[97, 98], DPIRD NSW[99]	-	No	Uncategorised	-
Perkinsiella vastatrix (as a vector of Fiji leaf gall virus)	Sugarcane leaf hopper	None	-	No vector surveillance however, general and specific surveillance is undertaken within Queensland for Fiji leaf gall virus including sugar industry surveys, seed cane inspections, variety	Yes –DPIRD NSW[100]	-	No	None	Grains (Maize, Sorghum), Vegetable (Poaceae)

[93] LUCID factsheet: https://apps.lucidcentral.org/ppp/text/web_full/entities/rice_pink_stem_borer_409.htm
[94] Contingency Plan: https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Cane-borer-CP-2002.pdf
[95] Endorsed NDP-43 available: https://www.plantbiosecuritydiagnostics.net.au/app/uploads/2021/10/NDP43-Sugarcane-Woolly-Aphid-Ceratovacuna-lanigera-v1.0.pdf
[96] LUCID factsheet: https://apps.lucidcentral.org/pppw_v11/text/web_full/entities/sugarcane_woolly_aphid_531.htm
[97] SRA factsheet: https://sugarresearch.com.au/sugar_files/2017/02/Island_Sugarcane_Planthopper_IS15002.pdf
[98] SRA Dossier: https://elibrary.sugarresearch.com.au/server/api/core/bitstreams/f9d47497-1faf-4d0c-87fa-767b7713615a/content
[99] NSW DPI factsheet: https://idtools.dpi.nsw.gov.au/keys/cicadell/delphacidae/eflavipes.htm
[100] NSW factsheet (general for the genus *Perkinsiella*): https://idtools.dpi.nsw.gov.au/keys/cicadell/delphacidae/perkinsiella.htm

SCIENTIFIC NAME	COMMON NAMES	NATIONAL DIAGNOSTIC PROTOCOL (NDP)[74]	SRA[75] MOLECULAR DIAGNOSTIC TEST(S)	SURVEILLANCE PROGRAMS[76]	FACT SHEETS	CONTINGENCY PLAN	NATIONAL PRIORITY PLANT PEST (NPPP)	EPPRD CATEGORY	POTENTIAL COLLABORATORS[77]
				trials and general pest surveys[76]. NAQS target species[81,82].					
Perkinsiella vitiensis (as a vector of Fiji leaf gall virus)	Sugarcane planthopper	None	-	No vector surveillance however, general and specific surveillance is undertaken within Queensland for Fiji leaf gall virus including sugar industry surveys, seed cane inspections, variety trials and general pest surveys[76].	Yes – DPIRD NSW100	-	No	None	-
Pyrilla perpusilla	Indian sugarcane leaf hopper, Sugarcane plant hopper	None	-	-	Yes – Farm Biosecurity[101]	-	No	None	Grains (Maize, Oats, Sorghum, Millet, Wheat, Barley), Vegetable (Fabaceae, Poaceae)
Yamatotettix flavovittatus		None	-	NAQS target species[81,82].	Yes – DPIRD NSW[102]	-	No	None	-
Bacteria									
Xanthomonas albilineans (exotic strains- serological groups 2 or 3)	Leaf scald	None	The current disease tests used are Polymerase Chain Reaction (PCR) and Bio-PCR (Wang et al. 1999). These tests will be upgraded and replaced by Quantitative Polymerase Chain Reaction (qPCR) and	General and specific surveillance undertaken within Queensland including sugar industry surveys, seed cane inspections, variety trials and general pest surveys. NAQS target species[81,82].		-	No	None	-

[101] Farm Biosecurity general Sugarcane pests factsheet: https://www.farmbiosecurity.com.au/crops/sugarcane/sugarcane-pests-and-weeds/
[102] NSW DPI factsheet: https://idtools.dpi.nsw.gov.au/keys/cicadell/species/yflavovittatus.htm

SCIENTIFIC NAME	COMMON NAMES	NATIONAL DIAGNOSTIC PROTOCOL (NDP) [74]	SRA [75] MOLECULAR DIAGNOSTIC TEST(S)	SURVEILLANCE PROGRAMS [76]	FACT SHEETS	CONTINGENCY PLAN	NATIONAL PRIORITY PLANT PEST (NPPP)	EPPRD CATEGORY	POTENTIAL COLLABORATORS [77]
			LAMP testing.						
Fungi									
Stagonospora sacchari	Sugarcane scorch; leaf scorch	Draft NDP in development	-	NAQS target species[81],[82].	Yes – Farm Biosecurity101	-	No	Yes (3)	-
Xylaria cf warburgii/Xylaria arbuscula	Sugarcane root and basal stem rot	None	-	-	-	-	No	None	-
Oomycetes									
Peronosclerospora philippinensis	Downy mildew	Draft NDP in development	The current disease test for exotic *Peronosclerospora* species is PCR (unpublished).	NAQS target species[81],[82].	Yes – Farm Biosecurity101, SRA [103]	Yes [104]	No	None	Grains (Maize, Sorghum, Oats), Vegetable (Poaceae)
Peronosclerospora sacchari	Sugarcane downy mildew	Draft NDP in development	The current disease test for exotic *Peronosclerospora* species is PCR (unpublished).	NAQS target species[81],[82].	Yes – Farm Biosecurity101, LUCID [105], SRA [103]	-	No	Yes (3)	Grains (Maize), Vegetable (Poaceae)
Phytoplasma									
Sugarcane white leaf phytoplasma (16SrXI inc, 16SrXI-B and 16SrXI-D)	White leaf of sugarcane (SWLP) (with vector)	Draft NDP in development	The current disease test is Nested PCR (Deng and Hiruki, 1991; Schneider et al., 1995; Gundersen and Lee, 1996; Padovan et al. 1995). This test will be upgraded and replaced by qPCR and LAMP	-	Yes – Farm Biosecurity101	-	No	Yes (3)	-

[103] SRA factsheet: https://sugarresearch.com.au/sugar_files/2022/02/Downy-mildew_2022_F.pdf
[104] Contingency Plan: https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Downy-mildew-of-maize-and-sorghum-CP-2009-1.pdf
[105] LUCID factsheet: https://apps.lucidcentral.org/ppp/text/web_full/entities/maize_sugarcane_downy_mildew_227.htm

SCIENTIFIC NAME	COMMON NAMES	NATIONAL DIAGNOSTIC PROTOCOL (NDP)[74]	SRA[75] MOLECULAR DIAGNOSTIC TEST(S)	SURVEILLANCE PROGRAMS[76]	FACT SHEETS	CONTINGENCY PLAN	NATIONAL PRIORITY PLANT PEST (NPPP)	EPPRD CATEGORY	POTENTIAL COLLABORATORS[77]
			testing.						
'*Candidatus* Phytoplasma sacchari' 16SrXI-B	Green grassy shoot (with vector)	None	The current disease test is Nested PCR (Deng and Hiruki, 1991; Schneider et al., 1995; Gundersen and Lee, 1996; Padovan et al. 1995). This test will be upgraded and replaced by qPCR and LAMP testing.	-	-	-	No	None	-
'*Candidatus* Phytoplasma' 16SrXI-D (potentially F)	Grassy shoot (with vector)	None	The current disease test is Nested PCR (Deng and Hiruki, 1991; Schneider et al., 1995; Gundersen and Lee, 1996; Padovan et al. 1995). This test will be upgraded and replaced by qPCR and LAMP testing.	-	Yes – Farm Biosecurity[101]	-	No	None	-
Viruses									
Sugarcane Ramu stunt (with vector)	Ramu stunt (SRSV)	None	The current disease test is Reverse Transcription Polymerase Chain Reaction (RT-PCR) (Braithwaite et al.	NAQS target species[81],[82].	Yes - SRA[106], Farm Biosecurity101, LUCID[107]	-	No	Yes (2)	-

[106] SRA factsheet: https://sugarresearch.com.au/sugar_files/2017/02/Ramu_stunt_IS13090.pdf
[107] LUCID factsheet: https://apps.lucidcentral.org/pppw_v10/text/web_full/entities/sugarcane_ramu_stunt_disease_279.htm

SCIENTIFIC NAME	COMMON NAMES	NATIONAL DIAGNOSTIC PROTOCOL (NDP)[74]	SRA[75] MOLECULAR DIAGNOSTIC TEST(S)	SURVEILLANCE PROGRAMS[76]	FACT SHEETS	CONTINGENCY PLAN	NATIONAL PRIORITY PLANT PEST (NPPP)	EPPRD CATEGORY	POTENTIAL COLLABORATORS[77]
			2019). This test will be upgraded and replaced with Reverse Transcription qPCR (RT-qPCR).						
Sugarcane streak mosaic virus (Poacevirus)	Sugarcane streak mosaic virus (SCSMV)	None	The current disease tests include RT-PCR and RT-qPCR)(Damayanti and Putra, 2010; Thompson et al., 2016).	NAQS target species[81],[82].	Yes – Farm Biosecurity101, SRA[108]	-	No	Yes (4)	Banana (Abaca strain).

[108] SRA factsheet: https://sugarresearch.com.au/sugar_files/2022/02/Sugarcane-streak-mosaic_2022_D.02.pdf

BIOSECURITY PLAN DEVELOPMENT AND REVIEW

Biosecurity Plan Development

With the assistance of SRA, 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 Sugarcane Industry*. These groups were coordinated by Plant Health Australia (PHA) and included representatives from Canegrowers, SRA, relevant state and territory agriculture agencies and PHA.

Key roles of the Technical Review Panel included:

- identifying and documenting key exotic pest threats to the Australian sugar industry
- confirming an agreed High Priority Pest (HPP) and Exotic Pests to Monitor (EPM) list

Table 8. *Members of the Technical Review Panel (TRP).*

NAME	ORGANISATION	AREA OF EXPERTISE
Felicity **Atkin**	Sugar Research Australia (SRA)	Research, Variety Development
Shamsul **Bhuiyan**	Sugar Research Australia (SRA)	Pathology, Disease Screening
Trevor **Dunmall**	Plant Health Australia (PHA)	Biosecurity
Christine **Horlock**	Department of Primary Industries, Queensland (DPI QLD)	Pathology, Biosecurity
Luke **McKee**	Plant Health Australia (PHA)	Biosecurity
Stephen **Mudge**	Sugar Research Australia (SRA)	Research
Kevin **Powell**	Sugar Research Australia (SRA)	Entomology
Sandy **Watts**	Department of Primary Industries, Queensland (DPI QLD)	Pathology

Key roles of the Biosecurity Reference Panel 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

Table 9. *Members of the Biosecurity Reference Panel (BRP).*

NAME	ORGANISATION	AREA OF EXPERTISE
Shamsul **Bhuiyan**	Sugar Research Australia (SRA)	Pathology, Disease Screening
Lawrence **Di Bella**	Queensland Cane Agriculture & Renewables (QCAR) Herbert	Industry
David **Doperouzel**	Department of Primary Industries, Queensland (DPI QLD)	Policy
Christine **Horlock**	Department of Primary Industries, Queensland (DPI QLD), Biosecurity Queensland	Pathology, Biosecurity
Evie **Kielnhofer**	Plant Health Australia (PHA)	Biosecurity
Anthony **La Rocca**	CANEGROWERS	Industry

NAME	ORGANISATION	AREA OF EXPERTISE
Meagan **McKenzie**	Department of Primary Industries, Queensland (DPI QLD)	Policy, Research
Rob **Milla**	Burdekin Productivity Services	Industry
Stephen **Mudge**	Sugar Research Australia (SRA)	Research
Chuong **Ngo**	Sugar Research Australia (SRA)	Pathology
Stephen **Quarrell**	Plant Health Australia (PHA)	Biosecurity, Entomology
Daniel **Saloman**	Department of Primary Industries, Queensland (DPI QLD)	
Greg **Shannon**	Tully Sugar Ltd	Industry
Elisa **Westmore**	CANEGROWERS	Industry, Research

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 Sugar Biosecurity Reference Panel 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

Development 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 sugar industry.

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

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

Established pests and weeds 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 and weeds, as well as for surveillance and early detection of exotic pests. Established pests and weeds 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 and weeds for the industry.

Exotic Pests of the Australian Sugar Industry

Threat identification

Information on exotic pest threats to the Australian sugar industry 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 review 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 and 11 [Food and Agriculture Organization of the United Nations (FAO), 2004; 2007]. A summary of the pest risk analysis protocol followed in this biosecurity plan is shown in **Table 10**.

While there are similarities in the ranking system used in this document and the Biosecurity Import Risk Analysis (BIRA) process followed by the Department of Agriculture, 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 2016 DAFF 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 by 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 sugar industry. 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 impact (**Table 11**) differs in comparison to that used in the BIRA process.

Table 10. *Summary of the pest risk assessment process used in Biosecurity Plans.*

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

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) (**Appendix 1: Threat Summary Tables**) present a list of potential plant pest threats to the Australian sugar industry and provide summarised information on entry, establishment and spread potential, the economic consequences of establishment and eradication potential (where available). The most serious threats from the TST were identified through a process of qualitative risk assessment and are 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 (DAFF), 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 sugar industry), and therefore this rating may differ between biosecurity plans.

Description of terms used in pest risk tables

Table 11. *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 and Commonwealth and State/Territory legislation.

Adoption of effective preparedness practises can reduce the risk of exotic pest movement for the industry. These mitigation activities are the responsibility of governments, industry and the community.

A number of key risk mitigation areas are outlined in this guide, along with summaries of the roles and responsibilities of the Australian 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.

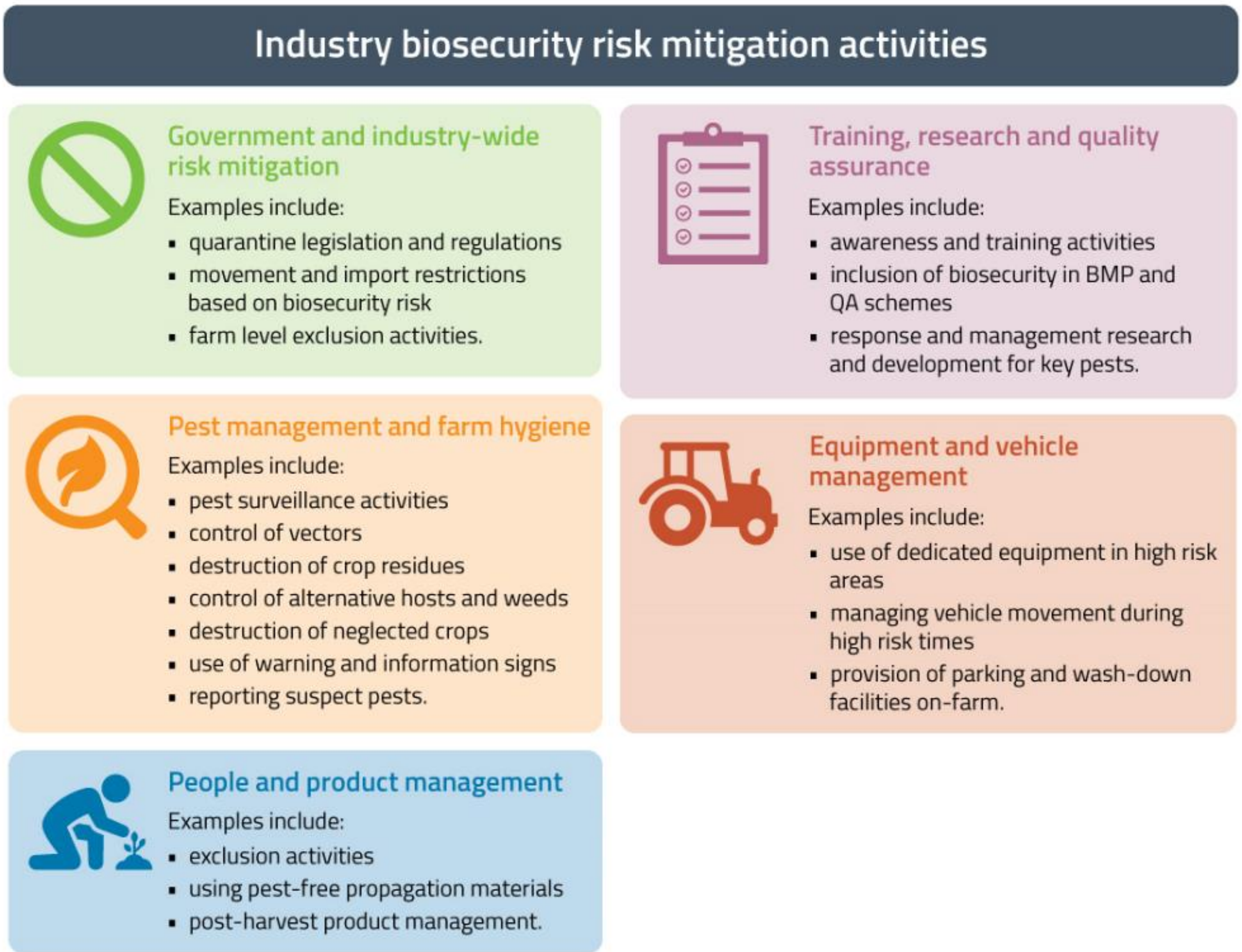

Figure 7. *Examples of biosecurity risk mitigation activities.*

Barrier quarantine

Barrier quarantine refers to the biosecurity measures implemented at all levels of the industry 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. In particular, 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 agriculture.gov.au/micor/plants.

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 agriculture.gov.au/import/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 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 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

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). NAQS surveillance programs relevant to high priority pests of the sugarcane industry are listed in **Table 7**.

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
- 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 sugarcane industry (exotic or those under official control in a region or state/territory) are shown in **Table 12Table 12**.

Table 12. *Official surveillance programs that target pests of the Australian sugar industry*[109].

Surveillance program name	Target host(s)	Target pest(s)	Type of surveillance*
Australian Government			
External Territories Surveillance Program	Various environmental, production and ornamental plants	High priority exotic pests	General and specific
International Plant Health Surveillance Program	Tropical horticultural, environmental and agricultural species	High priority exotic pests	General and specific
National Border Surveillance Program	Plant families of high economic importance and known or potential key hosts of specific exotic pests, focusing on regulatory import pathway risks	Specific high priority exotic pests and any pest belonging to key taxonomic groups	General and specific
National Plant Health Surveillance Program (delivered through states and territories)	Various, based on the species surveyed	High priority exotic pests including exotic gypsy moth and fruit fly species	General and specific
Northern Australia Quarantine Strategy – pest and disease surveys	Tropical horticultural, environmental and agricultural species	123 high priority exotic pests, diseases and weeds	General and specific
Within New South Wales			
National Plant Health Surveillance Program – multi pest surveillance	Multiple	Multiple including *Bactrocera albistrigata, B. carambolae, B. caryae, B. correcta, B. curvipennis, B. dorsalis, B. facialis, B. kandiensis, B. kirki, B. melanotus, B. occipitalis, B. passiflorae, B. psidii, B. trilineola, B. trivialis, B. umbrosa, B. xanthodes, B. zonata, Ceratitis capitata, Zeugodacus cucurbitae, Z. tau,* gypsy moth (*Lymantria* spp.), glassy winged sharpshooter *(Homalodisca vitripennis), Xylella fastidiosa,* fire blight *(Erwinia amylovora),* brown marmorated stink bug *(Halyomorpha halys),* exotic mites *(including Brevipalpus* spp., *Aceria granati*), Asian sugarcane psyllid *(Diaphorina citri)*, African sugarcane psyllid *(Trioza erytreae)*, huanglongbing ('*Candidatus* Liberibacter asiaticus'), sugarcane canker *(Xanthomonas axonopodis* subsp. *citri)*, and invasive ants *(Solenopsis* spp., *Wasmannia auropunctata*, *Anoplolepis gracilipes*)	Specific
Within the Northern Territory			

[109] https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/2020-National-Plant-Biosecurity-Status-Report.pdf

National Plant Health Surveillance Program – multi pest surveillance	Multiple	Multiple including sugarcane canker (*Xanthomonas axonopodis* pv. *citri*), huanglongbing ('*Candidatus* Liberibacter spp.'), Asiatic sugarcane psyllid (*Diaphorina citri*), giant African snail (*Achatina fulica*), glassy winged sharpshooter (*Homalodisca vitripennis*), Pierce's disease (*Xylella fastidiosa*), banana black sigatoka (*Mycosphaerella fijiensis*), red imported fire ant (*Solenopsis invicta*), electric ant (*Wasmannia auropunctata*), yellow crazy ant (*Anoplolepis gracilipes*), *BacteSugarcanera cockerelli, 'Candidatus* Liberibacter solanacearum', potato leafminer, pea leafminer, serpentine leafminer (*Liriomyza huidobrensis*), American leafminer (*Liriomyza trifolii*), vegetable leafminer (*Liriomyza sativae*), exotic fruit flies (*Bactrocera* spp. and *Ceratitis* spp.)	Specific
Within Queensland			
Area freedom surveys	Multiple	Multiple pests	Specific
Grow Help Australia diagnostic service project	Fruit, vegetable and ornamental hosts	All pests and pathogens that can affect horticultural crops, national parks, gardens, hobby growers and home gardeners. Commonly encountered pathogens include *Phytophthora* spp., *Fusarium* spp., *Colletotrichum* spp., *Alternaria* spp., *Rhizoctonia* spp., *Pythium* spp., *Ralstonia* spp., *Erwinia* spp. and viruses	General
National Plant Health Surveillance Program	Multiple	Multiple, including exotic fruit flies, exotic gypsy moths, Pierce's disease (*Xylella fastidiosa*) and glassy winged sharpshooter (*Homalodisca vitripennis*)	Specific
Sugar Industry surveys, seed cane inspections, variety trials and general pest surveys	Sugarcane	Ratoon stunting disease (*Leifsonia xyli* subsp. *xyli*), leaf scald (*Xanthomonas albilineans*), sugarcane mosaic virus (Potyvirus), Fiji leaf gall (Fiji disease virus (Fijivirus)), sugarcane smut (*Sporisorium scitamineum*), sugarcane rust (*Puccinia melanocephala*, *P. kuehnii*), yellow spot (*Mycovellosiella koepkei*), exotic pests and diseases	General and specific
Fall Armyworm Response Project monitoring	Multiple	Fall armyworm (*Spodoptera frugiperda*)	General and specific
Within South Australia			
Area freedom surveys	Multiple	Multiple pests	General and specific
National Plant Health Surveillance Program – multi pest surveillance	Multiple	Multiple, including exotic invasive ants (tramp ants), Asian and African sugarcane psyllids (*Diaphorina citri*, '*Candidatus* Liberibacter africanus'), huanglongbing ('*Candidatus* Liberibacter asiaticus'), sugarcane canker (*Xanthomonas axonopodis* pv. *citri*), glassy winged sharpshooters (*Homalodisca vitripennis* and *H. coagulata*), brown mamorated stink bug (*Halyomorpha halys*), xylella (*Xylella fastidiosa*)	General and specific
Trogoderma glabrum program	Multiple	*Trogoderma glabrum*	General and specific
Within Tasmania			

National Plant Health Surveillance Program – multi pest surveillance	Multiple	Brown marmorated stink bug (*Halyomorpha halys*), sugarcane canker (*Xanthomonas citri* subsp. *citri*), gypsy moths (including *Lymantria albescens, L. atameles, L. concolor, L. dispar asiatica, L. dispar, L. dispar japonica, L. dissoluta, L. fumida, L. marginata, L. minomonis, L. monacha, L. postalba, L. pulverea, L. sinica, L. umbrosa, L. xylina*), huanglongbing ('*Candidatus* Liberibacter asiaticus'), *BacteSugarcanera cockerelli, Diaphorina citri, Trioza erytreae, B. trigonica, Trioza apicallis*, Pierce's disease (*Xylella fastidiosa*), glassy winged sharpshooter (*Homalodisca vitripennis*), *Bactrocera, Zeugodacus* and *Ceratitis spp.* (exotic fruit fly species)	Specific
Within Victoria			
Alert contacts	All hosts, general surveillance	All plant pests	General
MyPestGuide e-surveillance	All hosts, general surveillance	All plant pests	General and specific
National Plant Health Surveillance Program – multi pest surveillance	Multiple	Multiple including sugarcane canker (*Xanthomonas axonopodis* pv. *citri*), exotic fruit flies (*Bactrocera* spp., *Ceratitis captitata*), Pierce's disease (*Xylella fastidiosa*), glassy winged sharpshooter (*Homalodisca vitripennis*), plum pox virus, Asian gypsy moth (*Lymantria dispar* and other *Lymantria* spp.), brown marmorated stink bug (*Halyomorpha halys*), Asian sugarcane psyllid (*Diaphorina citri*), African sugarcane psyllid (*Trioza erytreae*) and spotted wing drosophila (*drosophila suzukii*)	Specific
Urban Plant Health Network	Multiple plant hosts in peri-urban landscape, including community gardens	Various, including brown marmorated stink bug (*Halyomorpha halys*), Asian sugarcane psyllid (*Diaphorina citri*), African sugarcane psyllid (*Trioza erytreae*), Asian honeybee, red imported fire ant (*Solenopsis invicta*), spotted wing drosphila (drosophila suzukii) and glassy winged sharpshooter (*Homalodisca vitripennis*)	General
Victorian funded containment program	Pasture and fruit trees	Green snail (*Cantareus apertus*)	Specific
Within Western Australia			
Biosecurity Blitz	General surveillance, all hosts	All plant pests	General
MyPestGuide e-surveillance	All hosts, general surveillance	All plant pests	General and specific
National Plant Health Surveillance Program – multi pest surveillance	Pome and sugarcane crops	Multiple including Asian sugarcane psyllid (*Diaphorina citri*), sugarcane canker (*Xanthomonas axonopodis* pv. *citri*), sugarcane longicorn beetle (*Anoplophora chinensis*), glassy winged sharpshooter (*Homalodisca vitripennis*), xylella (*Xylella fastidiosa*), brown marmorated stink bug (*Halyomorpha halys*)	Specific

Farm level pest monitoring

Farm level monitoring involves the participation and interaction of owners, managers, agribusiness and industry representative groups. Examples of the surveillance activities that can be carried out by each of these groups are outlined in **Figure 8.** Examples of farm level surveillance activities., below.

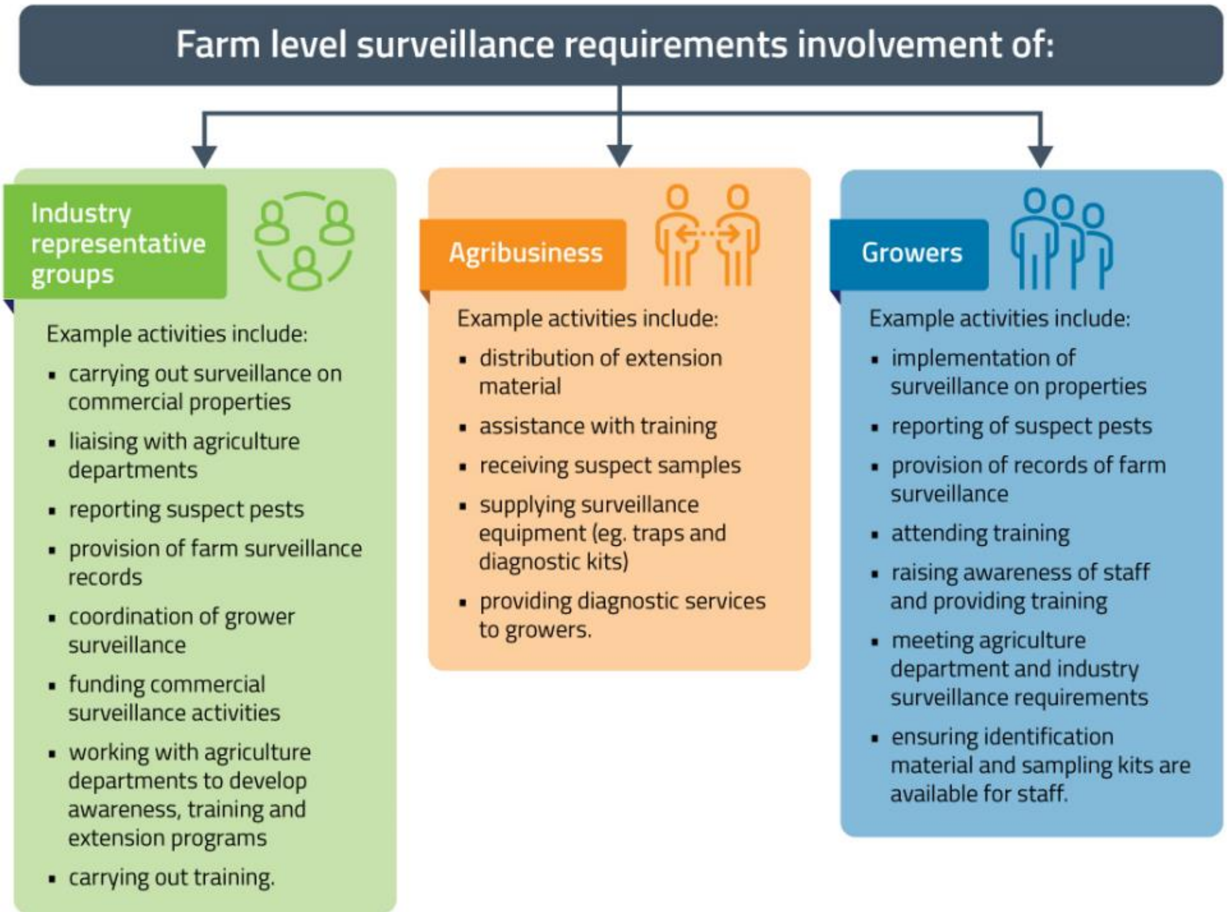

Figure 8. *Examples of farm level surveillance activities.*

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 EPP Training Program

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

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

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

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 Emergency Plant Pest Response Deed (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 sugar industry, which increases the chance of early detection and reporting of suspect pests. Responsibility for awareness material lies with industry and government, with assistance from PHA as appropriate. Any unusual plant pest should be reported immediately to the relevant state/territory agriculture department through the Exotic Plant Pest Hotline (1800 084 881).

High priority plant pest threat-related documents

A total of 29 High Priority Pests (**Table 2**) were identified by the TRP as high priority threats to the Australian sugar industry. Using a qualitative risk assessment approach, each HPP was determined to have high entry, establishment and spread potentials and/or a high economic impact. This list should provide the basis for the development of awareness material for the industry.

Further information on High Priority Pests

The websites listed below (**Table 13**) contain information on pests across most plant industries, including the sugar industry.

Table 13. *Sources of information on High Priority Pests of the sugar industry.*

Source	Website
CABI – Crop Protection Compendium	cabi.org/cpc/
Department of Agriculture, Fisheries and Forestry (DAFF)	agriculture.gov.au
Department of Energy, Environment and Climate Action, Victoria (DEECA Vic)	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, Queensland (DPI QLD)	business.Qld.gov.au/industries/farms-fishing-forestry/agriculture/crop-growing/priority-pest-disease
Department of Primary Industries and Regional Development, New South Wales (DPIRD NSW)	https://www.dpi.nsw.gov.au/biosecurity/plant
Department of Primary Industries and Regions South Australia (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
Farm Biosecurity	https://www.farmbiosecurity.com.au/crops/cotton/cotton-pests/
Global Biodiversity Information Facility (GBIF)	https://www.gbif.org/
Plant Biosecurity Science Foundation	http://www.apbsf.org.au/
Plant Health Australia (PHA)	planthealthaustralia.com.au/
Pest and Disease Image Library (PaDIL)	padil.gov.au/
University of California Statewide Integrated Pest Management (IPM) Program	ipm.ucdavis.edu/EXOTIC/exoticpestsmenu.html

Sugar On-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 that Australia does not have.

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 sugar on-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 biosecurity 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.

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 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 biosecurity can be found at farmbiosecurity.com.au or by contacting Canegrowers or Sugar Research 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 13. 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 Sugarcane 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 (**Table 7**). Over time, as more resources are produced for individual pests of the sugar industry they will be included in this document and made available through the PHA website. Resources include the development of pest-specific information and emergency response documents, such as fact sheets, contingency plans and diagnostic protocols. These documents and programs should be developed over time for all medium to high-risk pests listed in the TST (**Appendix 1: Threat Summary Tables**).

Fact sheets

Fact sheets or information sheets are a key activity of biosecurity extension and education with growers. Fact sheets provide summary information about the pest, its biology, what it looks like and what symptoms it may cause. They also contain detailed images. Refer to **Table 7** for a list of current fact sheets available for cane growers.

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 and be endorsed by the National Management Group 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 Biosecurity implementation plan.

For a list of current contingency plans relevant to industry HPP's see **Table 7**.

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 (NDP) are diagnostic protocols for the unambiguous taxonomic identification of a pest in a manner consistent with ISPM No. 27 – Diagnostic Protocols for Regulated Pests. NDP include diagnostic procedures and data on the pest, its hosts, taxonomic information, detection and identification.

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

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

National Surveillance Protocols

National surveillance protocols (NSPs)[110] 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. Published NSPs are reviewed by the National Surveillance Protocol working group (NSPWG) and endorsed by the Subcommittee on National Plant Health Surveillance (SNPHS)[111].

Research Development and Extension

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 Implementation Table. Some of these gaps will require:

- Further research and development (e.g. understanding risk pathways, developing surveillance programs or diagnostic protocols, developing tools to facilitate preparedness and response, developing IPM or resistance breeding strategies).
- 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.

[110] https://plantsurveillancenetwork.net.au/resources/reference-standards-for-development-and-approval-of-national-surveillance-protocols-for-plant-pests/
[111] 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 can still potentially 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 sugar industry. 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 sugar industry 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, which is an agreement between the Australian government, the state/territory governments, 38 plant industries (including Canegrowers) and PHA (collectively known as the signatories), that allows the rapid and efficient response to EPPs. 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/response-arrangements/emergency-plant-pest-response-deed-epprd/.

Australian Sugar Industry: Biosecurity Statement

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

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 (https://www.planthealthaustralia.com.au/response-arrangements/plantplan/).

For more information about PLANTPLAN and the supporting document visit https://www.planthealthaustralia.com.au/response-arrangements/plantplan/.

Funding a response under the EPPRD

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

A copy of the EPPRD can be downloaded from the PHA website https://www.planthealthaustralia.com.au/response-arrangements/emergency-plant-pest-response-deed-epprd/. .

Cost sharing a response

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

The 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. 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 14. *Response funding allocation between Government and Industry for an EPP.*

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

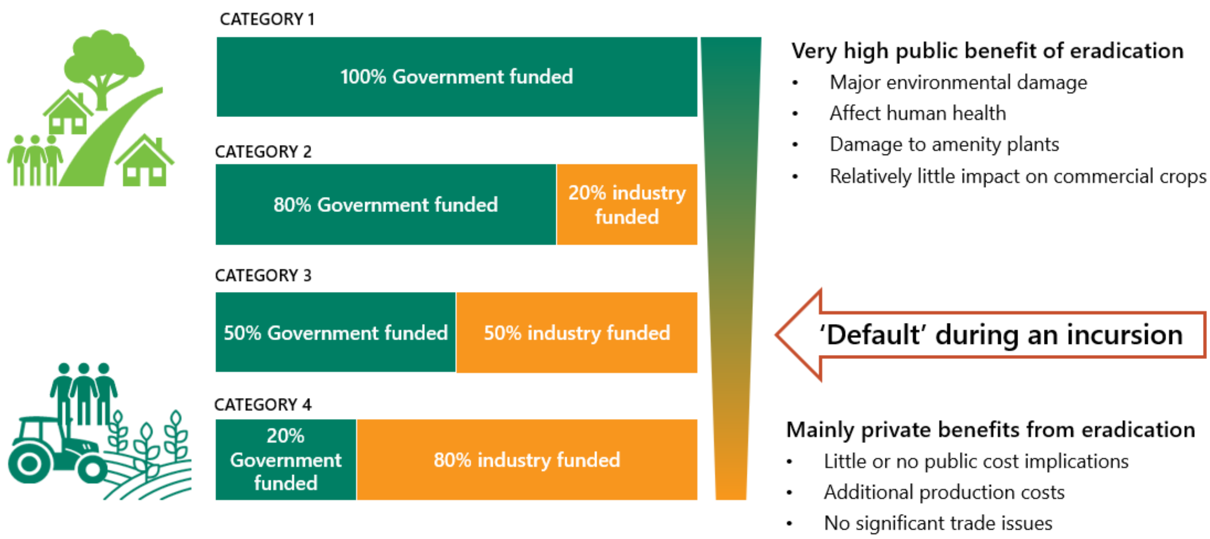

Figure 9. *Categorisation under the EPPRD.*

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.

Sugarcane EPPs categorised to date

EPPs relevant to the Australian sugar industry that are categorised and listed within Schedule 13 of the EPPRD are listed below in **Table 15**.

Table 15. *Formal categories for High Priority Pests of the Australian sugar industry as listed in Schedule 13 of the EPPRD (as of 17 October 2024).*

SCIENTIFIC NAME	COMMON NAMES	EPPRD CATEGORY
Coptotermes gestroi	Asian subterranean termite	None
Dorysthenes buquetii (syn. Dorysthenes buqueti)	Sugarcane longhorn stem borer	None
Chilo auricilius	Gold fringed-rice borer	None
Chilo infuscatellus (syn. Chilo tadzhikiellus)	Yellow top sugarcane borer	None
Chilo sacchariphagus	Spotted borer	None

SCIENTIFIC NAME	COMMON NAMES	EPPRD CATEGORY
Chilo terrenellus	Dark headed rice borer	None
Chilo tumidicostalis	Spotted sugarcane stem borer; Plassey borer	None
Scirpophaga excerptalis	Top borer	None
Sesamia grisescens	Pink stalk borer	2
Sesamia inferens	Asiatic pink stem borer; Purple stem borer; Noctuid moth	None
Eldana saccharina	African sugarcane borer	None
Polyocha depressella (syn. Emmalocera depressella)	Sugarcane root borer	None
Aleurolobus barodensis	Sugarcane whitefly	3
Ceratovacuna lanigera	Sugarcane woolly aphid	None
Eumetopina flavipes (insect only)	Island Sugarcane planthopper	Uncategorised
Perkinsiella vastatrix (as a vector of Fiji leaf gall virus)	Sugarcane leaf hopper	None
Perkinsiella vitiensis (as a vector of Fiji leaf gall virus)	Sugarcane planthopper	None
Pyrilla perpusilla	Indian sugarcane leaf hopper, Sugarcane plant hopper	None
Xanthomonas albilineans (exotic strains-serological groups 2 or 3)	Leaf scald	None
Stagonospora sacchari	Sugarcane scorch; leaf scorch	3
Xylaria cf warburgii/Xylaria arbuscula	Sugarcane root and basal stem rot	None
Peronosclerospora philippinensis	Downy mildew	None
Peronosclerospora sacchari	Sugarcane downy mildew	3
Sugarcane white leaf phytoplasma (16SrXI inc, 16SrXI-B and 16SrXI-D)	White leaf of sugarcane (SWLP) (with vector)	3
'*Candidatus* Phytoplasma sacchari' 16SrXI-B	Green grassy shoot (with vector)	None
'*Candidatus* Phytoplasma' 16SrXI-D (potentially F)	Grassy shoot (with vector)	None
Sugarcane Ramu stunt (with vector)	Ramu stunt (SRSV)	2
Sugarcane streak mosaic virus (Poacevirus)	Sugarcane streak mosaic virus (SCSMV)	4

How to respond to a suspect EPP

Following the detection of a suspect EPP, the relevant state agency will be notified either directly or through the Exotic Plant Pest Hotline. Within 24 hours of the state agency having a reasonable suspicion that they are dealing with an EPP, the Chief Plant Health Manager (CPHM) of the state or territory will inform the Australian Chief Plant Protection Officer (ACPPO). All signatories affected by the EPP (both government and industry) are then notified immediately, and a Consultative Committee on Emergency Plant Pests (CCEPP) meeting is convened (**Figure 10**). 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.

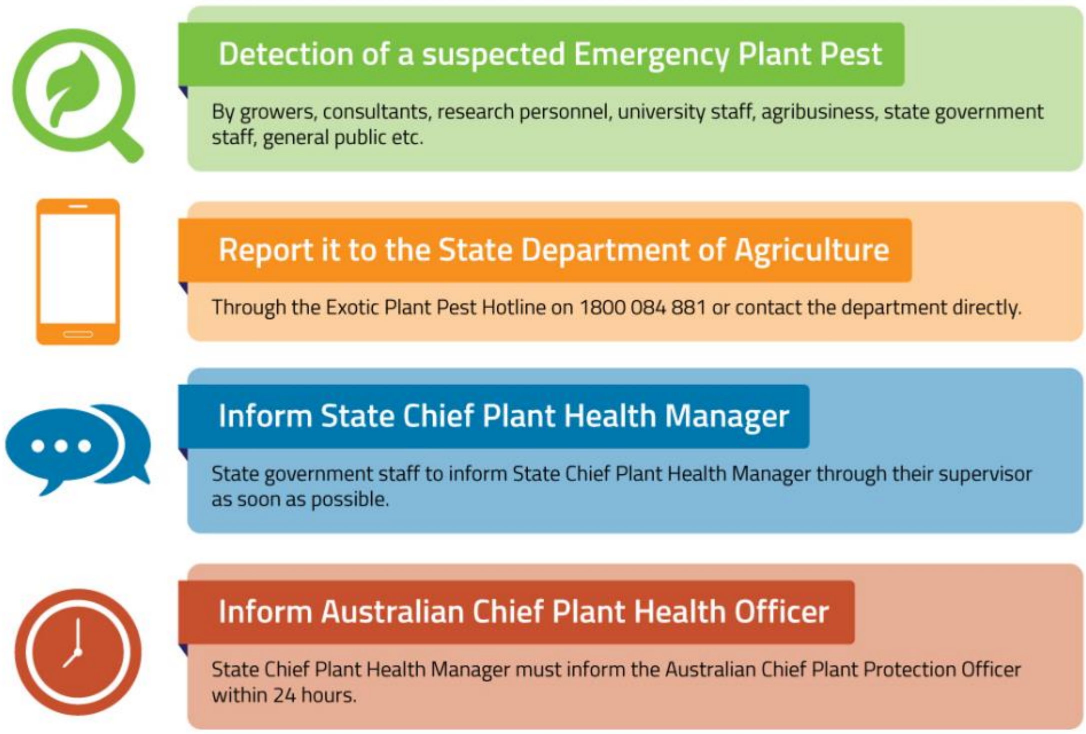

Figure 10. *Reporting of suspect EPPs and notification process.*

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 Canegrowers. 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.

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 planthealthaustralia.com.au/biosecurity/incursion-management/phases-of-an-emergency-plant-pest-response/.

Owner Reimbursement Costs

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

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

- Value of crops destroyed
- Replacement of lost capital items
- 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 sugarcane industry.

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

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

Industry specific response procedures

Industry communication

Canegrowers is the peak industry body for the Australian sugar industry and a signatory to the EPPRD. Canegrowers will be the key industry contact point if a plant pest affecting the industry is detected and responded to using the arrangements in the EPPRD. Canegrowers will have responsibility for relevant industry communication and media relations (see PLANTPLAN for information on approved communications during an incursion). The contacts nominated for the CCEPP and the NMG by Canegrowers 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 Movement Restrictions

The ability to control movement of materials that can carry and spread pests of sugarcane is of high importance. Each state/territory may have biosecurity legislation in place to control the importation of sugarcane plant 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) now 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 Sugarcane plants and related material can be obtained by contacting your local state or territory agriculture department directly or accessed through the SDQMA website which lists relevant contacts in each state/territory as well as Interstate Certification Assurance (ICA) documents relating to each state/territory. Contacts for local and territory governments are provided in **Table 16**.

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.

Table 16. *Contact details and information sources.*

ORGANISATION	WEBSITE/EMAIL	PHONE	ADDRESS	LEGISLATION/BIOSECURITY MANUALS	EMERGENCY PLANT PEST HOTLINE – 1800 084 881
National					1800 084 881
Australian Sugar Milling Council	http://asmc.com.au E. Contact ASMC | Australian Sugar Milling Council (online form)	0411 933 500	IBM Building Level 11, 348 Edward Street Brisbane GPO Box 945 Brisbane, QLD 4501 Australia		
Queensland Cane Growers Organisation LTD (QCGO) *(also known as 'Canegrowers')*	http://www.canegrowers.com.au E: info@canegrowers.com.au	07 3864 6444	Suite 701, Level 7 348 Charlotte Street Brisbane, QLD 4001		
Sugar Research Australia	http://sugarresearch.com.au sra@sugarresearch.com.au	(07) 3331 3333	Level 10, 300 Queen Street, Brisbane QLD 4000 GPO Box 133, Brisbane QLD 4001.		
Department of Agriculture, Fisheries and Forestry	agriculture.gov.au	(02) 6272 3933 1800 020 504	GPO Box 858 Canberra, ACT 2601	https://www.agriculture.gov.au/biosecurity-trade/policy/legislation	
Plant Health Australia	planthealthaustralia.com.au E. biosecurity@phau.com.au	(02) 6215 7700	Level 1, 1 Phipps Cl Deakin, ACT 2600		
ACT					1800 084 881
Environment ACT	https://www.environment.act.gov.au Biosecurity - Environment, Planning and Sustainable Development Directorate - Environment (act.gov.au) ACTBiosecurity@act.gov.au	132 281		*Plant Disease Act 2002* *Pest Plants and Animals Act 2005* ACT Biosecurity Strategy 2016-2026	
New South Wales					1800 084 881
Department of Primary Industries and Regional Development, New South Wales (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*	Operates 08:30 – 16:30 Monday to Friday. After hours answering machine

ORGANISATION	WEBSITE/EMAIL	PHONE	ADDRESS	LEGISLATION/BIOSECURITY MANUALS	EMERGENCY PLANT PEST HOTLINE – 1800 084 881
NSW)				and other supporting legislation such as Control Orders https://www.dpi.nsw.gov.au/biosecurity/managing-biosecurity/legislation	service with messages followed up the next business day.
Queensland					1800 084 881
Department of Primary Industries, Queensland (DPI QLD)	daf.qld.gov.au E. info@daf.qld.gov.au	13 25 23	41 George Street Brisbane, QLD 4000	*Biosecurity Act 2014* *Biosecurity Regulation 2016* qld-biosecurity-manual.pdf (daf.qld.gov.au)	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://daf.nt.gov.au/ E. quarantine@nt.gov.au Contacts: https://daf.nt.gov.au/contacts	(08) 8999 5511	Berrimah Farm, Science Precinct, 29 Makagon Road Berrimah, NT 0828	*Plant Health Act 2008* *Plant Health Regulations 2011* https://daf.nt.gov.au/__data/assets/pdf_file/0011/396587/plant-health-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	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 2009 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 Fruit fly & Quarantine: 1300 666 010	33 Flemington Street Glenside, SA 5065		

ORGANISATION	WEBSITE/EMAIL	PHONE	ADDRESS	LEGISLATION/BIOSECURITY MANUALS	EMERGENCY PLANT PEST HOTLINE – 1800 084 881
		Market Access and Interstate Certification Assurance (08) 8207 7814			
South Australian Research and Development Institute (SARDI)	https://pir.sa.gov.au/research/about_sardi E. pirsa.sardi@sa.gov.au	(08) 8303 9400	Plant Research Centre Waite Campus 2B Hartley Grove 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.

ORGANISATION	WEBSITE/EMAIL	PHONE	ADDRESS	LEGISLATION/BIOSECURITY MANUALS	EMERGENCY PLANT PEST HOTLINE – 1800 084 881
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, Northern Territory (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 21181 or email plantbiosecurity@nt.gov.au

For more information refer to the DAF NT website (https://daf.nt.gov.au/ or Biosecurity | Secure NT)

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 DPI QLD website https://www.daf.qld.gov.au/

Further details can be obtained from the DPI QLD 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 DEECA website https://www.deeca.vic.gov.au/.

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 DJPR on the web at https://agriculture.vic.gov.au/biosecurity/moving-plants-and-plant-products or by phone 136 186.

Western Australia

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

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

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

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

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

For further information on requirements contact Quarantine WA on .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. The industry is already a strong supporter of farm biosecurity but should continue to further extend this message of promoting good farm hygiene in a wide range of ways.

APPENDIX 1: Threat Summary Tables

The information provided in the threat summary tables is an overview of exotic plant pest threats to the Australian sugar industry. More than 470 exotic plant pests were identified. Summarised information on entry, establishment and spread potentials and economic consequences of establishment are provided where available.

An explanation of the method used for calculating the overall risk and full descriptions of the risk rating terms can be found in the **'THREAT IDENTIFICATION AND PEST RISK ASSESSMENTS**' section on page 56.

Invertebrates

Table 17. *Invertebrate Threat Summary Table.*

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
	Acari												
Acari	Eriophyidae	*Aceria sacchari*		Sugarcane (*Saccharum* sp).	Mites are piercing and sucking feeders. [113]	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if leaves are touching or if blown by wind.		China, India, Sri Lanka.	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW
Acari	Tarsonemidae	*Steneotarsonemus bancrofti*	Sugarcane blister mite	Sugarcane	Leaves, stem.	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if leaves are touching or if blown by wind.		India, Barbados, United States of America, Brazil.	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW
Acari	Tetranychidae	*Aponychus corpuzae*	Bamboo spider mite	Sugarcane, Bamboo, Rice	Preferred host is Bamboo. Low impact only to sugarcane (leaves, stem).	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if leaves are touching or if blown by wind.		China, Japan, South Korea, Indonesia, Thailand, Taiwan, India, Italy, Slovenia.	HIGH	MEDIUM	HIGH	MEDIUM	MEDIUM
Acari	Tetranychidae	*Oligonycus afrasiaticus*	Date dust mite	Sugarcane, dates, maize, palms, Poaceae spp.	Leaves, stem.	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if		Iran, Iraq, Saudi Arabia, United Arab Emirates, Bahrain, Oman, Kuwait, Yemen, Jordan, Israel,	MEDIUM	MEDIUM	HIGH	LOW	VERY LOW

[112] Establishment potential.

[113] Their feeding activity causes cells to grow and envelop the mites, leading to the formation of galls, which range in diameter from 1.3 to 1.8 mm, around buds on sugarcane and *Prunus* sp. This mite induces discoloured blisters on the inner surface of leaf sheath of sugarcane which can support hundreds of mites within the spongy tissue.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Acari						leaves are touching or if blown by wind.		Libya, Tunisia, Algeria, Morocco, Egypt, Sudan, Chad, Mauritania, Mali, and Nigeria.					
Acari	Tetranychidae	*Oligonychus grypus*	African sugarcane spidermite	Polyphagous with a wide host range including Sugarcane. [114]	Can cause severe damage to foliage causing bronzing and defoliation during high infestations.	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if leaves are touching or if blown by wind.	Unlikely to transmit Sugarcane yellow leaf virus (SCYLV).	Africa (Cameroon, Congo, Madagascar, Malawi, Mozambique, Nigeria, South Africa, Zaire, Zimbabwe), India, United States of America, Cuba, Brazil, Papua New Guinea, Torres Strait Islands, (see footnote in relation to possible presence in mainland Australia). [115]	HIGH	MEDIUM	HIGH	MEDIUM	MEDIUM
Acari	Tetranychidae	*Oligonychus indicus*	Sugar leaf mite; sugarcane red mite	Sugarcane, maize, sorghum, rice, banana	Feeds on sap, leaf scarring within leaf sheath, small amounts of toxic material left behind cause red spots that eventually coalesce and cover entire leaf surface causing leaf to dry and fall off.	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if leaves are touching or if blown by wind.		China, India, Kenya.	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW
Acari	Tetranychidae	*Oligonychus orthius*		Sugarcane, bananas, sorghum.	Leaves, stem.	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if leaves are touching or if blown by wind.		China, Japan, Korea, the Philippines, Taiwan, Thailand.	MEDIUM	MEDIUM	HIGH	MEDIUM [116]	LOW
Acari	Tetranychidae	*Oligonychus pratensis*	Date mite, Banks grass mite	Sugarcane, barley, rice, millet (Panicum spp.), sorghum, wheat,	Above ground plant parts, mostly impact leaves (galls,	Individuals can easily hitch-hike on people and equipment and will spread		Egypt, United States of America, Antigua and Barbuda, Barbados,	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW

[114] Additional hosts include: *Arundinaria* sp., Cissampelos sp., *Colocasia* sp., *Echinochloa colonum*, *Ehrharta* sp., *Eleusine indica*, *Heteropogon* sp, *Leptochloa* sp.,*Panicum* sp., *Rottboelia cochinchinensis*, *Setaria* sp., *Urochloa* sp., *Sorghum bicolor*, *Oryza sativa*, *Pennisetum purpureum*, *Zea mays*, *Manihot esculenta* (Euphorbiaceae), *Musa sapeintum* (Musaceae).

[115] *Oligonychus grypus* has most likely been mistakenly recorded as being present in Australia by Gutierrez & Schicha (1983) (Beard et al. 2003). A comparison of the type material of *O. grypus* with specimens previously identified as *O. grypus* collected from Sydney clearly indicated that the Australian material was not *O. grypus*. These specimens and others collected in southeast Queensland in outbreak numbers in sugarcane, were in fact a previously undescribed species, now called *O. zanclopes* Beard & Walter. As not all Australian material has been examined (e.g. specimens collected in the Torres Strait), it cannot be stated for sure that this species is absent from Australia.

[116] In August 2024, the Sugarcane Technical Review Panel advised a rating change from LOW to MEDIUM based on locality and climate.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Acari				maize, coconut, turf.	depressions, furrows on either adaxial or abaxial side); can cause damage.	to neighbouring plants if leaves are touching or if blown by wind.		Bermuda, Costa Rica, Dominican Republic, Guadeloupe, Haiti, Martinique, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, French Guiana, Guyana, Suriname.					
	Tetranychidae	*Oligonychus sacchari*	Sugarcane yellow mite	Sugarcane.	Discolouration of leaves, heavy infestations can cause whole plant to die; probing causes damage to plant cells resulting in chloroplast deterioration; damage limits photosynthesis within the plant restricting plant growth.	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if leaves are touching or if blown by wind.		Iran, India, Thailand, United States of America. [117]	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW
	Tetranychidae	*Oligonychus zeae*	Red spider mite	Maize (*Zea mays*), Sugarcane (*Saccharum officinarum*).	Leaves.	Individuals can easily hitch-hike on people and equipment and will spread to neighbouring plants if leaves are touching or if blown by wind.		Iran, Costa Rica, Venezuela, Guadeloupe, Brazil.	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW

[117] Widespread in western USA.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Blattodea													
Blattodea	Rhinotermitidae	*Coptotermes formosanus*	Formosan subterranean termite	Sugarcane, maize, sorghum, peanut, soybean, sweet potato, cassava, fruit trees, and forest trees.	Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%.	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil, machinery and wood packaging material are the most likely pathways for long distance dispersal.		China, Hong Kong, Japan, Taiwan, South Africa, United States of America, Virgin Islands (USA), Marshall Islands and US Minor Outlying Islands.	MEDIUM	HIGH	MEDIUM	HIGH [118]	MEDIUM
Blattodea	Rhinotermitidae	*Coptotermes gestroi*	Asian subterranean termite	Polyphagous. Maize, sugarcane.	Dispersal flights, foraging tubes or damage are usually the first indications of an infestation. [119]	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil, machinery and wood packaging material are the most likely pathways for long distance dispersal.		Marquesas Islands (Pacific Ocean), Mauritius and Reunion (Indian Ocean), Brazil, Barbados other West Indian islands include Antigua, Barbuda, Cuba, Grand Cayman, Grand Turk, Jamaica (Montego Bay and Port Antonio), Little Cayman, Montserrat, Nevis, Providenciales, Puerto Rico (San Juan), St. Kitts, U.S. Virgin Islands (possible), Mexico. Indonesia, Malaysia, Philippines. [120]	MEDIUM	HIGH	HIGH	HIGH [121]	HIGH
Blattodea	Rhinotermitidae	*Coptotermes heimi*	Termite	Sugarcane, gum arabic tree, forest red gum, mulberry tree, poplars, plum.	Prefers woody hosts. Unknown impact on sugarcane.	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil and machinery are the most likely pathways for long distance dispersal.		Bangladesh, India, Pakistan, Nepal.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN

[118] Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%. In China, the damage rate in severely damaged sugarcane areas is as high as 30–60%, causing widespread sparse seedling and even total yield loss (Huang & Li, 2011). In the middle and later stages of sugarcane growth, *C. formosanus* bores into underground cane stalks, which makes the stem hollow, the leaves yellow or dry, and the plants easily broken or fall over in the wind, leading to the death of the plant and large yield losses (Guo et al., 2014).

[119] Advanced stages of infestation are indicated by the incorporation of nest material ('carton', a mixture of faeces, chewed wood and soil) in hollowed wood or existing structural voids. In severe infestations, *C. gestroi* hollows out wood, leaving only a paper-thin surface. The hollowed wood surface may look blistered or peeled. Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%.

[120] Endemic to Southeast Asia. *C. gestroi* was introduced to other geographic areas including North America and Pacific, Caribbean, South American and Indian Ocean islands.

[121] Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Blattodea	Rhinotermitidae	*Heterotermes cardini*	West Indian Subterranean termite	Legumes and grasses (including sugarcane).	Prefers woody hosts. Unknown impact on sugarcane.	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil and machinery are the most likely pathways for long distance dispersal.		Bahamas, Cuba, Dominican Republic, Haiti, Puerto Rico.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Rhinotermitidae	*Heterotermes convexinotatus*	West Indian Subterraneans	Pigeon pea, sorghum, maize, sugarcane, cassava, passionfruit.	Scale of impact unknown.	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil, machinery and wood packaging material are the most likely pathways for long distance dispersal.		Barbados, British Virgin Islands, Cuba, El Salvador, Haiti, Jamaica, Puerto Rico, U.S. Virgin Islands, Colombia, Venezuela.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Rhinotermitidae	*Heterotermes tenuis*	West Indian Subterraneans	Sugarcane, upland rice, maize, cotton, soybean, coffee, cassava, *Eucalyptus* and *Pinus* reforestations.	Can cause considerable impact to sugarcane including reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%.	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil, machinery and wood packaging material are the most likely pathways for long distance dispersal.		South America, Caribbean.	LOW	MEDIUM	HIGH	UNKNOWN [122]	UNKNOWN
	Rhinotermitidae	*Reticulitermes flavipes*	Subterranean Termite	Sugarcane.	Prefers woody hosts. Unknown impact on sugarcane.	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil and machinery are the most likely pathways for long distance dispersal.		Europe (Austria, Germany, Italy, Portugal), North America (Canada, United States of America, Bahamas, Turks and Caicos archipelago) South America (Chile).	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Rhinotermitidae	*Reticulitermes speratus*	Japanese termite	Sugarcane.	Prefers woody hosts. Unknown impact on sugarcane.	Potential for local movement via crawling. Infested plant material (e.g. hitchhiking), soil and machinery are the most likely pathways for long distance dispersal.		China, Japan, Korea, Taiwan.	LOW	LOW [123]	MEDIUM	UNKNOWN	UNKNOWN

[122] Can cause considerable impact to sugarcane including reduced germination and shoot emergence, and significant quality loss of canes; losses can be up to 100%.
[123] Low establishment as more adapted to cold climates - withstand the cold temperatures of the temperate regions it inhabits

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Blattodea	Termitidae	*Cornitermes cumulans*	Termite	Sugarcane, signal grass, *Eucalyptus*.	Affected plant parts include roots and stem.	Main method of movement is crawling, can travel long distances in infested material.		Argentina, Brazil, Paraguay.	MEDIUM	MEDIUM	LOW	UNKNOWN	UNKNOWN
	Termitidae	*Macrotermes barneyi*	Termite	Sugarcane, *Pinus* spp., China fir (*Cunninghamia lanceolata*).	Prefers woody hosts. Unknown impact on sugarcane.	The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		Hong Kong, China, Vietnam.	LOW	MEDIUM[125]	MEDIUM	UNKNOWN	UNKNOWN
	Termitidae	*Macrotermes gilvus*	Termite	Sugarcane, bamboo, blackwood, rubber.	Scale of impact unknown.	Termites can disperse locally via crawling or flight of alates (reproductive caste).[124, 126]		Cambodia, China, East Timor, Hong Kong, India, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam.	MEDIUM	MEDIUM[125]	MEDIUM	UNKNOWN	UNKNOWN
	Termitidae	*Macrotermes subhyalinus*	Termite	Sugarcane, wheat.	Varying impacts on host range, can cause damage to sugarcane.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers, wood packaging materials) that harbour termites.[124]		Cote d'Ivoire, Ghana, Nigeria, Kenya, Republic of Benin, Ethiopia, Malawi.	LOW	MEDIUM[125]	HIGH	MEDIUM	LOW
	Termitidae	*Microtermes mycophagus*	Desert termite	Wide host range including sugarcane.[127] Considered an important pest of castor.	In sugarcane, the species has been reported to tunnel through the eye bud and cut ends of sowed 'setts' due to which the 'setts'	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil		Iran, India, Pakistan.	LOW	MEDIUM[125]	HIGH	LOW	VERY LOW

[124] Termites can also disperse locally via crawling or flight of alates (reproductive caste). Individuals usually nest in the ground or in mounds. Some species need contact with soil or some other constant source of moisture.

[125] The establishment potential of termite species may be dependent on colony status. There are instances of exotic termite species being intercepted in Australia which involved a nest with a queen.

[126] The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.

[127] Additional hosts include: chickpea, cowpea, barley, wheat, peanut, cotton, potato, *Leucaena leucocephala* (leucaena), silk cotton tree, sacred fig, white cedar, sweet orange, pongam oil tree, litchi, gum arabic tree, banyan tree, common guava, jujube tree, mango, shisham, whites iris, black pulm, white leed-tree, long beak eucalyptus, neem, toothbrush tree, mesquite, white mulberry.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Blattodea					failed to propagate. *M. mycophagus* also damaged the root system of the newly emerged shoots. [128]	or wood/cellulose products (e.g. vessels, in containers, wood packaging material) that harbour termites.[124]							
	Termitidae	*Microtermes obesi*	Wheat termite	Various hosts including wheat, barley, oats, maize, pearl millet, pigeon pea, chickpea, black gram, cowpea, field pea, lentil, common bean, faba bean, peanut, rice, cotton, jute, sugarcane, coconut, sun hemp, chillies, vegetables, plantation crops, potato, cassava, chrysanthemum, rose and fruit trees.	Varying impacts across host range, minor impact only to sugarcane.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		Bangladesh, India, Myanmar, Pakistan, Thailand, Sri Lanka, Vietnam.	LOW	MEDIUM[125]	MEDIUM	LOW	VERY LOW
	Termitidae	*Nasutitermes corniger*	Arboreal termite	Sugarcane, wheat, *Pinus elliottii*, *Eucalyptus grandis*, *Manilkara huberi*.	Varying impacts on host range, can cause damage to sugarcane.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		Wide geographic range. [129]	HIGH	MEDIUM[124, 125]	MEDIUM	LOW	VERY LOW
	Termitidae	*Nasutitermes costalis*	Termite	Sugarcane.	Prefers woody hosts. Unknown impact on sugarcane.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil		Antigua and Barbuda, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Panama, Puerto Rico,	LOW	MEDIUM[124 125]	MEDIUM	UNKNOWN	UNKNOWN

[128] Cottons are damaged by this species both at seedling and fully grown stage. In castor, it has been reported to attack the root region and to have nibbled the tap root in adult plants. Although the species preferred to feed on roots but in certain cases it was seen to devour the stem at a height of two feet above the ground level. It also survived on the fallen castor fruits.

[129] Geographic range includes: Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sint Maarten, Trinidad and Tobago, Turks and Caicos Islands, U.S. Virgin Islands, United States, Papua New Guinea, Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Venezuela.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Blattodea						or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands, U.S. Virgin Islands, Guyana.					
	Termitidae	*Nasutitermes nigriceps*	Termite	Sugarcane, mangrove.	Prefers woody hosts. Unknown impact on sugarcane.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		British Virgin Islands, Curaçao, Jamaica, Panama, Puerto Rico, Trinidad and Tobago, Turks and Caicos Islands, U.S. Virgin Islands, Brazil.	LOW	MEDIUM[125]	MEDIUM	UNKNOWN	UNKNOWN
	Termitidae	*Nasutitermes rippertii*	Termite	Sugarcane.	Prefers woody hosts. Unknown impact on sugarcane.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		Bahamas, Cuba, Jamaica, Brazil.	LOW	MEDIUM[125]	MEDIUM	UNKNOWN	UNKNOWN
	Termitidae	*Odontotermes assmuthi*	Sugarcane termite	Sugarcane, mango, coconut palms, citrus, T. aestivum, Z. mays, Pinus, grasses, shrubs.	Prefers woody hosts. Unknown impact on sugarcane.	Termites can disperse locally via crawling or flight of alates (reproductive caste).[124, 130]		India, Pakistan, Sri Lanka.	LOW	MEDIUM[125]	MEDIUM	UNKNOWN	UNKNOWN
	Termitidae	*Odontotermes formosanus*	Formosan subterranean termite	Wheat, sugarcane, rice, cotton, palms, tea.	Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes;	Termites can disperse locally via crawling or flight of alates (reproductive caste).[124,130]		Myanmar (formerly Burma), China, Taiwan, India, Japan, Thailand, Vietnam.	MEDIUM	MEDIUM[124]	MEDIUM	MEDIUM	LOW

130 The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Blattodea					losses can substantial.								
	Termitidae	*Odontotermes guptai*	Termite	Sugarcane, gum arabic tree, forest red gum, *Eucalyptus* sp.	Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can substantial.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		India, Pakistan.	LOW	MEDIUM[125]	MEDIUM	MEDIUM	LOW
	Termitidae	*Odontotermes horni*	Termite	Maize, finger millet, castor, cashew, tamarind, tea, coconut, sugarcane, *Eucalyptus* sp.	Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can substantial.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		India, Sri Lanka, Nepal, Pakistan.	LOW	MEDIUM[125]	HIGH	MEDIUM	LOW
	Termitidae	*Odontotermes obesus*	Termite	Wheat, barley, sorghum, peanut, cotton, sugarcane, coconut, sunhemp, chillies, mango, citrus, grapevine, peach, Japanese mint, fruit trees and forest trees.	Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can substantial.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		Southwestern Asia (India, Pakistan).	LOW	MEDIUM[125]	MEDIUM	MEDIUM	LOW
	Termitidae	*Odontotermes smeathmani*	Termite	Sugarcane, date palms.	Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes;	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil		Nigeria, Burkina Faso.	LOW	LOW[125]	MEDIUM	MEDIUM	VERY LOW

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential[112]	Spread potential	Economic impact	Overall risk rating
Blattodea					losses can substantial.	or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]							
Blattodea	Termitidae	*Odontotermes takensis*	Termite	Sugarcane.	Prefers woody hosts. Unknown impact on sugarcane.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		Indonesia, Malaysia, Thailand.	MEDIUM	MEDIUM[125]	MEDIUM	UNKNOWN	UNKNOWN
Blattodea	Termitidae	*Odontotermes wallonensis*	Termite	Maize, finger millet, peanut (groundnut), soybean, sunflower, *Eucalyptus*, pigeon pea (redgram), sugarcane, castor, coconut, mango, jackfruit, cashew.	Impacts on sugarcane begin with reduced germination and shoot emergence, and significant quality loss of canes; losses can substantial.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		India.	LOW	MEDIUM[125]	MEDIUM	LOW	VERY LOW
Blattodea	Termitidae	*Procornitermes triacifer*	Brazilian termite	Rice, maize, sugarcane, sorghum, wheat, pigeon pea, cucurbits, cotton, sweetpotato, cassava, beans, Poaceae (grasses), tomato, *Eucalyptus*.	Impacts on sugarcane include reduced germination and shoot emergence, and significant quality loss of canes; losses can be significant.	Termites can disperse locally via crawling or flight of alates (reproductive caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]		Argentina, Bolivia, Brazil.	LOW	HIGH[125]	HIGH	MEDIUM	LOW
Blattodea	Termitidae	*Pseudacanthotermes militaris*	Sugarcane termite	Sugarcane, red gum.	Prefers woody hosts. Causes poor germination of	Termites can disperse locally via crawling or flight of alates (reproductive		Cameroon, Ghana, Kenya, Malawi, Uganda, Zimbabwe.[131]	LOW	MEDIUM[125]	MEDIUM	MEDIUM	LOW

[131] Major pest of sugarcane in East Africa.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Blattodea					sugarcane setts. When it attacks mature cane, the cane is encrusted with earthen tunnels and stalks are often felled when nearing maturity.	caste). The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.[124]							
Blattodea	Termitidae	*Trinervitermes biformis*	Snouted harvester termite	Wheat, finger millet, peanut, cotton, brinjal, guava, mango, citrus, sapota, pomegranate, sugarcane, eggplant.	The termites attack setts, shoots, canes and stubble. The termites gain entry through the cut ends or through buds of the setts and feed on the soft tissue[132].	Termites can disperse locally via crawling or flight of alates (reproductive caste)[124, 133]		India, Sri Lanka.	LOW	MEDIUM[125]	MEDIUM	MEDIUM	LOW
Coleoptera													
Coleoptera	Buprestidae	*Aphanisticus aureocupreus (syn. Aphanisticus aeneus)*	Leafminer	Sugarcane.	Grubs mine the leaves on the lower side leading to loss of mesophyll tissue. Results in reddish brown marks on leaves at feeding sites. Association with sugarcane germplasm.	Adults are capable of flight. Long-distance dispersal may occur through human-assisted movement of plant material.		India.	LOW[134]	MEDIUM	MEDIUM	LOW	VERY LOW

[132] The tunnel excavated is filled with the soil. This affects germination and thus the initial crop stand and ultimately the cane yield. The germination failure could be up to 60%. In the stalks the termites feed on the inner tissues leaving the rind intact. The cavity formed is filled up with moist soil, having galleries, in which, they move about. The affected canes die.

[133] The most common pathway for long distance dispersal is human-mediated transport of soil or wood/cellulose products (e.g. vessels, in containers etc.) that harbour termites.

[134] This species is not currently present in locations geographically close to Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Buprestidae	*Aphanisticus cochinchinae seminulum*	Leafminer	Sugarcane.	Mines the leaves of sugarcane. Feeds on leaf tissue.	Adults are capable of flight. Long-distance dispersal may occur through human-assisted movement of plant material.		Malaysia, Southeast Asia.	MEDIUM [135]	MEDIUM	MEDIUM	LOW [136]	VERY LOW
Coleoptera	Cerambycidae	*Amniscus assimilis (syn. Leptostylopsis assimilis)*	Longhorn Beetle	Sugarcane.	Affected plant parts include the stem and leaves.	Adults are capable of flight. Long-distance dispersal may occur through human-assisted movement of plant material.		Barbados, Bermuda, Guadaloupe.	LOW [137]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
Coleoptera	Cerambycidae	*Chlorophorus annularis*	Bamboo tiger longicorn	Bamboo, citrus, cotton, sugarcane, maize.	Affected plant parts include the stem.	Adults are capable of flight. Long-distance dispersal may occur through human-assisted movement of plant material. Has been intercepted on bamboo products and packaging.		Brunei, China, Cocos Islands, Hong Kong, India, Indonesia, Israel, Japan, Laos, Malaysia, Myanmar, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand, Vietnam, Italy, Spain, United States (Hawaii), Federated States of Micronesia, Guam, Northern Mariana Islands, Papua New Guinea, Timor-Leste.	HIGH [138]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
Coleoptera	Cerambycidae	*Dorysthenes buquetii (syn. Dorysthenes buqueti)*	Sugarcane longhorn stem borer	*Bambusa vulgaris, S. officinarum*, Cassava.	Bores into the stalk causing significant damage to the plant; can lead to considerable yield loss.	Local dispersal occurs via flight (up to two kilometres each season). Long distance dispersal occurs through human-assisted movement of eggs, larvae, pupae and adults on plants, within packing materials or wood products.		India, Indonesia, Laos, Malaysia, Myanmar, Thailand.	MEDIUM [139]	HIGH [140]	HIGH [141]	HIGH	HIGH

135 This species is present somewhat geographically close to Australia including in Malaysia and Southeast Asia.
136 Economic impact is considerably low.
137 This species is not currently present in locations geographically close to Australia.
138 This species is present in several locations geographically close to Australia including Cocos Islands, Indonesia, Malaysia, Myanmar, Thailand, Singapore, Papua New Guinea and Timor-Leste.
139 This species is present somewhat geographically close to Australia including in Indonesia, Myanmar and Thailand.
140 A capacity to attack a range of hosts presents greater opportunities for locating suitable hosts on which to feed and establish.
141 A capacity to attack a range of hosts in conjunction with an ability to disperse short distances (up to 2 kilometres) through flight increases the risk of spread into new areas in a domestic setting. Eggs and larvae are also able to persist on packing materials or wood products which may allow spread through international and/or domestic trade.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Cerambycidae	*Lagocheirus araneiformis*	Longhorn beetle	Sugarcane, cassava, avocado. [142]		Local dispersal occurs via flight (up to two kilometres each season). Long distance dispersal occurs through human-assisted movement of eggs, larvae, pupae and adults on plants, within packing materials or wood products.		United States of America, Antigua and Barbuda, Bahamas, Barbados, Dominica, Grenada, Guadeloupe, Honduras, Martinique, Montserrat, St. Kitts and Nevis, French Polynesia, Colombia.	LOW [143]	MEDIUM	MEDIUM	LOW	VERY LOW
	Cerambycidae	*Migdolus fryanus*	Sugarcane rhizome borer	Sugarcane.	Attacks roots, can cause significant damage.	Local dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae, pupae and adults on plants and plant material.		Brazil.	LOW [144]	MEDIUM	MEDIUM	HIGH	MEDIUM
	Cerambycidae	*Mycerinopsis alternans (syn. Sybra alternans)*	Flat faced longhorn beetle	*Ananas comosus* (pineapple), *Erythrina*, *Ficus carica* (common fig), *Gossypium hirsutum* (Bourbon cotton), *Musa* x *paradisiaca* (plantain), *Ocimum basilicum* (basil), *Phaseolus vulgaris* (common bean), *Saccharum officinarum* (sugarcane).	May impact foliage, extent unknown.	Local dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae, pupae and adults on plants and plant material.		Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, Taiwan, Indonesia, Mariana Islands, Caroline Islands, Marshall Islands, Guam, the Philippines, United States of America (Hawaii, Florida), Chile (Easter Island).	MEDIUM [145]	MEDIUM	LOW	UNKNOWN	UNKNOWN
	Chrysomelidae	*Callispa vittata*	Leaf scraper beetle	Sugarcane.	Feeds on all species of Saccharum sp.	Beetle can crawl and fly for short distance dispersal. Longer distance dispersal may be supported by hitchhiking or transportation in plant materials.		India.	LOW [146]	MEDIUM	LOW	MEDIUM	VERY LOW

[142] Prefers Cassava. Sugarcane is ingested as a secondary food source. Can have a substantial impact in high infestations.
[143] This species is not currently present in locations geographically close to Australia.
[144] This species is not currently present in locations geographically close to Australia.
[145] This species is present somewhat geographically close to Australia including in Myanmar, the Philippines, Thailand and Vietnam.
[146] This species is not currently present in locations geographically close to Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Chrysomelidae	*Chaetocnema basalis*	Flea beetle	Sugarcane, sweet potato, rice, potato, wheat.	Chews on leaves with mouthparts, can transmit bacteria through feeding process.	Dispersal may be possible via crawling or hitchhiking.		Afghanistan, Bangladesh, China, India, Indonesia, Japan, Myanmar, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam.	MEDIUM [147]	HIGH [148]	HIGH [149]	MEDIUM	MEDIUM
	Chrysomelidae	*Chaetocnema confinis*	Flea beetle; Leaf beetle	Wide host range. [150]	Larvae feed inside roots and attack the collar between the roots and the stem; Adults consume leaf material (mostly during the summer) causing wilt.	Short distance dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae or pupae and adults on plants and plant material.		Comoros, Gambia, Ghana, Madagascar, Malawi, Mauritius, Réunion, Senegal, Seychelles, South Africa, Japan (Ryukyu Islands), Taiwan, Thailand, Vietnam, Guernsey, Canada, El Salvador, Nicaragua, United States of America, French Polynesia, Guam, Marshall Islands, Palau, Brazil, Ecuador (Galapagos Islands). [151]	MEDIUM [152]	HIGH [153]	HIGH [154]	MEDIUM	MEDIUM

[147] This species is present somewhat geographically close to Australia including in Indonesia, the Philippines, Thailand and Vietnam.
[148] A wide host range presents greater opportunities for locating suitable hosts on which to feed and establish.
[149] A wide host range in conjunction with an ability to disperse short distances through crawling and/or hitchhiking increases the risk of spread into new areas in a domestic setting.
[150] Host range includes: *Abutilon hybridum* (Indian mallow), *Acer negundo* (box elder), *Acer platanoides* (Norway maple), *Aesculus* (buckeye), *Amaranthus retroflexus* (redroot pigweed), *Arctium minus* (common burdock), *Avena sativa* (oats), *Beta vulgaris* (beetroot), *Beta vulgaris* var. *saccharifera* (sugarbeet), *Brassica napus* var. *napus* (canola), *Brassica rapa* subsp. *oleifera* (turnip rape), *Calystegia sepium* (great bindweed), *Catalpa bignonioides* (Southern catalpa), *Convolvulus arvensis* (bindweed), *Fragaria vesca* (wild strawberry), *Fraxinus americana* (white ash), *Glycine max* (soybean), *Gossypium* (cotton), *Helianthus tuberosus* (Jerusalem artichoke), *Hibiscus* (rosemallows), *Ipomoea aquatica* (swamp morning-glory), *Ipomoea batatas* (sweet potato), *Ipomoea pandurata* (bigroot morningglory (USA)), *Ipomoea purpurea* (tall morning glory), *Malus domestica* (apple), *Medicago sativa* (lucerne), *Mucuna* (velvetbeans), *Nicotiana tabacum* (tobacco), *Phaseolus lunatus* (lima bean), *Phaseolus vulgaris* (common bean), *Prunus americana* (American plum), *Prunus avium* (sweet cherry), *Prunus virginiana* (common chokecherrytree), *Rubus* (blackberry, raspberry), *Secale cereale* (cereal rye), *Solanum lycopersicum* (tomato), *Solanum nigrum* (black nightshade), *Solanum tuberosum* (potato), *Tilia americana* (basswood), *Trifolium pratense* (red clover), *Triticum aestivum* (wheat), *Vitis vinifera* (grapevine), *Zea mays* (maize).
[151] Geographic spread is expected to reach Australia.
[152] This species is present somewhat geographically close to Australia including in Thailand and Vietnam.
[153] A wide host range presents greater opportunities for locating suitable hosts on which to feed and establish.
[154] A wide host range in conjunction with an ability to disperse short distances through flight increases the risk of spread into new areas in a domestic setting.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Chrysomelidae	*Dicladispa armigera*	Rice hispa	Rice, maize, sugarcane, wheat, grasses.	Adult *D. armigera* feed externally on leaf tissue.	Short distance dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae or pupae and adults on plants or plant material.		Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Iran, Laos, Malaysia, Myanmar, Nepal, North Korea, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam, Papua New Guinea.	HIGH [155]	HIGH [156]	HIGH [157]	MEDIUM	MEDIUM
	Chrysomelidae	*Glyptoscelis aeneipennis*	Leaf beetle	Sugarcane, Citrus.	May have some impact sugarcane, extent of impact is unknown.	Short distance dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae or pupae and adults on plants or plant material.		Trinidad and Tobago, Venezuela.	LOW [158]	MEDIUM	LOW	UNKNOWN	UNKNOWN
	Chrysomelidae	*Myochrous armatus*	Cane leaf beetle	*Glycine max* (soybean), *Ipomoea batatas* (sweet potato), *Nicotiana tabacum* (tobacco), *Saccharum officinarum* (sugarcane).	Known to chew and consumes seedlings and stems, scale of impact unknown.	Short distance dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae or pupae and adults on plants or plant material.		Trinidad & Tobago, Brazil, Guyana.	LOW[158]	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Chrysomelidae	*Systena basalis*	S-lettered leaf beetle	*Ipomoea batatas* (sweet potato), *Phaseolus* (beans), *Phaseolus vulgaris* (common bean), *Saccharum officinarum* (sugarcane), *Solanum lycopersicum* (tomato), *Solanum tuberosum* (potato).	Affected plant parts include leaves.	Short distance dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae or pupae and adults on plants or plant material.		Germany, Cuba.	LOW[158]	MEDIUM	MEDIUM	LOW	VERY LOW
	Chrysomelidae	*Systena s-littera*		*Beta vulgaris* var. *saccharifera* (sugarbeet), *Cajanus cajan* (pigeon pea), Cucurbitaceae	Affected plant parts include leaves.	Short distance dispersal occurs via flight (up to two kilometres each season). Long distance dispersal occurs through human-		Dominica, Dominican Republic, Mexico, Puerto Rico, Trinidad and Tobago, Suriname, Venezuela.	LOW[158]	MEDIUM	MEDIUM	LOW	VERY LOW

[155] This species is present in several locations geographically close to Australia including Malaysia, Indonesia, the Philippines and Papua New Guinea.
[156] A wide host range presents greater opportunities for locating suitable hosts on which to feed and establish.
[157] A wide host range in conjunction with an ability to disperse short distances through flight increases the risk of spread into new areas in a domestic setting.
[158] This species is not currently present in locations geographically close to Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
				(cucurbits), *Daucus carota* (carrot), *Glycine max* (soybean), *Ipomoea batatas* (sweet potato), *Manihot esculenta* (cassava), *Phaseolus* (beans), *Saccharum officinarum* (sugarcane), *Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Vigna unguiculata* (cowpea).		assisted movement of eggs, larvae or pupae and adults on plants or within packing materials and wood products.							
Coleoptera	Chrysomelidae	*Typophorus nigritus*	Black sweet potato beetle	Sugarcane, capsicum, sweet potato.	The polyphagous larvae damage roots of cereals, sugarcane and strawberries, especially when planted near woodlands. [159]	Short distance dispersal occurs via flight. Long distance dispersal occurs through human-assisted movement of eggs, larvae or pupae and adults on plants or plant material.		Cuba, Grenada, Guadaloupe, Saint Vincent and the Grenadines, Trinidad and Tobago, United States of America, Venezuela.	LOW [160]	MEDIUM	MEDIUM	MEDIUM	LOW
	Coccinellidae	*Chnootriba similis (syn. Epilachna similis)*	Maize ladybird	*Abelmoschus esculentus* (okra), *Eragrostis tef* (teff), *Hordeum vulgare* (barley), *Oryza sativa* (rice), *Pennisetum* (feather grass), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Triticum aestivum* (wheat), *Zea mays* (maize). [161]		Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil or hitchhiking are the most likely pathways for long distance dispersal.		Angola, Burkina Faso, Cameroon, Chad, Congo, Democratic Republic of the, Congo, Republic of the, Côte d'Ivoire, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Kenya, Madagascar, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe, Yemen.	LOW [160]	MEDIUM	HIGH [162]	LOW [161]	VERY LOW

[159] The powerful mandibles gnaw right through small roots and make large, sizeable wounds on large ones, sometimes severing the tap roots 30 cm or more below the soil surface. Well drained, sandy soils and less disturbed areas are more commonly affected. In pastures, fine-leaved grasses are often preferentially attacked, while cocksfoot and perennial ryegrass show some degree of resistance. Damage is more likely on light land and in wet hilly areas. Damage is often accentuated by large numbers of birds tearing up portions of sward in search of the larvae.
[160] This species is not currently present in locations geographically close to Australia.
[161] Prefers barley. Negligible impact on sugarcane.
[162] A capacity to attack a range of hosts in conjunction with an ability to disperse short distances through flight increases the risk of spread into new areas in a domestic setting.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Curculionidae	*Anacentrinus subnudus*	Sugarcane rootstock weevil	*Saccharum* sp., Poaceae, Paspalum.	Soil, root dwelling weevil that feeds on cane. Larvae feeding does more damage than adult feeding. Heavy infestations can cause significant yield loss.	Movement is likely due to the transportation of contaminated plant materials and soil.		United States of America.	LOW [163]	MEDIUM	LOW	MEDIUM [164]	VERY LOW
	Curculionidae	*Compsus serrans*	Aserruchador de la caña	Sugarcane.	Known to be harmful to sugarcane crops, scale of impact difficult to determine.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Venezuela.	LOW[163]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Curculionidae	*Diaprepes abbreviatus (syn. Diaprepes spengleri)*	Golden leaf weevil	Sugarcane, avocado, roses, citrus, Christmas palm, aloe vera, celery, groundnut, capsicum, mandarin, orange, grapefruit, coconut, coffee, yam, cotton, sweet potato, jacaranda, privet, lichi, mango, cassava, banana, passionflower, lima bean, pepper, guava, potato, sorghum, rose apple, almond, maize.	Adults feed on the leaves, usually along the edges of new tender leaves, resulting in a characteristic notching. Unless extensive, feeding by adults is generally considered to have an insignificant effect on citrus and sugarcane. [165]	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Antigua and Barbuda, Barbados, British Virgin Islands, Costa Rica, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Cuba, Puerto Rico, Saint Vincent and the Grenadines. Trinidad and Tobago, Sweden, United Kingdom.	LOW[163]	HIGH [166]	HIGH [167]	LOW [168]	VERY LOW

[163] This species is not currently present in locations geographically close to Australia.
[164] Heavy infestations can cause significant yield loss.
[165] Sugarcane roots are injured by the larvae causing signs of wilting and dieback of the whole plants. Although adult weevils may not prefer feeding on some sugarcane cultivars, it is an excellent reproductive host. Infested sugarcane may become stunted and some stalks within an infested stool may become desiccated and die. Stalks with basal damage may break over in high winds or when a field is mechanically harvested.
[166] A wide host range presents greater opportunities for locating suitable hosts on which to feed and establish.
[167] A wide host range in conjunction with an ability to disperse short distances through flight increases the risk of spread into new areas in a domestic setting.
[168] Adults feed on the leaves, usually along the edges of new tender leaves, resulting in a characteristic notching. Unless extensive, feeding by adults is generally considered to have an insignificant effect on citrus and sugarcane.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Curculionidae	*Diaprepes famelicus*	Sugarcane root borer; Donkey beetle	*Cajanus cajan* (pigeon pea), *Calotropis procera* (apple of sodom), Citrus, *Citrus aurantiifolia* (lime), *Ricinus communis* (castor bean), *Saccharum officinarum* (sugarcane).	Larvae feed on citrus root bark, girdling the major roots and causing severe chlorosis, wilting and death of the seedlings. Feeding on leaves produces a characteristic notching appearance.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Antigua and Barbuda, Barbados, Bermuda, Cuba, Dominica, Grenada, Guadeloupe, Martinique, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines.	LOW [169]	HIGH [170]	HIGH [171]	LOW	VERY LOW
	Curculionidae	*Exophthalmus vittatus*	Citrus weevil	Citrus, Sugarcane.	Unknown impact.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Jamaica, Cuba.	LOW [163]	MEDIUM	LOW	UNKNOWN	UNKNOWN
	Curculionidae	*Hypomeces pulviger (syn. Hypomeces squamosus)*	Green weevil; Gold dust weevil	Wide host range including sunflower, cotton, tobacco, rice, sugarcane, maize, cowpea. [172]	Larvae feed on roots of host plants, adults feed above ground plant parts. The larvae damage seedlings of upland rice, maize, sugarcane, cotton and tobacco (Kalshoven, 1981); recently planted sugarcane cuttings are also damaged.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Brunei, Cambodia, China, Hong Kong, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Taiwan, Thailand, Vietnam.	MEDIUM [173]	MEDIUM [174]	MEDIUM [175]	LOW	VERY LOW

[169] This species is not currently present in locations geographically close to Australia.
[170] A wide host range presents greater opportunities for locating suitable hosts on which to feed and establish.
[171] A wide host range in conjunction with an ability to disperse short distances through flight increases the risk of spread into new areas in a domestic setting.
[172] Both larvae and adults are polyphagous.
[173] This species is present somewhat geographically close to Australia including in Singapore, Malaysia, Indonesia and the Philippines.
[174] The wide host range and polyphagous nature of both larvae and adults, presents greater opportunities for locating suitable hosts on which to feed and establish.
[175] A wide host range in conjunction with an ability to disperse short distances through flight increases the risk of spread into new areas in a domestic setting.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Curculionidae	*Lachnopus aurifer*	White grub	Citrus, Sugarcane.	Impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Jamaica.	LOW[163]	LOW	LOW	UNKNOWN	UNKNOWN
Curculionidae	*Lissorhoptrus oryzophilus*	Rice water weevil	Wide host range including *Saccharum officinarum* (sugarcane).[176]	Prefers the leaves, roots of rice. Unknown impact on sugarcane.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		China, India, Japan, North Korea, South Korea, Taiwan, Europe, Greece, Italy, Canada, Cuba, Dominican Republic, Mexico, United States of America, Colombia, Suriname, Venezuela.	MEDIUM	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN

[176] Additional hosts include: *Alopecurus aequalis* (Dent foxtail), *Axonopus compressus* (carpet grass), *Cynodon dactylon* (Bermuda grass), *Cyperus difformis* (small-flowered nutsedge), *Cyperus iria* (rice flatsedge), *Cyperus serotinus*, *Echinochloa crus-galli* (barnyard grass), *Imperata cylindrica* (cogon grass), *Leersia hexandra* (southern cut grass), *Leersia oryzoides* (Rice cutgrass), *Oryza sativa* (rice), *Panicum repens* (torpedo grass), *Poa annua* (annual meadowgrass), Poaceae (grasses), *Zea mays* (maize).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Curculionidae	*Metamasius hemipterus*	West Indian cane weevil	Sugarcane, banana, coconut, maize, sorghum.	Feeding on sugarcane causes retarded growth, plants to turn a yellow colour and become stunted, and the stalks to be riddled with large galleries (Wyniger, 1962). [177]	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Cameroon, Congo (ROC), Equatorial Guinea, Gabon, Nigeria, Antigua and Barbuda, Barbados, Belize, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, U.S. Virgin Islands, United States of America, Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.	LOW[163]	MEDIUM	MEDIUM	MEDIUM	LOW
	Curculionidae	*Myllocerus undecimpustulatus*	Sri Lankan weevil	Sugarcane, mango, pomegranate, citrus, peach, lychee, eggplant, musk mallow, golden apple, cashew, groundnut, pigeon pea, liquorice, sorghum, mung bean.	Unknown impact.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		India, Pakistan, Sri Lanka, Indonesia, United States of America.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Curculionidae	*Rhynchophorus cruentatus*	Palmetto weevil	Sugarcane, palms.	Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		United States of America.	LOW [178]**Error! Bookmark not defined.**	LOW	LOW	UNKNOWN	UNKNOWN

[177] As soon as the larvae have begun their development, the rotting cane stalks acquire a distinctive odour of acetic acid which becomes ever more pronounced as more of the stalk is infested (Wolcott, 1948). In banana, plants show slowed growth, leaves wilt and wither; the pseudostems are heavily mined and often broken, and young plants turn yellow and collapse.
[178] This species is not currently present in locations geographically close to Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Curculionidae	*Rhynchophorus ferrugineus*	Red palm weevil	Sugarcane, *Cocos nucifera*, *Metroxylon* spp., *Elaeis guineensis*, *Phoenix dactylifera.* [179]	It is very difficult to detect *R. ferrugineus* in the early stages of infestation. Impact on sugarcane undetermined.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Wide geographic range. [180]	LOW**Error! Bookmark not defined.**	HIGH [181]	HIGH [182]	LOW	VERY LOW
	Curculionidae	*Rhynchophorus palmarum*	South American palm weevil	Sugarcane, Coconut palms (primary host).	The external symptoms on infested palms (preferred host) are a progressive yellowing of the foliar area, destruction of the emerging leaf and necrosis in the flowers. [183]	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.	Vector of *Rhadinaphelenchus cocophilus* causing red ring disease of coconut.	Côte d'Ivoire, Europe, Slovenia, Barbados, Belize, Costa Rica, Cuba, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Martinique, Mexico, Nicaragua, Panama, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States, Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.	LOW [184]	HIGH	HIGH	LOW	VERY LOW
	Curculionidae	*Sepiomus sp.*	Sugarcane leaf eating weevil	Sugarcane.	Consumes leaves, scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Thailand.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN

[179] Preferred host is coconut palms.
[180] Geographic range includes: Djibouti, Egypt, Libya, Mauritania, Morocco, Tunisia, Bahrain, Bangladesh, Cambodia, China, Georgia, Hong Kong, India, Iran, Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Myanmar, Oman, Pakistan, Philippines, Qatar, Saudi Arabia, Sri Lanka, Syria, Taiwan, Thailand, Turkey, United Arab Emirates, Vietnam, Yemen, Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Finland, France, Greece, Italy, Malta, Montenegro, Poland, Portugal, Aruba, Curacao, Netherlands.
[181] Difficulty of detection in the early stages of infestation increases the risk of establishing undetected.
[182] Difficulty of detection in the early stages of infestation in conjunction with an ability to disperse short distances through flight increases the risk of spread into new areas in a domestic setting.
[183] Leaves start to dry in ascendant order in the crown; the apical leaf bends and eventually drops. Internally, the galleries and damage to leaf-stems produced by the larvae are easily detected in heavily infested plants. Identification of attacked plants by visual symptoms alone may lead to wrong identification. Pupae and old larvae are frequently found when inspecting the crown of infested plants.
[184] This species is not currently present in locations geographically close to Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Curculionidae	*Sphenophorus levis*	Sugarcane weevil	Sugarcane.	Can have minor impact on leaves.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Costa Rica, Brazil.	LOW[184]	MEDIUM	MEDIUM	LOW	VERY LOW
	Curculionidae	*Temnoschoita quadripustulata*	Oil palm weevil	Sugarcane, African oil palm.	Leaves.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Congo, Ghana.	LOW[184]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Curculionidae	*Xyleborus volvulus*	Ambrosia beetle	Sugarcane, cashew, sugar apple, jackfruit, pawpaw, cinnamon, coconut, Eucalyptus, rubber, macadamia, mango, avocado, almond.	Wood boring insect; can cause discolouration of leaves, dieback, visible frass.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.	Potential vector of *Raffaela lauricola.*	Wide geographic range. [185]	HIGH [186]	HIGH	MEDIUM	LOW	LOW
	Dryophtoridae	*Metamasius hemipterus sericeus*	Silky cane weevil	Sugarcane, banana, date-palm. Cabbage palmetto, guava, spindle palm.	Can cause negative impact on crop; specifically stem, leaves.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Spain, Costa Rica, United States of America.	LOW[184]	MEDIUM	MEDIUM	LOW	VERY LOW
	Dynastidae	*Alissonotum piceum*	Dung beetle; Sugarcane beetle	Sugarcane.	Larvae have been observed in commercial sugarcane fields, scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Mauritius.	LOW[184]	LOW [187]	LOW	UNKNOWN	UNKNOWN
	Dynastidae	*Cyclocephala parallela*	Rhinoceros beetle	Sugarcane.	Attacks roots. Can reduce tonnes of sugar per hectare	Crawling and flying allows for local dispersal. Introduction of infested		United States of America.	LOW[184]	MEDIUM	MEDIUM	MEDIUM [188]	LOW

[185] Geographic range includes: Angola, Burundi, Cameroon, Congo, Cote d'Ivoire, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Kenya, Madagascar, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Seychelles, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe, India, Indonesia, Japan, Malaysia, Myanmar, Philippines, South Korea, Taiwan, Thailand, Bermuda, Costa Rica, Cuba, Dominica, El Salvador, Grenada, Guadeloupe, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Puerto Rico, Trinidad and Tobago, United States (Florida, Hawaii), Fiji, French Polynesia, New Zealand, Papua New Guinea, Samoa, Solomon Islands, Argentina, Bolivia, Brazil, Brazil, Chile, Colombia, Ecuador, French Guinea, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.
[186] This species is present in several locations geographically close to Australia including Indonesia, Malaysia, Myanmar, the Philippines, New Zealand and Papua New Guinea.
[187] The narrow host range presents fewer opportunities for individuals of this species to find suitable hosts on which to feed and establish relative to species that are polyphagous with a wide host range.
[188] Can reduce tonnes of sugar per hectare resulting in significant yield loss.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera					resulting in significant yield loss.	plant materials and soil are the most likely pathways for long distance dispersal.							
	Dynastidae	*Tomarus subtropicus (syn. Ligyrus subtropicus)*	Sugarcane grub	Sugarcane.	Of primary economic importance. Larvae feed on grass roots; causes significant root reduction on host species resulting in severe production loss.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		United States of America.	LOW[184]	MEDIUM	MEDIUM	HIGH	MEDIUM
	Elateridae	*Melanotus communis*	Common wireworm	*Apium graveolens* (celery), *Arachis hypogaea* (peanut), *Avena sativa* (oats), *Capsicum annuum* (bell pepper), *Daucus carota* (carrot), *Ipomoea batatas* (sweet potato), *Nicotiana tabacum* (tobacco), Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Solanum tuberosum* (potato), *Sorghum bicolor* (sorghum), *Triticum aestivum* (wheat), *Zea mays* (maize).	Affected plant parts include germinating seed, roots, tubers, underground stems of seedlings. Seedlings and young plants are especially vulnerable, although older plants can also be attacked. [189]	Larvae move freely in the soil. Adults can fly but stay close to the ground, usually remaining within 3 m of the soil surface (Cherry and Hall, 1986). This pest could possibly be transported with contaminated soil containing eggs and larvae, or via potato tubers with larvae on their surface. [190]		Canada, United States of America.	LOW[184]	MEDIUM	MEDIUM	LOW	VERY LOW
	Elateridae	*Melanotus tamsuyensis*	Sugarcane wireworm	Sugarcane.	The larvae damage the shoots and roots of the cane seedlings so that they do not germinate; after the damage to the base of the cane, they form a dead heart	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		China, Japan, Taiwan.	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

[189] Characteristically, crops will show symptoms only in a restricted part of infested fields where hosts that have been attacked may appear stunted or wilted, because of larval root feeding.

[190] Villani and Gould (1986) tracked the movement of M. communis larvae in containers of soil under laboratory conditions using a low dose or 'soft' X-ray technique which appeared to show that larvae were attracted to maize seeds. Larvae burrowed simple tunnels directly to the seed, whereas in soils without any host seed, larvae formed a complex matrix of tunnels spreading randomly through the soil in an apparent effort to locate a food source. Adults are active at night (Fulton, 1928). Peak flight activity occurs when females are ovipositing; for example, 88% of all adults captured flying in Florida, USA, were caught during the early summer, in May and June, when females were ovipositing (Cherry and Hall, 1986).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera					and the damage to the growth of the roots of the stems affects the growth, and in severe cases they cannot stay at the roots.								
	Melolonthidae	*Cochliotis melolonthoides*	Sugarcane white grub	Sugarcane.	Larvae feed on roots and can cause substantial damage during heavy infestations.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Somalia, Tanzania.	LOW[184]	MEDIUM	MEDIUM	MEDIUM	LOW
	Melolonthidae	*Eulepida baumanni*	White grub	Sugarcane.	Can have minor impact, typically feed on roots, requires management and control to reduce impact.	Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil, packing material or hitchhiking are the most likely pathways for long distance dispersal.		Burkina Faso, Cote d'Ivoire.	LOW[184]	LOW	MEDIUM	MEDIUM	VERY LOW
	Melolonthidae	*Holotrichia serrata*	White grub	Legumes, tobacco, rubber, potato and grasses (including sugarcane).	The grubs feed on plant roots, causing yellowing. Some plants wilt and ultimately die; such plants can be easily pulled out. [191]	Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil, packing material or hitchhiking are the most likely pathways for long distance dispersal.		Bangladesh, India, Sri Lanka.	LOW[184]	MEDIUM	MEDIUM	MEDIUM	LOW
	Melolonthidae	*Hoplochelus marginalis*	White worm	Sugarcane.	Poses substantial threat to sugarcane.	Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil, packing material or hitchhiking are the most likely pathways for long distance dispersal.		Madagascar, Mauritius, Reunion.	LOW [192]	MEDIUM	MEDIUM	MEDIUM	LOW

[191] In spite of attack, most perennial crops, such as coconut, areca nut and orchard trees, do not show immediate symptoms of damage, although in the long run their lifespan is reduced and they bear uneconomic yields. In annuals, sudden wilting is the earliest symptom. In cases of attack by adult beetles, the affected plants are defoliated. Can cause 100% yield loss.

[192] This species is not currently present in locations geographically close to Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Rutelidae	*Anomala polita*	Beetle	Sugarcane, potato.	Affected plant parts include leaves. Scale of impact unknown. [193]	Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil, packing material or hitchhiking are the most likely pathways for long distance dispersal.		India.	LOW [194]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Scarabaeidae	*Adoretus compressus*	Compressed rose beetle	African oil palm, sugarcane, sorghum, cocoa, maize.	Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil, packing material or hitchhiking are the most likely pathways for long distance dispersal.		Brunei, Indonesia, Malaysia, Singapore, Thailand, Vietnam.	MEDIUM	MEDIUM	MEDIUM	LOW	VERY LOW
	Scarabaeidae	*Adoretus sinicus*	Chinese rose beetle	Wide host range including *Saccharum officinarum* (sugarcane). [195]	Above ground plant parts (adults), roots (eggs, larvae).	Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil or hitchhiking are the most likely pathways for long distance dispersal.		Cambodia, China, Hong Kong, India, Indonesia, Macau, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam, United States of America, (Hawaii), American Samoa, Federated States of Micronesia, Guam, Northern Mariana Islands, Palau.	MEDIUM	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN

[193] Known to impact potatoes, difficult to determine impact on sugarcane.
[194] This species is not currently present in locations geographically close to Australia.
[195] Additional hosts include: Abelmoschus esculentus (okra), Abutilon menziesii, Acacia (wattles), Acalypha (Copperleaf), Acalypha wilkesiana, Alocasia, Arachis hypogaea (peanut), Artocarpus heterophyllus (jackfruit), Asparagus officinalis (asparagus), Bauhinia (camel's foot), Berrya cordifolia, Brassica oleracea (cabbages, cauliflowers), Brassica rapa subsp. chinensis (Chinese cabbage), Cajanus cajan (pigeon pea), Camellia sinensis (tea), Carya (hickories), Castanea crenata (Japanese chestnut), Coccoloba uvifera (sea grape), Colocasia esculenta (taro), Colubrina oppositifolia, Combretum, Combretum indicum (Rangoon creeper), Commelina communis (common dayflower), Cucumis sativus (cucumber), Dimocarpus longan (longan tree), Diospyros kaki (persimmon), Fragaria (strawberry), Glycine max (soybean), Gossypium (cotton), Hedychium, Heliconia, Hibiscadelphus distans, Hibiscus (rosemallows), Hibiscus tiliaceus (coast cottonwood), Ipomoea batatas (sweet potato), Juglans regia (walnut), Ligustrum sinense (Chinese privet), Liquidambar taiwaniana, Macaranga grandifolia, Malus toringo (toringo crab-apple), Melaleuca leucadendra (long-leaved paperbark), Morus alba (mora), Musa x paradisiaca (plantain), Paederia foetida (skunkvine), Perilla frutescens, Phaseolus vulgaris (common bean), Plumbago auriculata (cape leadwort), Quercus aliena (oriental white oak), Quercus mongolica (Mongolian oak), Ricinus communis (castor bean), Robinia pseudoacacia (black locust), Rosa (roses), Rubus (blackberry, raspberry), Salacca zalacca, Sapium sebiferum (Chinese tallow tree), Solanum melongena (aubergine), Syzygium samarangense (water apple), Terminalia, Theobroma cacao (cocoa), Vitis (grape), Vitis vinifera (grapevine), Ximenia, Zea mays (maize), Zingiber officinale (ginger).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Scarabaeidae	*Adoretus versutus* (syn. *Adoretus bangalorensis, Adoretus insularis, Adoretus vestitus, Adoretus vitiensis*)	Rose beetle	Wide host range including *Saccharum officinarum* (sugarcane). Preferred host is cocoa. (Veitch, 1919).[196]	*A. versutus* adults feed by perforating the leaflets, starting from the middle and without destroying the ribs.[197]	Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil, packing material or hitchhiking are the most likely pathways for long distance dispersal.		Madagascar, Mauritius, Réunion, Saint Helena, Seychelles, Bangladesh, British Indian Ocean Territory, India, Indonesia, Malaysia, Pakistan, Sri Lanka, American Samoa, Cook Islands, Fiji, Samoa, Tonga, Vanuatu, Wallis and Futuna.	MEDIUM	HIGH	HIGH	LOW	LOW
	Scarabaeidae	*Alissonotum impressicolle*	Black sugarcane beetle	Sugarcane.	Serious pest of sugarcane; bores into the plant causing serious economic damage during infestations.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		China, Indonesia, Malaysia, Myanmar, Taiwan, Thailand, Vietnam.	MEDIUM	HIGH	HIGH	LOW	LOW
	Scarabaeidae	*Alissonotum pauper*	Sugarcane beetle	Sugarcane.	The larvae damage the roots of sugarcane while the adults feed on the stem.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		China, Indonesia.	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW
	Scarabaeidae	*Anomala sulcatula*	Chafer beetle	Sugarcane, rice, maize, Poaceae spp.	Larvae are reported as feeding on roots and adults as most likely generalist folivores (Dunlap et	The larvae or eggs could be accidentally transported in turf or agricultural products.		Malaysia, Philippines, Guam, Mariana Islands.[198]	MEDIUM[199]	MEDIUM	MEDIUM	LOW	VERY LOW

[196] Additional hosts include: *Acacia* (wattles), *Anacardium occidentale* (cashew nut), *Arachis hypogaea* (peanut), *Bauhinia* (camel's foot), *Bougainvillea spectabilis* (great bougainvillea), *Carica papaya* (pawpaw), *Citrus limon* (lemon), *Citrus maxima* (pummelo), *Citrus sinensis* (navel orange), *Citrus* x *paradisi* (grapefruit), *Coffea canephora* (robusta coffee), *Colocasia esculenta* (taro), *Delonix regia* (flamboyant), *Dioscorea* (yam), *Ficus carica* (common fig), *Hibiscus manihot* (bele), *Ipomoea batatas* (sweet potato), *Lagerstroemia indica* (Indian crape myrtle), *Litchi chinensis* (lichi), *Malus domestica* (apple), *Musa* x *paradisiaca* (plantain), *Pachyrhizus erosus* (yam bean), *Persea americana* (avocado), *Phaseolus* (beans), *Pometia pinnata* (fijian longan), *Prunus domestica* (plum), *Psidium guajava* (guava), *Pyrus communis* (European pear), *Raphanus sativus* (radish), *Rosa* (roses), *Solanum melongena* (aubergine), *Sorghum bicolor* (sorghum), *Syzygium malaccense* (Malay apple), *Terminalia catappa* (Singapore almond), *Theobroma cacao* (cocoa), *Vigna unguiculata* (cowpea), *Vitis* (grape), *Zingiber officinale* (ginger), *Zinnia elegans* (zinnia).

[197] The leaflets are eaten away in very small but numerous patches, giving a skeletal appearance to the leaflet. The attacks are more numerous at the apex of the leaflets than at the base. Besides this characteristic feeding behaviour, the adult rose beetles make depressions in the border of the areas eaten, which is typical of *Adoretus* spp. and distinguishes them from the damage caused by other foliage pests.

[198] According to Cartwright and Gordon (1971), *A. sulcatula* probably arrived in the Northern Mariana Islands via military planes.

[199] Reports the species as possibly introduced with plants and soils imported for the establishment of cable facilities in the Midway Atoll. The adults of *A. sulcatula* are attracted to light at night, so they could be present in well-lit ports and airports from where they could hitchhike on marine or air cargo. This is confirmed by its detection on an airplane bound to Hawaii in the 1950s (Suehiro, 1960). The larvae or eggs could be accidentally transported in turf or agricultural products.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential[112]	Spread potential	Economic impact	Overall risk rating
					al., 2016).								
	Scarabaeidae	*Apogonia destructor*	Leaf beetle	Fabaceae, Sugarcane.	The larvae damage the roots of sugarcane while the adults feed on the stem.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Indonesia.	MEDIUM	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Scarabaeidae	*Apogonia rauca*	Dung beetle	Sugarcane, gum arabic tree, groundnut, neem tree, leucana.	Can have minor impact on leaves.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		India.	LOW[200]	LOW	MEDIUM	LOW	NEGLIGIBLE
Coleoptera	Scarabaeidae	*Cyclocephala amazona* subsp. *signata*	Hard-back beetle	*Cajanus cajan* (pigeon pea), *Saccharum officinarum* (sugarcane).	Unknown impact.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Barbados, Guyana.	LOW[200]	LOW	LOW	UNKNOWN	UNKNOWN
	Scarabaeidae	*Dasylepida ishigakiensis*	White grub	Sugarcane.	Feed on sugarcane roots and underground stems, often killing the plant prior to harvest.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Japan.	LOW[200]	LOW	LOW	MEDIUM	VERY LOW
	Scarabaeidae	*Dyscinetus dubius*	Hardback beetle	Poaceae including sugarcane.	Affected plant parts include those above ground. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Saint Vincent and the Grenadines, Guyana.	LOW[200]	LOW	LOW	HIGH	LOW
	Scarabaeidae	*Dyscinetus picipes* (syn. *Dyscinetus geminatus*)	Rhinoceros beetle	Sugarcane (Poaceae), Coffee (Rubicaea).	Affected plant parts include those above ground. Impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		United States of America (Florida), Mexico, West Indies, Cuba, Puerto Rico.	LOW[200]	LOW	LOW	UNKNOWN	UNKNOWN

[200] This species is not currently present in locations geographically close to Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Scarabaeidae	*Euetheola bidentata*	Bidentate scarab; Roughheaded corn stalk borer	*Ananas comosus* (pineapple), Araceae, *Oryza sativa* (rice), *Saccharum officinarum* (sugarcane), *Zea mays* (maize).	Affected plant parts include those above ground (attacked by adults) and roots (attacked by larvae). Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Mexico, Trinidad and Tobago, United States of America, French Guiana, Guyana, Suriname, Venezuela.	LOW[200]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Scarabaeidae	*Euetheola rugiceps*	Sugarcane beetle	*Gossypium* (cotton), *Saccharum officinarum* (sugarcane), *Zea mays* (maize).	Affected plant parts include roots and stems. This species can cause significant impact to sugarcane.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		United States of America (Arkansas, Louisiana).	LOW[200]	MEDIUM	MEDIUM	MEDIUM	LOW
	Scarabaeidae	*Exomala orientalis*	Oriental beetle	Wide host range including *Saccharum officinarum* (sugarcane). [201]	Affected plant parts include leaves and roots.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		China, India, North Korea, Philippines, South Korea, Taiwan, United States of America, Federated States of Micronesia.	LOW[200]	MEDIUM	MEDIUM	MEDIUM	LOW
	Scarabaeidae	*Heteronychus annulatus*	Whitegrub	Sugarcane.	Adults feed on underground plant parts. They bore into the base of the shoot and feed on tissues by remaining inside the hole. Feeding damage results in dead hearts.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		India.	LOW[200]	HIGH	HIGH	LOW	VERY LOW

[201] Additional hosts include: *Agrostis stolonifera* (creeping bentgrass), *Alcea rosea* (Hollyhock), *Ananas comosus* (pineapple), *Castanea crenata* (Japanese chestnut), *Dahlia*, *Euonymus japonicus* (Japanese spindle tree), *Festuca arundinacea* (tall fescue), *Fragaria ananassa* (strawberry), *Iris* (irises), *Lolium perenne* (perennial ryegrass), *Nandina domestica* (Nandina), *Petunia*, *Phlox*, *Poa pratensis* (smooth meadow-grass), *Rosa hybrida*, *Rubus idaeus* (raspberry), *Vaccinium macrocarpon* (cranberry), *Vaccinium myrtillus* (blueberry), *Zea mays* (maize), *Zoysia japonica* (zoysiagrass), *Zoysia matrella* (Manila grass).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Scarabaeidae	*Heteronychus licas* (syn. *Heteronychus corvinus, Heteronychus mashunus*)	Black maize beetle; Black sugarcane beetle	Maize, sugarcane, rice, millet (Panicum spp.), sorghum, tobacco.	Adults feed chiefly at the base of the finger or shoot causing the central heart or the whole shoot to wilt and die; they will also attack the buds or, when numerous or in the absence of shoots, burrow into the sett itself. [202]	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Cameroon, Republic of the Congo, Egypt, Eswatini, Ethiopia, Guinea, Kenya, Malawi, Mali, Mauritius, Mozambique, Niger, Nigeria, Senegal, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe.	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM
	Scarabaeidae	*Heteronychus sublaevis* (syn. *Heteronychus robustus*)	White grub	Sugarcane.	Feeds on above and below ground plant parts; mostly shoots; scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		India.	LOW[200]	HIGH	HIGH	UNKNOWN	UNKNOWN
	Scarabaeidae	*Holotrichia consanguinea*	White grub	Legumes and grasses (including sugarcane).	Larvae eat roots; adults damage leaves and field crops.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		India.	LOW[200]	HIGH	HIGH	MEDIUM	LOW
	Scarabaeidae	*Holotrichia reynaudi*	White grub	Peanut, Sugarcane.	Considered a pest. Larvae eat roots; adults damage leaves and field crops.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Southern India.	LOW[200]	HIGH	HIGH	UNKNOWN	UNKNOWN
	Scarabaeidae	*Lachnosterna consanguinea*	Melolonthid beetle	Sugarcane, groundnut, chickpea, soyabean, tobacco, pearl millet, mung bean, cowpea,	Serious polyphagous pest. Damage is done by the larvae by feeding on cane	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are		India.	LOW[200]	HIGH	HIGH	MEDIUM [204]	LOW

[202] The adults feed from just below the soil surface to deeper than the set or stool, and never expose themselves voluntarily in daylight. The larvae feed below the soil surface and never expose themselves, except possibly at night after heavy rain or irrigation. They feed on the root system, often partially or completely destroying the stool. Generally, the worst and most noticeable damage occurs due to large numbers of adults flying into a field during one or two nights, rather than to any local adult population in that field (Sweeney, 1967). A severe larval attack is sometimes detected by the wilting and yellowing of the leaves, the effect being identical with that caused by drought conditions. Nevertheless, there can be a high level of infestation without any obvious superficial effect on the cane and, unlike adult attack on the shoots, the cane very rarely dies completely. Wherever a small degree of yellowing or wilting is noticed, the soil should be sampled for the presence of larvae and evidence of root damage. Most damage is caused to maturing cane and larval damage due to *H. licas* is done between about March and September.
[204] Heavily infested cane clumps dry out completely and in severe infestations as much as 80 per cent, of the crop is lost.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera				grapevine, jujube.	roots.[203]	the most likely pathways for long distance dispersal.							
	Scarabaeidae	*Lepidiota blanchardi* (syn. *Lepidiota pruinosa*)	Blanchard's canegrub	Saccharum spp., other grasses.	Affected plant parts include roots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Philippines.	LOW	HIGH	HIGH	MEDIUM [205]	LOW
	Scarabaeidae	*Lepidiota discedens*	Canegrub	Saccharum spp.	Affected plant parts include roots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Thailand.	LOW	HIGH	HIGH	MEDIUM[205]	LOW
	Scarabaeidae	*Lepidiota reuleauxi*	Ramu canegrub	*Saccharum* spp., *Imperata cylindrical*, *Panicum maximum*, *Pennisetum purpureum*, *Zea mays*, other grasses.	Causes significant root damage; known pest of sugarcane.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Papua New Guinea.	HIGH [206]	HIGH	HIGH	MEDIUM [207]	MEDIUM
	Scarabaeidae	*Lepidiota stigma*	Sugarcane white grub	Sugarcane, maize, cassava and coffee.	Affected plant parts include those below ground as well as seedlings.	Crawling and flying allows for local dispersal. Introduction of infested plant materials, soil or hitchhiking are the most		China, India, Indonesia, Japan, Malaysia, Singapore, Thailand.	HIGH [208]	MEDIUM	MEDIUM	MEDIUM [209]	LOW

[203] Heavily infested cane clumps dry out completely and in severe infestations as much as 80 per cent, of the crop is lost. The infestation occurs only on light sandy soils; crops on clay soils are not affected. The February-planted crop suffers more seriously than that planted in October. The adults have not so far been observed doing any damage to sugarcane.
[205] In August 2024, the Sugarcane Technical Review Panel advised a rating change from LOW to MEDIUM based on potential economic impact caused by *Lepidiota* species.
[206] This species is present geographically close to Australia in Papua New Guinea.
[207] In August 2024, the Sugarcane Technical Review Panel advised a rating change from LOW to MEDIUM based on potential economic impact caused by *Lepidiota* species.
[208] This species is present in several locations geographically close to Australia including Indonesia, Malaysia, Thailand and Singapore.
[209] *Lepidiota stigma* has been reported to reduce sugarcane production and cause severe economic damage in Indonesia where it is considered a major pest and the most damaging pest species to sugarcane plants (Indrayani et. al, 2018; Jongeleen & Mahrub, 1978). Ineffective control methods include dipping of cuttings in insecticide and ploughing; the latter which is ineffective due to grubs being found "as deep as 1 metre below the soil surface" (Jongeleen & Mahrub, 1978). The fungus, Metarhizium anisopliae, has been identified as a biological control agent of *L. stigma* and is applied to the soil where sugarcane is cultivated (Habriantono & Alfarisy, 2021). Entomopathogenic nematodes (EPN) have been proposed as alternative control methods; with isolates DKS-1 (Steinernema sp.) and PH-1 (*Heterorhabditis* sp.) identified to be pathogenic to *L. stigma* (Indrayani et. al, 2018). In August 2024, the Sugarcane Technical Review Panel advised a rating change from LOW to MEDIUM based on potential economic impact.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera						likely pathways for long distance dispersal.							
	Scarabaeidae	*Leucopholis burmeisteri*	White grub	Peanut, sugarcane, rice, maize.	Roots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		India.	LOW[200]	MEDIUM	MEDIUM	LOW	VERY LOW
	Scarabaeidae	*Leucopholis irrorata*	White grub; Toy beetle	Rice, maize, peanut, sugarcane.	Affected plant parts include roots.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Philippines.	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
	Scarabaeidae	*Leucopholis lepidophora*	Areca white grub	Sugarcane, rice, maize, groundnut and peanut	*L. lepidophora* is an important pest of sugarcane in India (Patil and Adsule, 1991).[210]	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		India, Bangladesh.	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
	Scarabaeidae	*Leucopholis near armata*	Canegrub	Saccharum spp., other grasses.	Affected plant parts include roots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Indonesia.	LOW	HIGH	HIGH	LOW	VERY LOW
	Scarabaeidae	*Leucopholis rorida*	White grub	Sugarcane, rubber, cashew, cassava.	*L. rorida* is considered not only a noxious scarabaeid (Jongeleen et al., 1979), but also a common, polyphagous root pest (Intari and Natawiria, 1973) in Indonesia. It causes	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Indonesia, Malaysia.	MEDIUM	HIGH	HIGH	LOW	LOW

[210] In Maharashtra, India, (where *L. lepidophora* was first recorded in 1983; Patil et al., 1986), it infests sugarcane, rice, maize, and summer groundnuts (Adsule and Patil, 1990, 1994a). *L. lepidophora* is a pest of areca nuts in Karnataka, India (Veeresh et al., 1982) and is one of the most destructive pests of this crop in India. In addition, *L. lepidophora* is a problem in sugarcane fields in the Coimbatore region of Tamil Nadu, India. From 1986-89, surveys in Maharashtra, India indicated that *L. lepidophora* caused damage to 25-100% of sugarcane, rice, maize, groundnuts and vegetables, and accounted for the mortality of 56-89% (average 80.56%) of summer groundnuts (Adsule and Patil, 1990). *L. lepidophora* is a pest of areca nuts in Karnataka, India (Veeresh et al., 1982) and is one of the most destructive pests of this crop in India. In addition, *L. lepidophora* is a problem in sugarcane fields in the Coimbatore region of Tamil Nadu, India. From 1986-89, surveys in Maharashtra, India indicated that *L. lepidophora* caused damage to 25-100% of sugarcane, rice, maize, groundnuts and vegetables, and accounted for the mortality of 56-89% (average 80.56%) of summer groundnuts (Adsule and Patil, 1990).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera					economically significant damage to a wide variety of crops (Jongeleen et al., 1979).[211]								
	Scarabaeidae	*Ligyrus cuniculus*	Rough black hard-back	Yam, sweet potato, Poaceae including sugarcane.	Affected plant parts include leaves, stem and shoots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Antigua and Barbuda, Barbados, Bermuda, Cuba, Guadeloupe, Jamaica, Puerto Rico, Saint Kitts and Nevis, Saint Vincent and the Grenadines, United States of America, Martinique, Dominican Republic, Trinidad and Tobago.	LOW[200]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Scarabaeidae	*Maladera nathani*	White grub	*Acacia nilotica* (gum arabic tree), *Arachis hypogaea* (peanut), *Azadirachta indica* (neem tree), *Saccharum officinarum* (sugarcane).	Affected plant parts include roots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		India (Gujurat).	LOW[200]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Scarabaeidae	*Miridiba sinensis* (syn. *Holotrichia sinensis*)	Black chafer beetle	Sugarcane, citrus.	Whole plant - scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		China, Indonesia, Thailand, Vietnam.	HIGH	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Scarabaeidae	*Oryctes monoceros*	African coconut beetle; African rhinoceros beetle	Sugarcane, palms, coconut, banana.	The adults bore through the basal parts of the leaves into the tops of the growing point of the palm and enter the heart of the unfolded leaves, or centre spike, working	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Angola, Benin, Burkina Faso, Burundi. Cameroon, Comoros, Congo, Cote d'Ivoire, Ghana, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritius, Mozambique, Niger, Nigeria, Reunion, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Saudi Arabia,	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW

[211] *L. rorida* occasionally caused serious damage to cassava (Lozano, 1978).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera					downwards.[212]			Yemen.					
	Scarabaeidae	*Oryctes rhinoceros*	Coconut rhinoceros beetle	Sugarcane.	Affected plant parts include leaves.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Africa, Asia, Europe, North America, South America.	HIGH	MEDIUM	MEDIUM	MEDIUM	LOW
	Scarabaeidae	*Pentodon idiota*	Canegrub; Whitegrub	Sugarcane, turfgrasses.	Soil, root dwelling pest of sugarcane feeds on the root extract of the plant. Severe cases can cause plant death.	Local dispersal via crawling, flying.		Iran.	LOW[200]	MEDIUM	MEDIUM	MEDIUM	LOW
	Scarabaeidae	*Phyllophaga antiguae*	White grub	Poaceae including sugarcane.	Affected plant parts include roots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Antigua and Barbuda.	LOW[200]	HIGH	HIGH	UNKNOWN	UNKNOWN
	Scarabaeidae	*Phyllophaga helleri*	White grub	Poaceae incl. Sugarcane, rice, sorghum and maize.	Affected plant parts include roots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Indonesia.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Scarabaeidae	*Phyllophaga jamaicana* (syn. *Lachnosterna jamaicensis*)	White grub	*Cajanus cajan* (pigeon pea), *Phaseolus* (beans), *Saccharum officinarum* (sugarcane).	Affected plant parts include foliage and roots. Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Jamaica.	LOW[200]	HIGH	HIGH	UNKNOWN	UNKNOWN
	Scarabaeidae	*Phyllophaga plaei*	White grub	Citrus, sugarcane, pineapple, banana.	Larvae attack roots, adult trees and shrubs during night.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Dominican Republic, Guadeloupe, Martinique, Puerto Rico.	LOW[200]	HIGH	HIGH	UNKNOWN	UNKNOWN

[212] The youngest expanded leaves die off, and the leaves in the central bud generally unfold, showing triangular cuts on each side of the central rib. Eggs are laid in the soft growing-point. The larvae feed on the younger tissues and top part of the palm, the whole of the centre of the top being usually eaten away.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Scarabaeidae	*Phyllophaga smithi*	White grub	Citrus, banana, pea, common bean, yam, maize, potato, sweet potato and sugarcane.	Generalist herbivore feeding habits (leaf feeder) may impact a range of agricultural practices; greatly reduces photosynthetic capability of host plant.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Mauritius, Barbados, Trinidad and Tobago.	LOW[200]	HIGH	HIGH	UNKNOWN	UNKNOWN
	Scarabaeidae	*Phyllophaga subnitida*	White grub	Sugarcane.	Generalist herbivore feeding habits (leaf feeder) may impact a range of agricultural practices; greatly reduces photosynthetic capability of host plant.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Venezuela, Barbados, Trinidad and Tobago.	LOW[200]	HIGH	HIGH	UNKNOWN	UNKNOWN
	Scarabaeidae [213]	*Phyllophaga vandinei*	Scarab beetle	Sugarcane, pineapple, pawpaw, casuarina, citrus, coconut, coffee, cotton, eucalyptus, lantana, lime, banana, guava, tamarind, cocoa, almond, Poaceae. [214]	*Phyllophaga vandinei* larvae attack roots and seedlings (Wolcott, 1948; Jenkins and Goenaga, 2008) and the adults defoliate mostly trees and shrubs during the night. [215]	The adults of *P. vandinei* fly for a short period of about 30-45 min after dusk and at dawn (Jenkins and Goenaga, 2010). They do not fly long distances, mostly aggregating near where they have risen and usually staying low near base of vegetation.		Barbados, Puerto Rico.	LOW[200]	MEDIUM	MEDIUM	LOW	VERY LOW
	Scarabaeidae	*Podischnus agenor*	Scarab beetle	*Bambusa* (bamboo), *Saccharum officinarum* (sugarcane), *Zea mays* (maize).	Scale of impact unknown.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Costa Rica, El Salvador, Guatemala, Colombia, Venezuela.	LOW [216]	HIGH	HIGH	UNKNOWN	UNKNOWN
	Scarabaeidae	*Scapanes australis*	New Guinea	Sugarcane, coconut,	The beetle feeds on	Crawling and flying allows		Indonesia, Philippines,	HIGH [218]	MEDIUM	MEDIUM	MEDIUM	LOW

[213] sub. Melolonthidae
[214] Wolcott (1948) reports that banana plants are especially favoured and could be entirely defoliated by *Phyllophaga* species.
[215] Although sugarcane suffers from defoliation by adults, it is not as extensive as some other species, such as *Casuarina equisetifolia*, *Delonix regia*, *Musa* spp. and *Cocos nucifera* (Smyth, 1917). Young trees are especially susceptible to the defoliation by the adults and the root-feeding by the larvae, which can cause the plant death due to not being able to accumulate enough carbohydrate reserves to survive. Also, seedling mortality is seen in locations where *P. vandinei* populations are high (Jenkins and Goenaga, 2008).
[216] This species is not currently present in locations geographically close to Australia.
[218] This species is present in several locations geographically close to Australia including Indonesia, the Philippines, Singapore, Papua New Guinea and the Solomon Islands.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera			rhinoceros beetle	banana, palms.	tissue juices.[217]	for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Singapore, Papua New Guinea, Solomon Islands.					
	Scarabaeidae	*Scapanes australis grossepunctatus*	Rhinoceros beetle	Sugarcane, coconut, banana, palms.	The beetle feeds on tissue juices.[219]	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Papua New Guinea.	HIGH[220]	MEDIUM	MEDIUM	MEDIUM	LOW
	Scarabaeidae[221]	*Schizonycha affinis*	Scarab beetle	Sugarcane.	Feeds on roots.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		South Africa, Eswatini.	LOW[200]	MEDIUM	MEDIUM	LOW	VERY LOW
	Scarabaeidae	*Strategus aloeus*	Coconut cockle; Ox beetle	Sugarcane, coconut, agave.	Generalist herbivore feeding habits (leaf feeder) may impact a range of agricultural practices; greatly reduces photosynthetic capability of host plant.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Jamaica, Mexico, Trinidad and Tobago, Colombia, French Guinea, Guyana, Suriname, Venezuela.	LOW[200]	MEDIUM	MEDIUM	MEDIUM	LOW
	Scarabaeidae	*Strategus simson*	Large white grub	Sugarcane.	Generalist herbivore feeding habits (leaf feeder) may impact a range of agricultural practices; greatly reduces photosynthetic capability of host plant.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Jamaica.	LOW[200]	MEDIUM	MEDIUM	MEDIUM	LOW

[217] If the growing point is not completely destroyed by the attack, the opened fronds have 'V'-shaped cuts. Damaged palms show varying degrees of deformation; fronds are truncated, notched or twisted, with the leaflets compressed and crumpled together (Bedford, 1976a). Severe and repeated attacks may kill the host plant.

[219] If the growing point is not completely destroyed by the attack, the opened fronds have 'V'-shaped cuts. Damaged palms show varying degrees of deformation; fronds are truncated, notched or twisted, with the leaflets compressed and crumpled together (Bedford, 1976a). Severe and repeated attacks may kill the host plant.

[220] This species is present geographically close to Australia in Papua New Guinea.

[221] Scarab sub-family.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Coleoptera	Scarabaeidae	*Strategus talpa* (syn. *Strategus barbigerus*)	Rhinocerus beetle	Sugarcane.	Generalist herbivore feeding habits (leaf feeder) may impact a range of agricultural practices; greatly reduces photosynthetic capability of host plant.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Puerto Rico.	LOW[200]	MEDIUM	MEDIUM	MEDIUM	LOW
Coleoptera	Scarabaeidae	*Tomarus ebenus* (syn. *Ligyrus ebenus*)	Black sugarcane chafer	Sugarcane, banana.	Unknown impact.	Crawling and flying allows for local dispersal. Introduction of infested plant materials and soil are the most likely pathways for long distance dispersal.		Barbados, Guadeloupe, Martinique, Saint Lucia, Trinidad and Tobago, Columbia, French Guiana, Guyana, Venezuela.	LOW[200]	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
Diptera													
Diptera	Ulidiidae	*Chaetopsis massyla*	Corn silk fly	Maize, sorghum, sugarcane, spiny amaranth, little hogweed, and *Sorghum halepense* (Johnson grass).	Larvae primarily attack silks and ears.	Flying allows for local dispersal. Introduction of infested plant materials (e.g. plants, produce), soil, or hitchhiking are the most likely pathways for long distance dispersal.		Canada, United States of America, Mexico.	LOW[200]	HIGH	HIGH	LOW	VERY LOW
Diptera	Ulidiidae	*Euxesta annonae*	Picture-winged fly	Maize, sorghum, sugarcane, spiny amaranth, little hogweed, and *Sorghum halepense* (Johnson grass).	Larvae primarily attack silks and ears.	Flying allows for local dispersal. Introduction of infested plant materials (e.g. plants, produce), soil, or hitchhiking are the most likely pathways for long distance dispersal.		United States of America, South America.	LOW[200]	HIGH	HIGH	LOW	VERY LOW
Diptera	Ulidiidae	*Euxesta eluta*	Corn silk flies	*Capsicum* (peppers), *Gossypium* (cotton), *Saccharum officinarum* (sugarcane), *Zea mays* (maize).	Larvae attack the silks and consume the contents of kernels along the ear (damage primarily occurs at the tip).	Flying allows for local dispersal. Introduction of infested plant materials (e.g. plants, produce), soil, or hitchhiking are the most likely pathways for long distance dispersal.		Antigua and Barbuda, Jamaica, Saint Kitts and Nevis, Brazil (Minas Gerais), Chile, Ecuador, Argentina.	LOW[200]	HIGH	HIGH	LOW	VERY LOW

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera													
Hemiptera	Aclerdidae	*Aclerda takahashii*	Brown sugarcane scale; Flat grass scale	Sugarcane.	Occupy stem mostly. Can reduce yield by up to 15%.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material		Egypt, Mauritius, Réunion, Bangladesh, India, Indonesia, Japan, Malaysia, Pakistan, Philippines, Sri Lanka, Taiwan, Haiti, United States, Guam, Brazil, Colombia.	HIGH	HIGH	HIGH	MEDIUM	MEDIUM
	Aleyrodidae	*Aleurolobus barodensis*	Sugarcane whitefly	*Saccharum* spp., *Erianthus aurundinaceum*, *Erianthus ciliaris*, *Miscanthus* spp.	Black sooty mould develops on honeydew, reducing photosynthesis and stunting growth. Reportedly reduces yield by up to 90%, depending on size of infestation.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		India, Indonesia, Myanmar, Pakistan, Thailand.	HIGH	HIGH	HIGH	HIGH	HIGH
	Aleyrodidae	*Neomaskellia andropogonis*	Sugarcane whitefly	Sugarcane.	Nymphs suck the sap and in cases of severe infestation, retard the growth of sugarcane plants. Sugar retrieval is also affected.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Iran, India, Pakistan, Hong Kong, Malaysia, China, Sri Lanka.	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM
	Aphididae	*Ceratovacuna lanigera*	Sugarcane woolly aphid	*Saccharum* spp., *Miscanthus* spp., *Alternanthera sessilis*, *Brachiaria mutica*, *Cynodon dactylon*, *Columella trifolia*, *Digitaria sanguinalis*, *Eragrostis japonica*, *Eclipta prostrate*, *Eleusine* spp.	Can potentially impact leaves and stem, sucks phloem, excretes honeydew enabling the development sooty mould and reduce the plants photosynthetic capability.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Brunei, China, India, Indonesia, Japan, Malaysia, Myanmar, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam.	HIGH	HIGH	HIGH	HIGH	HIGH
	Aphididae	*Geoica lucifuga*	Sugarcane root aphid	Sugarcane, rice.	Can potentially have an impact on plant growth, scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		India, Japan, Saudi Arabia, South Korea, New Zealand, Chile.	MEDIUM	LOW	MEDIUM	UNKNOWN	UNKNOWN
	Aphididae	*Sipha flava*	Yellow sugarcane aphid	Beardgrass, bermuda grass, crabgrass, coolatai grass, *Sorghum halepense*	Sap sucking: Leaves (chlorosis - red to purple discoloration, followed by	Local dispersal via crawling, flying. Long distance dispersal through infested	Vector of Sugarcane mosaic virus.	Morocco, South Africa, Tanzania, Spain, Barbados, Costa Rica, Cuba, Dominican	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera				(Johnson grass), maize, millet, sorghum, wheat, barley, sugarcane, rice.	premature necrosis). Reduced tillering and eventually plant death. [222]	plant material.		Republic, Jamaica, Puerto Rico, Trinidad and Tobago, United States of America, Argentina, Brazil, Chile, Colombia, Venezuela.					
	Aphididae	*Tetraneura javensis* (syn. *Tetraneura coimbatorensis*)	Aphid	*Saccharum* spp., *Ulmus wallichii, Neyaudia arundinaceae.*	Often colonise roots and impact plant growth. Scale of impact unknown	Local dispersal via crawling, flying. Long distance dispersal through infested plant material		India.	LOW	LOW	LOW	UNKNOWN	UNKNOWN
	Aphididae	*Uroleucon ambrosiae* (syn. *Dactynotus ambrosiae*)	Red lettuce aphid, Brown ambrosia aphid	Lettuce, common bean, sugarcane, sorghum, navy bean	Sap sucking: Above ground plant parts. Scale of impact unknown	Crawling, jumping and flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials (e.g. plants, fruit/pods, and/or seed) or hitchhiking are the most likely pathways for long distance spread.	Vectors Bean common mosaic necrosis virus, Bean common mosaic virus, Maize dwarf mosaic virus, Sugarcane mosaic virus, Zucchini yellow mosaic virus.	Costa Rica, Cuba, Mexico, United States of America, Argentina, Chile, Peru, Venezuela, Canada.	MEDIUM	LOW	MEDIUM	UNKNOWN	UNKNOWN
	Blissidae	*Cavelerius sweeti*	Sugarcane black bug	Sugarcane.	Consumes spindle, stem, killing shoots, impairing growth, destroying buds and facilitating the breakage of canes. Can cause severe yield loss.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.		India.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Blissidae	*Dimorphopterus gibbus* (syn. *Blissus gibbus*)	Indian chinch bug	Sugarcane.	Scale of impact unknown.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long		India.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN

[222] *S. flava* is often found feeding on the underside of leaves in small colonies. Long-term feeding causes leaf tissue to become chlorotic or necrotic, which may result in death. In sugarcane, feeding by *S. flava* produces reddish marks that turn yellowish in colour when feeding persists, until necrosis occurs (White, 1989).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera						distance spread.							
	Cercopidae	*Aeneolamia albofasciata*	Spittlebug	Sugarcane, Buffel grass.	Sap sucking: Above ground plant parts. Can cause discolouration of leaves, honeydew/sooty mould.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.		Costa Rica, Guatemala, Mexico, Nicaragua.	LOW	HIGH	HIGH	MEDIUM	LOW
	Cercopidae	*Aeneolamia contigua*	Spotted spittlebug	Maize, rice, sugarcane, Poaceae (grasses).	Sap sucking: Above ground plant parts. Can cause discolouration of leaves, honeydew/sooty mould.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.		Belize, Guatemala, Honduras, Mexico, Brazil.	LOW	HIGH	HIGH	MEDIUM	LOW
	Cercopidae	*Aeneolamia flavilatera*	Yellow-sided froghopper	Poaceae including rice and sugarcane	Sap sucking: Above ground plant parts. Can cause discolouration of leaves, honeydew/sooty mould.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.		French Guiana, Guyana, Suriname, Venezuela.	LOW	HIGH	HIGH	MEDIUM	LOW
	Cercopidae	*Aeneolamia varia*	Froghopper	Poaceae including rice, sugarcane, signal grass.	Sap sucking: Above ground plant parts. Can cause discolouration of leaves, honeydew/sooty mould.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.		Colombia, Venezuela.	LOW	HIGH	HIGH	MEDIUM	LOW
	Cercopidae	*Callitettix versicolor*	Sugarcane spittle bug; rice spittle bug	Maize, sugarcane, rice.	Sap sucking: Leaves, stems.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated		Malaysia, Vietnam, India, China, Myanmar, Cambodia, Laos, Thailand.	MEDIUM	HIGH	HIGH	LOW	MEDIUM

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera						pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.							
	Cercopidae	*Mahanarva fimbriolata*	Sugarcane spittlebug	Sugarcane, feather grass, signal grass.	Typically attack roots, scale of presence and impact warrants control.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.		Brazil.	LOW	HIGH	HIGH	MEDIUM	LOW
	Cercopidae	*Mahanarva tristis* (syn. *Delassor tristis*)	Large sugarcane froghopper	Sugarcane.	Leaves. Scale of impact unknown.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.		Trinidad and Tobago, Brazil, Suriname, Venezuela.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Cercopidae	*Prosapia bicincta basalis*	Spittlebug	Sugarcane.	Leaves. Scale of impact unknown.	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s).		Jamaica.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Cercopidae	*Prosapia simulans*	Spittlebug	Sugarcane, African stargrass, signal grass, jaragua grass, *Ilex*.	Feeds on leaves, leaving chlorotic spots	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s)		United States of America, Colombia.	LOW	HIGH	HIGH	LOW	VERY LOW
	Cercopidae	*Sphenorhina rubra*	Spittlebug	Soybean, maize, olive, sugarcane.	Sap sucking: Leaves, stems. Scale of impact unknown	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, soil (eggs) or hitchhiking are the most likely pathways for long distance spread.		Trinidad and Tobago.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera	Cicadellidae	*Chlorotettix minimus*	Leafhopper	Sugarcane, Japanese plum.	Adults and larvae feed on the leaves.	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s)		Barbados, Jamaica, Puerto Rico.	LOW	HIGH	HIGH	LOW	VERY LOW
	Cicadellidae	*Cicadulina chinai*	Leafhopper	Barley, maize, wheat, finger millet, sugarcane, rice, cotton.	Sap sucking: Stem, leaves.	Crawling, jumping and/or flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials, or hitchhiking are the most likely pathways for long distance spread.	Vector of MYSV.	Kenya, Egypt, India.	LOW	HIGH	HIGH	MEDIUM	LOW
	Cicadellidae	*Cicadulina mbila*	South African maize leafhopper (Insect only)	Sugarcane, oats, quick grass, crabgrass, goosegrass, finger millet, barley, African rice, rice, millets, buffalo grass, feather grass, pearl millet, grasses, sugarcane, foxtail millet, sorghum, Sudan grass, wheat, maize.	Adults and larvae feed on the leaves.	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s).	Vector of MYSV.	Angola, Botswana, Burkina Faso, Cabo Verde, Cameroon, Congo, Ethiopia, Gambia, Kenya, Mauritius, Mozambique, Namibia, Nigeria, South Africa, Tanzania, Togo, Uganda, Zambia, Zimbabwe, India, Tajikistan, Yemen.	LOW	HIGH	HIGH	LOW	VERY LOW
	Cicadellidae	*Draeculacephala clypeata*	Sharp-headed leaf hopper	Rice, peanut, Ananas comosus, *Ipomoea batatas*, *Cucumis melo*, *Phaseolus vulgaris* (common bean), *Cajanus cajan* (pigeon pea), *Vigna unguiculata* (cowpea), *Zea mays* (Maize), *Sorghum vulgare* (sorghum), *Saccharum officinarum* (sugarcane).	Sap sucking, impacts leaves.	Crawling, jumping and flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials (e.g. plants) or hitchhiking are the most likely pathways for long distance spread.		Mexico to Colombia, Guatemala, El Salvador, Honduras, Belize, Nicaragua, Costa Rica, Panama], Guyana, Suriname, Argentina, Peru.	LOW	HIGH	HIGH	LOW	VERY LOW
	Cicadellidae	*Draeculacephala mollipes*	Sharpshooter, Leafhopper	Poaceae including sugarcane.	Adults and larvae feed on the leaves.	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s).		Mexico, United States OF America (Hawaii), Venezuela.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera	Cicadellidae	*Draeculacephala portola*	Sugarcane leafhopper	Sugarcane.	Chews on leaves with mouthparts, can transmit chlorotic streak through feeding process	Can crawl/hop for short distance dispersal, flying allows for longer distance dispersal.	Important vector of chlorotic streak of sugarcane.	United States of America.	LOW	HIGH	HIGH	LOW	VERY LOW
	Cicadellidae	*Hortensia similis*	Common green sugarcane leaf hopper	Pigeon pea, rice, common bean, sugarcane, maize, peanut, soybean	Sap sucking: Above ground plant parts.	Crawling, jumping and flying allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plant materials (e.g. plants) or hitchhiking are the most likely pathways for long distance spread.	Vector of '*Candidatus* phytoplasma *palmae*' strains (16SrIV-A).	Barbados, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Puerto Rico, Saint Lucia, Trinidad and Tobago, Colombia, Suriname, Venezuela.	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
	Cicadellidae	*Protalebrella brasiliensis*	Brazilian leafhopper	Carrot, Poaceae including sugarcane.	Adults and larvae feed on the leaves.	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s).		Barbados, Untied States of America (Florida), Brazil.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Cicadellidae	*Yamatotettix flavovittatus*		Sugarcane.	Consumes leaves and can transmit sugarcane white leaf disease (Thein et. al, 2012).		Vector of Sugarcane white leaf disease (Thein et. al 2012).	China, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Papua New Guinea, Taiwan, Thailand (NSW DPI, n.d.).	HIGH [223]	MEDIUM	HIGH [224]	EXTREME [225]	HIGH
	Cicadidae	*Proarna bergi*		Sugarcane.	Leaves, stem. Scale of impact unknown.	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s).		Argentina, Suriname.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Cixiidae	*Haplaxius crudus*	American palm cixiid	Buffel grass, coconut, Bermuda grass, flatsedge, weeping	Feeds on leaves. Mature adults fly to palm foliage and	*H. crudus* is an effective hitchhiker pest which has probably spread via the		Bahamas, Belize, Caymen Islands, Costa Rica, Cuba, Dominican Republic,	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

[223] This species is present in several locations geographically close to Australia including Thailand, China, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Papua New Guinea and Taiwan (NSW DPI, n.d.; Roddee, Wangkeeree & Hanboonsong, 2024).
[224] Wind is reported as the main factor influencing dispersal of this leafhopper species (Thein et. al, 2012). A recent study estimated the mean dispersal distance of *Y. flavovittatus* as 387.5 metres, hence, this species has the potential to spread locally over large distances (Thein et. al, 2012).
[225] On its own in the absence of a vector, this species can cause significant damage to sugarcane by feeding on phloem sap which impedes sugar and organic compound transport in the host plant (Roddee, Wangkeeree & Hanboonsong, 2024). Control methods include crop covering with insect-proof screening (Roddee, Wangkeeree & Hanboonsong, 2024). Resistance to leafhoppers may also be achieved with sugarcane breeding programs (Roddee, Wangkeeree & Hanboonsong, 2024). On 1st October 2024, the Sugarcane Technical Review Panel advised an economic impact risk rating of EXTREME.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera				lovegrass, guinea grass, Bahia grass, date-palm, sugarcane, buffalo grass, Christmas palm, Washington palm.	feed by penetrating the tissue of the frond with their stylet and sucking the phloem. They feed on the undersides of leaves or in partly concealed portions of the plant (Kramer, 1979).	international trade of plant material (Smith, 1997; Molet, 2013). *H. crudus* has been intercepted twice at US ports of entry, both times on cut flowers (Molet, 2013).		Guadaloupe, Haiti, Honduras, Jamaica, Mexico, Panama, Puerto Rico, Trinidad and Tobago, United States, Brazil, Colombia, Venezuela.					
	Cixiidae	*Melanoliarus maidis* (syn. *Oliarus maidis*)	Cixiid planthopper	Maize, sugarcane, cotton, grasses.	Sap sucking: Leaves, stems.	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s)		Barbados, Trinidad and Tobago.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Coccidae	*Pulvinaria iceryi*	Pulvinaria scale; Cottony grass scale	*Saccharum* spp., *Agropyron repens, A. schinzii, Cymbopogon giganteus, Cynodon dactylon, Digitaria didactyla, D. scalarum.*	Sap depletion may lead to wilting, leaf drop, dieback, and stunted growth. As with most sap-sucking insects, the production of honeydew leads to the growth of sooty mould.	It is possible that it was carried in fodder or on pasture grasses with Zebu cattle from India to Jamaica and other countries in the Caribbean in the 19th century, spreading lethal yellowing disease (Ogle and Harries, 2005).		Mauritius, Morocco, Taiwan, Bahamas, Barbados, Cuba, Jamaica, Puerto Rico, Satin Kitts and Nevis, Trinidad and Tobago, United States of America, Guyana, Venezuela.	MEDIUM	HIGH	HIGH	LOW	LOW
	Coccidae	*Pulvinaria tenuivalvata*	Cottony grass scale	Sugarcane.	Sap depletion may lead to wilting, leaf drop, dieback, and stunted growth. As with most sap-sucking insects, the production of honeydew leads to the growth of sooty mould. Early and heavy infestations have resulted in complete yield loss (dependant on size and timing of infestation).	Long distance dispersal via hitchhiking or infested plant material.		Egypt.	LOW	HIGH	HIGH	HIGH	MEDIUM

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera	Coccidae	*Saccharipulvinaria iceryi*	Red-striped sugarcane scale	Sugarcane.	Consumes above ground parts.	Long distance dispersal via hitchhiking or infested plant material.		Mauritius, Barbados, Trinidad and Tobago, Morocco, Taiwan, Bahamas, Cuba, Jamaica, Puerto Rico, Saint Kitts and Nevis, United States of America, Guyana, Venezuela.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Colobathristidae	*Phaenacantha saccharicida*	Sugarcane red bug	Sugarcane, sorghum, maize.	The nymphs and adults of *P. saccharicida* feed on the upper and lower sides of cane leaves, causing yellowing of the leaves and subsequent necrosis. The infested sugarcane plants show stunting.	Long distance dispersal via hitchhiking or infested plant material.		Indonesia, Malaysia, Thailand.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Coreidae	*Amblypelta cocophaga*	Coconut bug	Papaya, *Ceiba pentandra*, navel orange, coconut, melon, *Eucalyptus deglupta*, *Macaranga*, mango, cassava, *Passiflora quadrangularis*, peach, winged bean, sugarcane, cocoa.	Sap sucking results in circular brown necrotic spots on leaves. Preferred host in cocoa.	Long distance dispersal via hitchhiking or infested plant material.		Singapore, Fiji, Papua New Guinea, Solomon Islands.	HIGH	HIGH	HIGH	UNKNOWN	UNKNOWN
	Coreidae	*Phthiacnemia picta* (syn. *Phthia picta*)	Black bug	Cucurbits, tomato and Poaceae including sugarcane.	Leaves.	Long distance dispersal via hitchhiking or infested plant material.		Antigua and Barbuda, Barbados, British Virgin Islands, Dominican Republic, Grenada, Jamaica, Montserrat, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Brazil, Guyana.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Cydnidae	*Scaptocoris castaneus*	Burrowing bug	Rice, sugarcane.	Feeds on roots, reducing the plants' ability to grow.	Infested plant material.		United States of America, Brazil, Venezuela.	MEDIUM	LOW	LOW	UNKNOWN	UNKNOWN

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera	Delphacidae	*Eoeurysa flavocapitata*	Black hopper of sugarcane	*Saccharum officinarum*.	Feeds on the sap from sugarcane leaves	Long distance dispersal via hitchhiking or infested plant material.		India, Taiwan, Thailand, Malaysia.	LOW	HIGH	HIGH	LOW	VERY LOW
	Delphacidae	*Eumetopina flavipes*	Island sugarcane planthopper (insect only)	*Saccharum officinarum*.	Adults and larvae feed on the leaves; The insect on its own may cause plant stress, yellowing of the whorl and spindle deformation under heavy pressure, especially in susceptible varieties. [226]	Short distance dispersal via flight (adults are winged), aided by the wind, hitchhiking (e.g. fruits/leaves), or infected plant material(s).	Vector of Ramu Stunt.	Malaysia, Borneo, Philippines, Papua New Guinea, Indonesia, Solomon Islands, and New Caledonia.	HIGH	HIGH	HIGH	EXTREME	EXTREME
	Delphacidae	*Numica viridis*	West Indian cane fly	Sugarcane.	The cane fly is a sap feeder and will excrete honeydew after feeding on the leaves. Sooty mould soon develops by fungi that feed on the honeydew. Impacts on sugar yields are influenced by pest density and infestation duration.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Caribbean, South Africa.	LOW	HIGH	HIGH	LOW	VERY LOW
	Delphacidae	*Peregrinus maidis*	Corn planthopper; Corn leafhopper	Sugarcane.	On sugarcane, aggregations of several broods of nymphs inside the whorl, leaf sheath or underside of leaves are often observed. Large quantities of honeydew or plant secretions are often on or near the sites of aggregation. As a result, stunting of the plant and sooty	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Africa, Asia, North America, South America.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN

[226] Eggs are laid under the leaf epidermis, and this causes local discoloration. However, if the insect transmits the causal agent of Ramu Stunt (a virus), then symptoms of severe stunting, trashy appearance, leaf stripes and mottling and stool death will be manifested in the sugarcane plant (SRA, 2019).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera					mould are evident.								
	Delphacidae	*Perkinsiella bicoloris*	Sugarcane planthopper (as a vector unknown)	*Saccharum* spp.	Sap sucking: Above ground plant parts. Scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material		Papua New Guinea.	HIGH	HIGH	HIGH	UNKNOWN	UNKNOWN
	Delphacidae	*Perkinsiella diagoras*	Sugarcane planthopper (as a vector unknown)	*Saccharum* spp.	Sap sucking: Above ground plant parts. Scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material		Papua New Guinea.	HIGH	HIGH	HIGH	UNKNOWN	UNKNOWN
	Delphacidae	*Perkinsiella lalokensis*	Sugarcane planthopper (as a vector unknown)	*Saccharum* spp. (sugarcane).	Sap sucking: Above ground plant parts. Scale of impact can vary, in exceptional circumstances, populations can reduce yield and sugar content.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material		Papua New Guinea.	HIGH	HIGH	HIGH	UNKNOWN	UNKNOWN
	Delphacidae	*Perkinsiella papuensis*	Sugarcane planthopper (as a vector unknown)	Saccharum spp. (sugarcane).	Sap sucking: Above ground plant parts. Scale of impact can vary, in exceptional circumstances, populations can reduce yield and sugar content.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material		Papua New Guinea.	HIGH	HIGH	HIGH	UNKNOWN	UNKNOWN
	Delphacidae	*Perkinsiella rattlei*	Sugarcane planthopper (as a vector unknown)	Saccharum spp. (sugarcane).	Sap sucking: Above ground plant parts. Scale of impact can vary, in exceptional circumstances, populations can reduce yield and sugar content.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material		Papua New Guinea, New Caledonia.	HIGH	HIGH	HIGH	UNKNOWN	UNKNOWN
	Delphacidae	*Perkinsiella saccharivora* [227]	Sugarcane planthopper	Saccharum spp. Including sugarcane, caex, coffee, rice, paspalum, maize.	Sap sucking: Above ground plant parts. Scale of impact can vary, in exceptional	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Unknown.	UNKNOWN	HIGH	HIGH	UNKNOWN	UNKNOWN

[227] *Perkinsiella saccharivora* is a legitimate species and was published in Muir, Frederick, 1916: Additions to the Known Philippine Delphacidae (Hemiptera). Philippine Journal of Science, vol. 11, section D, no. 6. 369-385. It is also listed on Page 141 of the General Catalogue of the Hemiptera by Z.P. Metcalf published in 1943 (Metcalf, 1943).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera					circumstances, populations can reduce yield and sugar content.								
	Delphacidae	*Perkinsiella vastatrix*	Sugarcane leaf hopper	Sugarcane, sorghum, maize.	Sap sucking: Above ground plant parts. Scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Vector of Fiji leaf gall virus.	Indonesia, Japan (Kyushu), Malaysia, Philippines, Singapore, Taiwan, Thailand, Papua New Guinea.	HIGH	HIGH	HIGH	LOW	LOW
	Delphacidae	*Perkinsiella vastatrix* (as a vector of Fiji leaf gall virus)	Sugarcane leaf hopper	Sugarcane, sorghum, maize.	Sap sucking: Above ground plant parts. Scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Vector of Fiji leaf gall virus.	Indonesia, Japan (Kyushu), Malaysia, Philippines, Singapore, Taiwan, Thailand, Papua New Guinea.	HIGH	HIGH	HIGH	HIGH [228]	HIGH
	Delphacidae	*Perkinsiella vitiensis*	Sugarcane planthopper (as a vector of Fiji Leaf Gall Virus)	*Saccharum* spp.	Sap sucking: Above ground plant parts. Scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Vector of Fiji leaf gall virus.	Fiji, Polynesia, Samoa.	HIGH	HIGH	HIGH	LOW	LOW
	Delphacidae	*Perkinsiella vitiensis* (as a vector of Fiji leaf gall virus)	Sugarcane planthopper (as a vector of Fiji Leaf Gall Virus)	*Saccharum* spp.	Sap sucking: Above ground plant parts. Scale of impact unknown	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Vector of Fiji leaf gall virus.	Fiji, Polynesia, Samoa.	HIGH	HIGH	HIGH	HIGH [229]	HIGH
	Delphacidae	*Saccharosydne saccharivora*	West Indian cane fly; Delphacid planthopper	Poaceae including sugarcane.	Phloem-feeding leafhopper feeding on above ground parts, can cause severe damage to host plant. Yield losses can vary between 30%-60% during heavy infestations (Arocha et al., 2005).	Adults capable of flight. Long distance spread likely via Infested plant material (e.g. fruit or puparia in soil or packaging).	Can potentially transmit Sugarcane yellow leaf phytoplasma.	Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Guatemala, Haiti, Jamaica, Martinique, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States of America, Guyana,	LOW [230]	HIGH	HIGH	MEDIUM	LOW

[228] On 1st October 2024, the Sugarcane Technical Review Panel advised an economic impact risk rating of HIGH based on the success of current resistance breeding programs for Fiji leaf gall virus which have helped limit the spread of the virus within Australia. Adoption of resistant varieties would reduce the economic impact caused by the virus. As of 2021-2022, sugarcane varieties with resistances to Fiji leaf gall virus included: SRA33, SRA29, SRA11, SRA4, SRA2, Q249, Q247, Q245, Q242, Q235, Q183, Q151 and Q138 (Sugar Research Australia, 2021).

[229] On 1st October 2024, the Sugarcane Technical Review Panel advised an economic impact risk rating of HIGH based on the success of current resistance breeding programs for Fiji leaf gall virus which have helped limit the spread of the virus within Australia. Adoption of resistant varieties would reduce the economic impact caused by the virus. As of 2021-2022, sugarcane varieties with resistances to Fiji leaf gall virus included: SRA33, SRA29, SRA11, SRA4, SRA2, Q249, Q247, Q245, Q242, Q235, Q183, Q151 and Q138 (Sugar Research Australia, 2021).

[230] This species is not currently present in locations geographically close to Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera								Venezuela.					
	Delphacidae	*Tropidocephala serendiba*	Planthopper	Saccharum spp.	Impact unknown	Local dispersal via crawling, flying. Long distance dispersal through infested plant material		Sri Lanka.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Deltocephalidae	*Matsumuratettix hiroglyphicus*	Leafhopper; Planthopper	Sugarcane.	Consumes leaves and can transmit sugarcane white leaf disease (Thein et. al 2012).	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Vector of Sugarcane white leaf disease (Thein et. al 2012).	Bangladesh, Taiwan, Thailand.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Derbidae	*Omolicna cubana*	Plant hopper	Okra and sugarcane.	Consumes leaves. Scale of impact unknown	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Vector of lethal bronzing.	Haiti.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Diaspididae	*Aspidiella sacchari*	Brown sugarcane scale	Poaceae including sugarcane.	Leaves, stems. Scale of impact unknown	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		India, Antigua and Barbuda, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Jamaica, Martinique, Montserrat, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States of America (Hawaii), Guyana, Venezuela.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Diaspididae	*Aulacaspis tegalensis*	White scale of sugar cane	Sugarcane, sorghum, *Sorghum halepense* (Johnson grass).	The symptoms of A. tegalensis damage are chlorotic spots and lesions on the leaves caused by toxins in the saliva injected during feeding.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Kenya, Madagascar, Mauritius, Seychelles, Tanzania, Uganda, India, Indonesia, Malaysia, Philippines, Singapore, Thailand, Papua New Guinea.	HIGH	HIGH	HIGH	LOW	LOW
	Diaspididae	*Melanaspis glomerata*	Sugarcane scale; Black aracaria scale	Sugarcane.	Colonisation of leaves and stems; The only obvious symptom is the	The main dispersal phase of M. glomerata is the first-instar crawler, which is probably capable of		Bangladesh, India, Pakistan.	LOW	HIGH	HIGH	MEDIUM	LOW

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera					presence of approximately circular, smoky-brown or greyish-black scale covers on stems and leaf midribs. No indication of necrosis or toxaemia results from feeding (Agarwal et al., 1959; Agarwal, 1960). The scales are often so closely crowded that it is difficult to distinguish their individual shapes.	walking no more than a metre or so. Wind is an important aid to the dispersal of the scale (Tripathi et al., 1985). Crawlers can be carried on animals including people. M. glomerata can be carried by man between countries on infested plant material.							
	Diaspididae	*Selenaspidus articulatus*	West Indian red scale	Sugarcane, cashew jackfruit, pawpaw, lime, orange, lemon, mandarin, grapefruit, coconut, coffee, kumquat, rubber, jasmine, lantana, mange, banana, lichi, rambutan, passionfruit, avocado, dat-palm, roses, tamarind, grapevine, oleander, European olive.	Sap sucking results in tiny yellow spot, minor impact only.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Wide geographic range. [231]	MEDIUM	HIGH	HIGH	LOW	LOW
	Lophopidae	*Pyrilla perpusilla*	Indian sugarcane leaf hopper, Sugarcane plant hopper	Sugarcane, barley, maize, oats, sorghum, wheat, millet, chickpea, jungle rice, grey fig, barley, guinea grass, honey clover, rice, pea, *Sorghum halepense*	Nymphs and adults of *Pyrilla* feed on the sap of leaves which results in drying and withering. The punctures (mainly along the main vein) made by the pest	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.	Potential vector of Sugarcane Grassy Shoot Phytoplasma (16SrXI-B subgroup).	Afghanistan, Bangladesh, Cambodia, China, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam.	MEDIUM	HIGH	HIGH	HIGH [233]	HIGH

[231] Geographic range includes: Angola, Benin, Cameroon, Cote d'Ivoire, Eritrea, Ethiopia, Ghana, Guinea, Kenya, Madagascar, Mali, Mauritius, Mozambique, Niger, Nigeria, Reunion, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe, Philippines, Sri Lanka, Taiwan, Croatia, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Puerto Rico, Saint Lucia, Trinidad and Tobago, United States of America, Fiji, Solomon Islands, Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela.
[233] The damage by the pest affects sugar yield and quality. Losses ranging from 2-34% in sucrose content of the cane and from 3-26% in the purity of the sugar have been recorded. Poor growth of seed sets and difficulties in milling cane from affected plants have also been recorded.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera				(Johnson grass).	during feeding expose the plant to disease organisms.[232]								
	Lygaeidae	*Blissus occidus* (syn. *Blissus leucopterus*)	Western Chinch bug	Poaceae including sugarcane, oat, maize and rye.	Symptoms include stunting (failure of leaf sheaths and internodes to properly elongate), reddish feeding marks behind leaf sheaths and a reddish or yellowish streaking on the leaves. Severely damaged plants may die or be badly stunted with leaves at the growing point wilted or dead.[234]	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Bahamas, Barbados, Canada, Cuba, Dominican Republic, El Salvador, Guadeloupe, Haiti, Jamaica, Martinique, Mexico, Puerto Rico, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Trinidad and Tobago, United States of America), Argentina, Brazil, Colombia, French Guiana, Guyana, Peru, Suriname, Venezuela.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Lygaeidae	*Cavelerius excavatus*	Sugarcane black bug	Sugarcane.	Resides in the whorl of sugarcane and consumes cell sap. Can be a serious pest.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		India, Myanmar, Pakistan.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Lygaeidae	*Cavelerius saccharivorus*	Oriental chinch bug	Sugarcane, jackfruit, pawpaw, lime, orange, lemon, mandarin, grapefruit, coconut, coffee, kumquat, rubber, jasmine, lantana, mange, banana, lichi, rambutan, passionfruit, avocado, dat-palm, roses, tamarind, grapevine, oleander,	Colonise under leaf sheaths.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		China, Japan.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN

[232] The insect's feeding habit of sucking phloem sap from leaves and exuding honeydew onto foliage, leading to sooty mould diseases such as *Capnodium* spp., have led to qualitative and quantitative effects on sugar production. *P. perpusilla* is a serious pest of sugarcane in the Orient, but it has also been recorded as a pest of other crops such as rice, wheat, maize and millet. The damage by the pest affects sugar yield and quality. Losses ranging from 2-34% in sucrose content of the cane and from 3-26% in the purity of the sugar have been recorded. Poor growth of seed sets and difficulties in milling cane from affected plants have also been recorded.

[234] *Blissus* spp. cause damage by sucking sap from plants, mostly from behind leaf sheaths but occasionally from roots and leaves. Feeding punctures cause physical damage and sap removal deprives plants of nutrients.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
				European olive.									
	Lygaeidae	*Spilostethus pandurus*	Seed bug; milkweed bug	*Alhagi pseudalhagi* (Camel-thorn), *Arachis hypogaea* (peanut), *Chenopodium album* (fat hen), *Elymus repens* (quackgrass), *Medicago sativa* (lucerne), *Nerium oleander* (oleander), *Pennisetum glaucum* (pearl millet), *Pistacia vera* (pistachio), *Sesamum indicum* (sesame), *Sorghum bicolor* (sorghum), sunflower, maize, soybean, wheat, cotton, sugarcane.	Sap sucking: Leaves, stems, pods, seeds.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Morocco, India, Iran, Israel, Egypt, Lebanon, Cyprus, France, Italy, Portugal.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
Hemiptera	Miridae	*Calocoris angustatus*	Cholam bug, Sorghum head bug	Sorghum, millet, maize, sugarcane.	Sap sucking: Developing kernel at preanthesis stage which often produced no grain. [235]	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		India, Africa.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Miridae	*Pycnoderes quadrimaculatus*	Black bug; Plant bug	Cucurbits, carrot, sugarcane.	Leaf and stem. Scale of impact unknown.	Local dispersal via crawling, flying. Long distance dispersal through infested plant material.		Barbados, Dominican Republic, Grenada, Jamaica, Mexico, Puerto Rico, Trinidad and Tobago, United States of America (Hawaii), Venezuela.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Pentatomidae	*Bagrada hilaris*	Painted bug; Bagrada bug	Sugarcane, onion, groundnut, beetroot, mustard, broccoli, cauliflower, tea,	*B. hilaris* feeds by inserting its piercing and sucking mouthparts, stylets,	The movement and dispersal behaviour of *B. hilaris* is not well studied. [237]		Angola, Botswana, Cabo Verde, Congo, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Madagascar,	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN

[235] Where grains are already formed, they become shrivelled, small, and off-coloured, resulting in yield loss. Kernels damaged by *C. angustatus* become infected by secondary pathogens, such as *Fusarium*, *Curvularia*, *Phoma*, and *Alternaria* species that further deteriorate grain quality.

[237] *B. hilaris* host finding is regulated by the level of food scarcity in the area. The long-distance movement and dispersal of *B. hilaris* is mostly accidental through trade. There were several interceptions of *B. hilaris* in Florida, USA, from 2011 to 2013, on trucks transporting plant material across state lines suggesting that such movement may play an important role in the spread of the bug.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential 112	Spread potential	Economic impact	Overall risk rating
Hemiptera				papaya, daisy, citrus, coffee, dahlia, carrot, cotton, sunflower, lettuce, millet, lima bean, common bean, radish, tomato, potato, sorghum, spinach, wheat, mung bean, maize, cabbage, turnip, lettuce, apple, mango	between the epidermal layers of the host (Reed et al., 2013) and releasing a salivary enzyme into the cells (Palumbo et al., 2016).[236]			Malawi, Mauritius, Mozambique, Namibia, Senegal, Seychelles, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe, Afghanistan, India, Iran, Iraq, Myanmar, Nepal, Pakistan, Sri Lanka, Yemen, Europe, Italy, Malta, Mexico, United States of America, Chile.					
	Pentatomidae	*Erthesina fullo*	Yellow-spotted stink bug	Sugarcane, beetroot, chestnut, citrus, quince, loquat, common fig, macadamia, apple, poplars, apricot, peace, guava, castor bean, lime, grape, common jujube.	Mealybugs feed on leaves and fruit and usually occur in protected areas on the host such as on the undersides of leaves, in the axils of leaves, and in cracks and crevices on the trunk. They are usually most visible when females form white waxy ovisacs surrounding the body.	Yellow spotted stink bug (YSSB)nymphs and adults feed on leaves, flowers, shoots and fruit of various host plants.[238]		Albania, China, India, Indonesia, Japan, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan, Vietnam, Brazil.	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM
	Pseudococcidae	*Cataenococcus hispidus*	Citrus mealybug	Sugarcane.	Mealybugs feed on leaves and fruit and usually occur in protected areas on the host such as on the undersides of leaves, in the axils of leaves, and in cracks and crevices on the trunk. They are usually most visible	Main course of movement is through the transport of infested plant material, usually through international trade.		Indonesia, Malaysia.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN

[236] The combination of mechanical damage and the injection of salivary enzyme during feeding can cause the death of cells at feeding sites (Reed et al., 2013). The bugs also remove sap from host tissues during feeding. Chlorotic lesions may form because of feeding and can eventually become necrotic. Severe damage caused by *B. hilaris* to the leaves or other plant parts may prevent normal growth and development of those parts and the whole plant.

[238] YSSB inserts its stylet into the plant tissue for feeding and secretes a thick saliva which breaks can break down tissue cells and enable the consumption of the liquified contents. Feeding can cause dry, corky tissues just below the surface of feeding sites on fruit, which can harden depressing and distorting the surface of the fruit, thereby reducing its value. In severe cases, feeding can also cause fruit to abort prematurely, leading to significant yield losses. Impact on Sugarcane may vary depending on size of infestation and availability of preferred hosts in sugarcane growing areas.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera					when females form white waxy ovisacs surrounding the body.								
	Pseudococcidae	*Dysmicoccus boninsis*	Pink sugarcane mealybug	Sugarcane, rice.	Damage to host plants occurs during feeding by directly removing sap and by causing malformations of the developing plant tissues. [239]	Main course of movement is through the transport of infested organic material, usually through international trade		Singapore, Taiwan, Europe, Portugal, Spain, Bahamas, Bermuda, Dominican Republic, Haiti, Jamaica, Mexico, Panama, Puerto Rico, Trinidad and Tobago, United States of America (Hawaii), Guam, Northern Mariana Islands, Argentina, Bolivia, Brazil, Guyana, Venezuela.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Pseudococcidae	*Ferrisia virgata*	Striped mealybug	Sugarcane.	Infestations of F. virgata remain clustered around the terminal shoots, leaves and fruit, sucking plant sap which results in yellowing, withering and drying of plants and premature shedding of leaves and fruit. [240]	As for most mealybugs, local dispersal of F. virgata is mainly by the crawling of the first instars. However, all the female developmental stages can walk, at least until eggs are laid (Kaydan and Gullan, 2012), and they will move to avoid unfavourable conditions. [241]		Africa, Asia, Europe, North America.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Pseudococcidae	*Kiritshenkella sacchari* (syn. *Ripersia sacchari*)	Sugarcane mealybug	Sugarcane.	Mealybugs feed on leaves and fruit and usually occur in protected areas on the host such as on	Main course of movement is through the transport of infested plant material, usually through		Israel, Cuba.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

[239] Additionally, causing indirect damage by the honeydew they excrete; honeydew is a growth medium for black sooty moulds that interfere with the photosynthetic process.

[240] The mealybugs do not feed on phloem very often, so unlike many mealybug species they do not produce huge quantities of sugary honeydew. What honeydew is produced can foul foliage and fruit and serve as a medium for the growth of black sooty moulds. Sooty moulds and wax deposits can block light and air from the plant, sometimes reducing photosynthesis and hence plant vigour and crop yield.

[241] Additionally, wind may pick up and carry crawlers longer distances (Kaydan and Gullan, 2012). In unfavourable conditions, attendant ants sometimes pick up mealybugs and carry them to new feeding sites (Missouri Botanical Garden, 2016). Sometimes mealybug crawlers walk onto the feet of birds perching on infested trees and get carried to new plants. All life stages of F. virgata may be carried in shipments of fresh plant material and fruit (Kaydan and Gullan, 2012); as for other mealybug species, human transport of infested plants is a common way in which F. virgata gets transported over long distances, in-country or internationally, and presumably for short distances as well. This includes trade in nursery stock, sharing or trade of infested material by plant fanciers, import of unusual plants to botanical gardens and food plant material to zoos, and the considerable trade in planting material like ornamental bamboos and orchids, bought online and sent via mail or courier, sometimes with no customs declaration on the package.
Humans and farm machinery working in infested fields can accidentally carry crawlers to other sites.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera					the undersides of leaves and in the axils of leaves. They are usually most visible when females form white waxy ovisacs surrounding the body.	international trade							
	Pseudococcidae	*Planococcus kenyae*	Coffee mealybug	Acacia, sugar apple, beetroot, pigeon pea, citrus, coffee, yam, cotton, sweet potato, jacaranda, ryegrass, passionflower, beans, guava, castor bean, sugarcane, nightshade, cocoa.	Symptoms for the presence of *P. kenyae* include wilting and shedding of leaves, dead branches, honeydew and sooty mould on leaves, and external feeding on fruits/pods. [242]	Information on the mode of dispersal for *P. kenyae* is lacking. Nevertheless, since the three nymphal instar stages are the most active stages, it can be assumed that dispersal between and within trees takes place at these stages. [243]		Burundi, Congo, Côte d'Ivoire, Ghana, Kenya, Malawi, Mauritius, Nigeria, Rwanda, Sierra Leone, Sudan, Tanzania, Togo, Uganda, Zimbabwe.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Pseudococcidae	*Pseudococcus saccharicola*	Yellowish sugarcane mealybug	Sugarcane.	Large quantity of sap is sucked up by this pest, often resulting in plant death.	Mealybug nymphs are quite mobile and disperse locally, adults have legs but tend not to move very far. Can hitchhike or be transported longer distances through trade, infested material.	Sugarcane mosaic.	India.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Pseudococcidae	*Rhizoecus epicopus*	Mealybug	Sugarcane.	Nymphs and adults suck the sap from leaves, nodes, and internodes of canes. Severe infestation results in yellowing of leaves, stunting of canes and poor	Main course of movement is through the transport of infested organic material, usually through international trade.		Barbados.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

[242] On coffee in Kenya, symptoms described include white masses of mealybugs between clusters of berries, on flower buds or apical shoots (i.e. external feeding), and spots of transparent honeydew and black sooty mould on the upper leaf surface.

[243] There is also the likelihood that the mealybugs are carried from place to place over short distances by the attendant ants, particularly when conditions are unfavourable, as described for other cocoa mealybugs (Entwistle, 1972). Movement of infested plant materials from place to place can also be an indirect mode of dispersal. Natural dispersal (non-biotic). Although information on aerial dispersal is lacking, it is possible that aerial dispersal of the early instars over long distances takes place as reported for the cocoa mealybugs, *Planococcoides njalensis* and *P. citri* (Strickland, 1950; Entwistle, 1972). Vector transmission. *P. kenyae* is a vector of various cocoa virus isolates including the cocoa swollen shoot virus disease. The virus is transmitted as the vector feeds from tree to tree. Alternative hosts of the virus, from which it can be transmitted onto cocoa, are mainly in the families Sterculiaceae, Bombacaceae and Malvaceae (Posnette et al., 1950, Legg and Agbodjan, 1969, Owusu and Lovi, 1970), but of these, only *Gossypium hirsutum* is likely to be a host plant of *P. kenyae*, since Le Pelley (1968) lists Gossypium species as hosts.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hemiptera					germination.[244]								
	Pseudococcidae	*Trionymus radicicola*	Grass-root mealybug	Sugarcane.	Sucks sap from plant, reduces sugar yield and can kill the plant if infestation is significant.	Main course of movement is through the transport of infested plant material, usually through international trade.		Cuba.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Tingidae	*Corythucha gossypii*	Cotton lacebug	Okra, peanut, beans, capsicum, pawpaw, cassava, banana, sugarcane, eggplant, sweet potato.	Lace bugs feed on the underside of leaves and their damage is characterised by premature leaf senescence, followed by focalised yellowing on the leaf blade, which can lead to complete leaf bleaching. these events can reduce plant vigour, thus decreasing fruit production or preventing its formation.	Main course of movement is through the transport of infested plant material, usually through international trade.		Antigua and Barbuda, Barbados, Cuba, Dominica, Dominican Republic, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Venezuela.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Tingidae	*Leptodictya tabida*	Sugarcane lacewing bug	Maize, Guinea grass, *Sorghum halepense* (Johnson grass), barnyard grass, bamboo, sugarcane.	Feeds on the underside of sugarcane leaves causing discolouration and reduces photosynthetic capability.	Main course of movement is through the transport of infested plant material, usually through international trade.		Belize, El Salvador, Mexico, United States of America.	LOW	HIGH	HIGH	MEDIUM	LOW

[244] Mealybugs such as *R. epicopus* feed on leaves and fruit and usually occur in protected areas on the host such as on the undersides of leaves, in the axils of leaves, and in cracks and crevices on the trunk. They are usually most visible when females form white waxy ovisacs surrounding the body.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hymenoptera													
Hymenoptera	Formicidae	*Acromyrmex octospinosus*	Leaf cutting ant	Citrus, coffee, cucurbits, yam, cotton, sweet potato, mango, cassava, avocado, sugarcane, cocoa.	Leaf feeder that can cause substantial damage. [245]	Movement of infested plants or materials.		Aruba, Belize, Costa Rica, Cuba, Curaçao, Dominica, Guadeloupe, Guatemala, Honduras, Mexico, Netherlands Antilles, Nicaragua, Panama, Trinidad and Tobago, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN
Hymenoptera	Formicidae	*Acropyga marshalli*	Leafcutter ant	Sugarcane.	Sugarcane is primary host, impact unknown.	Movement of infested plants or materials.		Barbados.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN
Hymenoptera	Formicidae	*Atta bisphaerica*	Leafcutter ant	Sugarcane.	Leaf cutting / grass cutting ant. Sugarcane is primary host, known to be a pest in Brazil. Large nests disturb soil. Scale of impact unknown.	Movement of infested plants or materials.		Brazil.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN

[245] *Acromyrmex octospinosus* is listed as a serious agricultural pest in Neotropical areas within and outside its native distribution range (Cristiano et al., 2020). This species has been listed as impacting more than ten crops including among others, citrus, cotton and cacao, causing economic losses estimated at several million dollars per year (Cherrett and Peregrine, 1976). On the island of Guadeloupe, *A. octospinosus* damages 20 to 30% of production of food and fruit crops (Silvy, 1992).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hymenoptera	Formicidae	*Atta cephalotes*	Leaf cutting ants	Polyphagous including Pinaceae, Poaceae, Rosaceae and tropical fruit crops.	Atta spp. mostly affect the vegetative plant parts (leaves and young stems), although in some cases they also cut flowers and harvest stored seeds. Young plants are usually totally defoliated, the damage resembling pruning, whereas in mature plants, often only young leaves are removed. [246]	Movement of infested plants or materials.		Costa Rica, Guatemala, Mexico, Panama, Trinidad and Tobago, Bolivia, Brazil, Ecuador, Peru, Venezuela.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN
Hymenoptera	Formicidae	*Atta insularis*	Leaf cutting ants	Polyphagous including Pinaceae, Poaceae, Rosaceae and tropical fruit crops.	Sugarcane is primary host, impact unknown.	Movement of infested plants or materials.		Cuba.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN
Hymenoptera	Formicidae	*Atta laevigata*	Caribbean Pine Leaf cutting ant	Polyphagous including Pinaceae, Poaceae, Rosaceae and tropical fruit crops.	Atta spp. mostly affect the vegetative plant parts (leaves and young stems), although in some cases they also cut flowers and harvest stored seeds. Young plants are usually totally defoliated, the damage resembling pruning, whereas in mature plants, often only young leaves are removed.[246]	Movement of infested plants or materials.		Bolivia, Brazil, Colombia, Venezuela.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN

[246] Scars, resembling those made with a knife, are frequently left on green parts of the plant stem. Grass blades are often cut near to ground level. Some *Atta* spp. cut the leaf petioles, whereas those that do not produce more minor damage, recognisable by U-shaped fragments cut from the leaf edges.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hymenoptera	Formicidae	*Atta sexdens*	Leaf cutting ants	Polyphagous including Pinaceae, Poaceaea, Rosaceae and tropical fruit crops.	Atta spp. mostly affect the vegetative plant parts (leaves and young stems), although in some cases they also cut flowers and harvest stored seeds. Young plants are usually totally defoliated, the damage resembling pruning, whereas in mature plants, often only young leaves are removed.[246]	Movement of infested plants or materials.		Panama, Brazil, Colombia, Paraguay.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN
Hymenoptera	Formicidae	*Dorylus orientalis*	Oriental army ant	Peanut, soybean, common bean, cowpea, sunflower, cabbage, potato, citrus, sugarcane.	Potato is primary host, impact on sugarcane unknown.	Movement of infested plants or materials.		Bangladesh, China, India, Myanmar, Nepal, Pakistan, Thailand, Sri Lanka, Vietnam, Borneo.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN
Hymenoptera	Formicidae	*Monomorium carbonarium* subsp. *ebenium* [247]	Little black ant	Sugarcane.	Has been observed feeding on parasitized sugarcane borer eggs *Diatraea saccharalis* (so, not a pest, but a potential biocontrol agent if the ant were able to avoid discriminating against parasitized borer eggs and attack all eggs). beside this, impact on sugarcane unknown.	Movement of infested plants or materials.		Barbados, Cuba, India.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN

[247] Could be Monomorium carbonarium subsp. ebininum

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Hymenoptera	Formicidae	*Paratrechina fulva*		Sugarcane.	Sugarcane is primary host, impact unknown.	Movement of infested plants or materials.		Cuba, Mexico, United States, Brazil, Colombia, Ecuador, Paraguay.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN
Lepidoptera													
Lepidoptera	Blastobasidae	*Blastobasis graminea*	Sugarcane borer moth	*Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Zea mays* (maize).	Larvae bore into cane stem.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Colombia, Venezuela, Costa Rica, Mexico, United States of America.	LOW	HIGH	HIGH	MEDIUM	LOW
Lepidoptera	Castniidae	*Castniomera licus*	Banana stem borer	Banana, sugarcane, coconut.	Bores into cane stem, can cause substantial damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Panama, Trinidad and Tobago, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Cosmopterigidae	*Cosmopterix dulcivora*	Moth	Sugarcane.	Leaves, stem. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Fiji, New Caledonia, Indonesia.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Cosmopterigidae	*Cosmopterix pallidifasciella* (syn. *Cosmopterix pallifasciella*)	Moth	Sugarcane.	Leaves, stem. Scale of impact unknown	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Indonesia.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Cossidae	*Phragmataecia castaneae*	Giant borer; Reed leopard	Poaceae including sugarcane.	Giant borer tunnels occur in the stems of sugarcane, wild *Saccharum* and sorghum. When the growing point is destroyed the	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Indonesia, China, Malaysia, Bulgaria, Finland, Italy, Russia.	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera					resulting condition, known as dead heart, is clearly visible. Pupal exuviae seen at the exit holes are a sign of infestation.								
	Crambidae	*Bissetia steniella* (syn. *Chilo trypetes, Acigonia steniella*)	Sugarcane gurdas pur borer (Pakistan)	Sugarcane.	Bores into the stem, can have substantial impact.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India, Indonesia, Pakistan.	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM
	Crambidae	*Chilo agamemnon*	Oriental corn borer	*Zea mays* (maize), *Oryza sativa* (rice), *Saccharum officinarum* (sugarcane).	Stem borer (larvae), can result in yield losses of up to 15%.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Spain, Egypt, Sudan, Uganda, Iraq, Israel.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Crambidae	*Chilo auricilius*	Gold fringed-rice borer	*Sorghum bicolor* (sorghum), *Zea mays* (maize), *Oryza sativa* (rice), Poaceae (grasses), *Saccharum officinarum* (sugarcane).	On sugarcane, damage by C. auricilius early in growth kills leaves and may produce 'dead hearts'. In older cane there may be no obvious external symptoms, but if leaf sheaths are stripped away, bore holes in the internodes may be apparent. [248]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, Bhutan, China, Hong Kong, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam, Papua New Guinea.	HIGH	HIGH	HIGH	EXTREME	EXTREME

[248] Damaged internodes may show reddening of tissues and may emit a rancid odour. Otherwise, it may be necessary to split canes to find the galleries that have been eaten out by larvae. On rice, symptoms are similar to those of other stem borer species with 'dead hearts' appearing early in crop development and 'white heads' later when normal development of the inflorescence is prevented.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Crambidae	*Chilo infuscatellus* (syn. *Chilo tadzhikiellus*)	Yellow top sugarcane borer	*Avena sativa* (oats), *Cymbopogon winterianus* (java citronellagrass), *Cynodon dactylon* (Bermuda grass), *Cyperus rotundus* (purple nutsedge), *Echinochloa colona* (junglerice), *Hordeum vulgare* (barley), *Oryza sativa* (rice), *Panicum* (millets), *Pennisetum glaucum* (pearl millet), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Zea mays* (maize).	Symptoms are similar to those produced by other lepidopterous stem borers. Young larvae eat small holes in leaves, especially in the leaf-sheaths, and at a later stage the growing points are killed. [249]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Afghanistan, Bangladesh, China, India, Indonesia, Myanmar, North Korea, Pakistan, Philippines, South Korea, Taiwan, Tajikistan, Thailand, Uzbekistan, Vietnam, Russia, Papua New Guinea.	HIGH	HIGH	HIGH	EXTREME	EXTREME
	Crambidae	*Chilo orichalcociliellus*	Coastal stalk borer	Maize, sorghum, millet and sugarcane.	Stem borer (larvae).	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Kenya, Madagascar, Zimbabwe.	LOW	HIGH	HIGH	LOW	VERY LOW
	Crambidae	*Chilo partellus*	Spotted stalk borer, Pink borer	Sorghum, maize, Millet (*Eleusine coracana*; *Pennisetum glaucum*; *Setaria italica*), rice, *Sorghum halepense* (Johnson grass), sugarcane.	*Chilo partellus* larvae feed inside leaf whorls (funnels), causing characteristic scars and holes in leaves. Similar symptoms are produced by other cereal stem borer species. [250]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Botswana, Cameroon, Comoros, Eritrea, Eswatini, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe, Afghanistan, Bangladesh, Cambodia, India,	MEDIUM	HIGH	HIGH	LOW	LOW

[249] The terminal leaves then die and form characteristic dead hearts. Older larvae tunnel in stems eating out extensive galleries and excreting frass, which resembles moist sawdust. Tunnelled stems may break, especially in high winds.

[250] Depending on the plant growth stage at the time of infestation, different symptoms are observed. Infestation of seedlings often results in the death of the growth point which manifests as dead hearts. The dead central leaves then form a characteristic 'dead-heart', especially in young plants. Larval feeding inside the whorl of plants from about 3-7 weeks after plant emergence results in typical stem borer damage symptoms which are visible deep inside the whorl, and which become more evident as the whorl leaves grow out. Older larvae tunnel extensively in stems and in maize ears, weakening the stems, which may break and lodge. In sorghum, damage to emerging panicles may be caused during the 'boot' stage of plant development when the panicles are still protected by the flag leaves. The incidence of damaged panicles increases markedly after the boot stage of sorghum and results in significant damage and yield loss (Rensburg and Berg, 1992b, c). An important behavioural characteristic of *C. partellus* is

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera								Indonesia (Java), Iran, Israel, Laos, Nepal, Pakistan, Sri Lanka, Thailand, Turkey, Vietnam, Yemen.					
	Crambidae	*Chilo polychrysus*	Dark-headed striped borer	Cyperaceae (sedges), *Oryza sativa* (rice), Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Triticum* (wheat), *Zea mays* (maize).	Symptoms caused by *C. polychrysus* are the appearance of 'dead hearts' and 'white heads' in growing crops, confirmed by dissection of samples of stems to retrieve larvae and pupae and rear adults for identification by specialist taxonomists.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Thailand, Vietnam.	MEDIUM	HIGH	HIGH	LOW	LOW
	Crambidae	*Chilo sacchariphagus*	Spotted borer	*Oryza sativa* (rice), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Zea mays* (maize).	Early indications of attack by *C. sacchariphagus* result from feeding by larvae on young leaves. Larvae eat through tightly rolled leaves which subsequently unfurl, resulting in characteristic repetitive patterns of small holes; superficial feeding on leaf epidermis produces small 'windowpanes'. [251]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Comoros, Madagascar, Mauritius, Mozambique, Réunion, South Africa, Tanzania, Bangladesh, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Iran, Japan, Laos, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam.	MEDIUM	HIGH	HIGH	EXTREME	EXTREME

the occurrence of large numbers of larvae behind leaf sheaths of the plant, where they feed between the sheath and stem. This is the case with both maize and sorghum (Berg and Rensburg, 1992c; 1996). The cryptic feeding behaviour of the larvae and feeding damage symptoms to whorl leaves are described and illustrated by Slabbert and Berg (2009).

[251] Later in the development of an attack, larvae may kill the growing points, producing characteristic 'dead hearts' formed from the dead, rolled leaves at the growing point. Later, tunnelling in the internodes produces extensive galleries and external holes, from which excreta (frass) exude. Larvae mainly bore into the softer elongating internodes at the tops of canes; this may have several effects, including reduced growth, growth of lateral shoots, constriction of the stem and shortening of internodes at the point of attack, and death of the top, which may kill the whole cane. Six or more larvae may develop in a

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Crambidae	*Chilo terrenellus*	Dark headed rice borer	*Saccharum* spp., other grasses, *Zea mays*, *Oryza sativa*, *Oryza latifolia*, *Eriochloa* spp., *Panicum* spp.	Bores into cane stems, causing significant damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, India, Myanmar, Pakistan, Thailand, Papua New Guinea, Torres Strait Islands.	HIGH	HIGH	HIGH	EXTREME	EXTREME
	Crambidae	*Chilo tumidicostalis*	Spotted sugarcane stem borer; Plassey borer	Sugarcane.	Stem boring moth, can cause significant damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, India, Pakistan, Thailand.	MEDIUM	HIGH	HIGH	EXTREME	EXTREME
	Crambidae	*Chilo zacconius*	African striped borer	Sugarcane, rice.	Stem borer, can cause substantial damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Benin, Cote d'Ivoire, Ghana, Nigeria, Senegal.	LOW	HIGH	HIGH	MEDIUM	LOW
	Crambidae	*Cnaphalocrocis patnalis* (syn. *Marasmia patnalis*)	Rice leafroller	*Cynodon dactylon* (Bermuda grass), *Cyperus difformis* (small-flowered nutsedge), *Cyperus iria* (rice flatsedge), *Cyperus rotundus* (purple nutsedge), *Dactyloctenium aegyptium* (crowfoot grass), *Echinochloa colona* (junglerice), *Echinochloa crus-galli* (barnyard grass), *Imperata cylindrica* (cogon grass), *Leersia*	Plants attacked by *M. patnalis* are defoliated and the affected leaves are scorched or white, plastic and not distinguishable from those damaged by *Cnaphalocrocis medinalis*. [252]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India, Indonesia, Malaysia, Philippines, Sri Lanka.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN

single internode, but it is usual to find only one or two per internode. Extensive tunnelling may result in stem breakage and lodging. Damage is generally most severe on canes that are growing slowly and is therefore often most apparent during dry periods.

[252] Before feeding, the larvae fold back the leaves longitudinally by stitching the leaf margins. The desiccation of the band facilitates contraction of the silk stitches and the leaf rolls in the process.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera				*hexandra* (southern cut grass), *Leptochloa chinensis* (Chinese sprangletop), *Oryza sativa* (rice), *Paspalum conjugatum* (buffalo grass), *Paspalum distichum* (knotgrass), *Paspalum scrobiculatum* (ricegrass paspalum), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Sporobolus* (Dropseed), *Zea mays* (maize)									
	Crambidae	*Cnaphalocrocis ruralis*	Rice leaf folder	Rice, wheat, sorghum, sugarcane	Leaf folder larva fold the leaf blades, glue the leaf edges longitudinally with silk strands and feeds inside the blade rolled leaf, thereby creating longitudinal white and transparent streaks on the blade which eventually withers. [253]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Sri Lanka, India, Malaysia, Indonesia, Philippines.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Crambidae	*Cnaphalocrocis trapezalis* (syn. *Marasmia trapezalis*)	Maize webworm	Rice, wheat, maize, sugarcane, sorghum.	Consumes leaves causing indirect damage by the honeydew they excrete; honeydew is a growth medium for black sooty moulds that interfere with the photosynthetic process.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Nigeria, Tanzania, India.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN

[253] A single larva can damage several leaves, disturbing their photosynthesis and growth, ultimately reducing the yield by as much as 60-80%, as seen in India Rajendran et al., 1986).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Crambidae	*Diatraea albicrinella*	Sugarcane borer	Sugarcane.	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[254]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bolivia, Ecuador, Brazil, Guyana, Peru.	LOW	HIGH	HIGH	HIGH	MEDIUM
	Crambidae	*Diatraea busckella* (syn. *D. rosa*)[255]	Sugarcane borer	Sugarcane.	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[254]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Panama, Bolivia, Colombia, Venezuela.	LOW	HIGH	HIGH	HIGH	MEDIUM
	Crambidae	*Diatraea centrella* (syn. *Diatraea canella*)	Sugarcane stalk borer	Sugarcane, rice, grasses.	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[254]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bahamas, Cuba, Grenada, Guadaloupe, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Guyana, Suriname, Venezuela.	LOW	HIGH	HIGH	HIGH	MEDIUM
	Crambidae	*Diatraea considerata*	Sugarcane borer	*Saccharum officinarum* (sugarcane), *Tripsacum lanceolatum*, *Zea mays* (maize).	In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Mexico.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

[254] Later in the development of the crop, the direct damage in the stalks by tunnelling and breaking thorough the tissues interferes with the movement of nutrients, the distribution of photosynthates and tends to increase the level of fiber in the affected stalk decreasing its weight and value.
[255] *D. rosa* is a synonym (Solis & Metz, 2016).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera					whorls of leaves.[254, 256]								
	Crambidae	*Diatraea dyari*	Cane borer; Moth borer of Sugarcane; Bolivian sugarcane stem borer (Box, 1930; Pruett 1985).	Sugarcane (Sallam, 2006).	Considered a pest of sugarcane in Argentina (Box, 1930).		Suspected to be involved in dissemination of the fungus, *Thielaviopsis ethaceticus*, the causal agent of black rot of sugarcane (Fawcett, 1931).	Argentina (Box, 1930; Sallam, 2006).[257]	LOW[258]	LOW[259]	LOW[260]	UNKNOWN[261]	UNKNOWN
	Crambidae	*Diatraea flavipennella*	Sugarcane borer	Sugarcane.	Feed on sugarcane, damage can reduce production.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Brazil.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

[256] This species is not known to have a significant economic impact on sugarcane, in comparison to other *Diatraea* sp.
[257] Argentina is the only location where this species is found that has been published in the literature.
[258] This species is not currently present in locations geographically close to Australia, being only reported in Argentina (Box, 1930; Sallam, 2006).
[259] The narrow host range (Sugarcane) presents fewer opportunities for individuals of this species to find suitable hosts on which to feed and establish relative to species that are polyphagous with a wide host range.
[260] A capacity to attack only a narrow range of hosts (Sugarcane) may reduce the potential for this species to spread locally into new areas.
[261] Suspected to be involved in dissemination of the fungus, *Thielaviopsis ethaceticus*, the causal agent of black rot of sugarcane (Fawcett, 1931).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Crambidae	*Diatraea grandiosella*	South-western corn borer; Crambid moth	*Pennisetum glaucum* (pearl millet), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Sorghum halepense* (Johnson grass), *Sorghum sudanense* (Sudan grass), *Zea diploperennis*, *Zea mays* (maize), Poaceae (grasses).	In sugarcane and maize, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[254, 262]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Mexico, United States of America.	LOW	HIGH	HIGH	HIGH	MEDIUM
Lepidoptera	Crambidae	*Diatraea guatemalella*		Sugarcane (Sallam, 2006).[263]				Costa Rica, Guatemala and Mexico (Teapa in Southern Mexico)(Box, 1956; Sallam, 2006).	LOW[264]	UNKNOWN	UNKNOWN	LOW[265]	UNKNOWN
Lepidoptera	Crambidae	*Diatraea impersonatella*	Sugarcane stalk borer	*Saccharum officinarum* (sugarcane), *Zea mays* (maize).	*D. impersonatella* feed by scraping the leaf or tunnelling through the midrib during first and second instars.[254, 266]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Guadeloupe, Trinidad & Tobago, South America (e.g. Brazil).	LOW	HIGH	HIGH	HIGH	MEDIUM
Lepidoptera	Crambidae	*Diatraea indigenella*	Sugarcane borer	*Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), Poaceae (grasses).	In sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Colombia.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

[262] Larvae feed on leaf tissue, and later on stalk tissue. Early in the season, severe feeding damage to young plants can kill the growing point; a symptom called 'dead heart'. Leaf-feeding results in small circular holes in the early stages of attack and as larval feeding continues, elongated lesions form in which the epidermis (usually the upper surface) is left intact. Larger larvae bore into the stalk and feed upon pith tissue, resulting in stunted growth of the plant. Subsequent generations of *D. grandiosella* cause damage to the sheath, husk, primary ear and ear shoots. By the third instar, larvae migrate down the stalk by tunnelling through the pith. In the northern part of its range (southern and central USA) girdling of the stalk occurs. This constitutes the main borer injury occurring late in the growing season and results in stalk lodging (Wilbur et al., 1943). Larval feeding in the pedicle of the ear can cause ear drop.

[263] Reported to cause moderate infestation in sugarcane in Costa Rica (Box, 1956).

[264] This species is not currently present in locations geographically close to Australia, being only reported in Costa Rica, Guatemala and Mexico (Teapa in Southern Mexico)(Box, 1956; Sallam, 2006).

[265] Reported to cause moderate infestation in sugarcane in Costa Rica (Box, 1956).

[266] After this, they burrow into the stalk creating galleries where they remain for larval and pupal stages. The damage could result in death of the apical meristem, aerial root growth, lateral sprouts and loss of biomass. In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera					death of the inner whorls of leaves.[267]								
Lepidoptera	Crambidae	*Diatraea lineolata*	Neotropical corn stalk borer	*Oryza sativa* (rice), Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Triticum aestivum* (wheat), *Zea*, *Zea mays* (maize), *Zea mays* subsp. *mexicana* (teosinte).	In sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[254]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India, Bahamas, Belize, Costa Rica, Cuba, El Salvador, Grenada, Guatemala, Honduras, Mexico, Nicaragua, Panama, Trinidad and Tobago, United States of America (Texas), Brazil, Colombia, Ecuador, French Guiana, Guyana, Suriname, Venezuela.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Crambidae	*Diatraea magnifactella*[268]		Sugarcane (Box, 1956; Sallam, 2006).	Larvae are reported to feed in sugarcanes of all ages and occasionally cause very serious damage in individual fields with some heavy attacks and infestations observed in some parts of Mexico (Box, 1956).			Mexico (Box, 1956; Sallam, 2006).[269]	LOW[270]	LOW[271]	LOW[272]	HIGH[273]	LOW

[267] Later in the development of the crop, the direct damage in the stalks by tunnelling and breaking thorough the tissues interferes with the movement of nutrients, the distribution of photosynthates and tends to increase the level of fiber in the affected stalk decreasing its weight and value, thus having a negative economic impact.

[268] Closely related to *Diatraea considerata*, also endemic to Mexico (Box, 1956). There was previously confusion in the literature between *Diatraea magnifactella* and *D. considerata*, however, the species can be distinguished by their distinctly different larvae (Box, 1956).

[269] Endemic to Mexico (Box, 1956).

[270] This species is not currently present in locations geographically close to Australia, being only reported in Mexico (Box, 1956; Sallam, 2006).

[271] The narrow host range (Sugarcane) presents fewer opportunities for individuals of this species to find suitable hosts on which to feed and establish relative to species that are polyphagous with a wide host range.

[272] A capacity to attack only a narrow range of hosts (Sugarcane) may reduce the potential for this species to spread locally into new areas.

[273] Larvae are reported to feed in sugarcanes of all ages and occasionally cause very serious damage in individual fields with some heavy attacks and infestations observed in some parts of Mexico (Box, 1956). *D. magnifactella* is reported to cause greater amounts of damage to sugarcane than *D. saccharalis* (Box, 1956).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Crambidae	*Diatraea rufescens*	Sugarcane borer	Sugarcane.	In sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves.[254]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bolivia.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Crambidae	*Diatraea saccharalis*	Sugarcane stalk borer	*Oryza sativa* (rice), *Panicum dichotomiflorum* (smooth witchgrass), *Paspalum*, Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Sorghum halepense* (Johnson grass), *Zea mays* (maize).	*D. saccharalis* feed by scraping the leaf or tunnelling through the midrib during first and second instars. After this, they burrow into the stalk creating galleries where they remain for larval and pupal stages.[274]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Antigua and Barbuda, Barbados, Belize, British Virgin Islands, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, U.S. Virgin Islands, United States of America (Alabama, Florida, Louisiana, Mississippi, Texas), Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.	LOW	HIGH	HIGH	HIGH	MEDIUM

[274] The damage could result in death of the apical meristem, aerial root growth, lateral sprouts and loss of biomass. In young plants of sugarcane, the attack may compromise the meristematic tissue producing the symptom known as "dead heart" and the death of the inner whorls of leaves. Later in the development of the crop, the direct damage in the stalks by tunnelling and breaking thorough the tissues interferes with the movement of nutrients, the distribution of photosynthates and tends to increase the level of fiber in the affected stalk decreasing its weight and value.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Crambidae	*Diatraea tabernella*		Sugarcane (Box, 1956; Sallam, 2006).	Through feeding, it causes holes and tunnels in sugarcane stalks that results in yield losses (Atencio et.al, 2017). Reported to cause considerable damage in cane-fields of all ages when present in larger numbers (Box, 1956). [275]			Central America (Costa Rica, Panama)(Box, 1956; Sallam, 2006).	LOW [276]	UNKNOWN [277]	UNKNOWN [278]	MEDIUM [279]	UNKNOWN
	Crambidae	*Diatraea veracruzana* [280]		Sugarcane, Maize (Box, 1956; Sallam, 2006). [281]				Mexico (Box, 1956; Sallam, 2006). [282]	LOW [283]	UNKNOWN [284]	UNKNOWN [285]	UNKNOWN	UNKNOWN
	Crambidae	*Eoreuma loftini*	Mexican rice borer	*Bromus* (bromegrasses), *Echinochloa crus-galli* (barnyard grass), *Lolium* (rye grasses), *Oryza sativa* (rice), *Paspalum urvillei* (Vasey grass), Poaceae (grasses), *Saccharum*	*E. loftini* injures 20% of sugarcane internodes, creating tunnels that allow for red rot which breaks down sugar. Dense and sustained infestations can have a substantial impact	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Mexico, United States of America.	LOW	HIGH	HIGH	MEDIUM	LOW

[275] Borer damage is reported to affect brix, sucrose content, fiber content, cane and sugar yield (Atencio et. al, 2017).
[276] This species is not currently present in locations geographically close to Australia, being only reported in Central America (Costa Rica, Panama)(Box, 1956; Sallam, 2006).
[277] Observed to develop a larger number of egg masses per female (67.3) compared to *D. saccharalis* (28.7)3 which may increase relative risk of establishment and spread (Echeverri-Rubiano et. al, 2022). The narrow host range (Sugarcane) presents fewer opportunities for individuals of this species to find suitable hosts on which to feed and establish relative to species that are polyphagous with a wide host range.
[278] A capacity to attack only a narrow range of hosts (Sugarcane) may reduce the potential for this species to spread locally into new areas. Observed to develop a larger number of egg masses per female (67.3) compared to *D. saccharalis* (28.7) which may increase relative risk of establishment and spread (Echeverri-Rubiano et. al, 2022).
[279] Borer damage is reported to affect brix, sucrose content, fiber content, cane and sugar yield (Atencio et. al, 2017).
Through feeding, it causes holes and tunnels in sugarcane stalks that results in yield losses. A 2016 study found *D. tabernella* decreased sugar yield by up to 2.56 t of sugar per hectare (Atencio et. al, 2017).
Key pest of sugarcane in Panama where it causes significant crop losses (Atencio & Goebel, 2018).
[280] Believed to be closely related to *Diatraea guatemalella* (Box, 1956).
[281] Reported to be a common sugarcane borer over considerable areas in Veracruz, Mexico, where it has a wide geographic distribution and can colonise across a wide range of altitudes (Box, 1956).
[282] First described from Mexico in 1956. Endemic to Veracruz, Mexico (Box, 1956).
[283] This species is not currently present in locations geographically close to Australia, being only reported in Mexico (Box, 1956; Sallam, 2006).
[284] Reported to be a common sugarcane borer over considerable areas in Veracruz, Mexico, where it has a wide geographic distribution and can colonise across a wide range of altitudes (Box, 1956).
[285] In Veracruz, Mexico, this species has been demonstrated to have established a wide geographic distribution and to have the capacity to colonise across a wide range of altitudes (Box, 1956).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera				*officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Sorghum halepense* (Johnson grass), *Urochloa platyphylla* (broadleaf signalgrass), *Zea mays* (maize).	on production.								
	Crambidae	*Scirpophaga magnella*		*Saccharum* spp., Sugarcane (Sallam, 2006).				Central and South-East Asia, specifically in China, Iran, Afghanistan, Pakistan, India, Nepal, Bangladesh, Myanmar, Thailand and Vietnam (Chen, Song & Wu, 2006; Sallam, 2006). [286]	MEDIUM [287]	UNKNOWN	UNKNOWN	MEDIUM [288]	UNKNOWN
	Crambidae	*Omiodes accepta*	Sugarcane leafroller	Sugarcane.	Leaf rolling pest of no great significance. Parasitised by a considerable number of enemies.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		United States (Hawaii).	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Crambidae	*Scirpophaga excerptalis*	Top borer	*Saccharum* spp., *Sorghum halepense*, rice, wheat. Mango	Early indications of the presence of *S. excerptalis* on sugarcane include the presence of egg clusters on the upper side of the leaves near the growing point. [289]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam, Papua New Guinea, Solomon Islands.	HIGH	HIGH	HIGH	EXTREME	EXTREME

[286] Species first described in 1929 (Chen,, Song & Wu, 2006).
[287] Entry potential risk relatively higher considering the species is found in countries geographically closer to Australia such as Myanmar, Thailand and Vietnam (Chen, Song & Wu, 2006; Sallam, 2006). Considered MEDIUM risk to Australia by Sallam (2006).
[288] Borers can cause a reduction in cane length, stalk weight and sucrose (Pandley, Singh & Singh, 2020). Also damages the top internodes of sugarcane (Shyamrao & Kumar, 2020). Reported in Pakistan in 2020 as a destructive pest of sugarcane and to severely damage sugarcane stalks. Early maturing varieties are reportedly less affected by this borer (Pandley, Singh & Singh, 2020). No literature on spp. yield impacts.
[289] The egg clusters are usually 13 mm long and covered by brownish-yellow hairs from the anal tuft of the female adult moth. First-instar larvae eat through the rolled leaves which subsequently unfurl, producing a characteristic, repetitive pattern of small holes. The larvae usually penetrate along the midrib of the leaf into the heart of the plant. They tunnel in the midrib for 24-48 hours and emerge through the upper epidermis. Two or three first- and/or second-instar larvae, and on rare occasions third-instar larvae, can be found in the spindle of the stems. The top shoot becomes withered and stunted, whereas

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Elachistidae	*Dicranoctetes saccharella*	Sugarcane leafminer	Sugarcane.	Consumes the leaf cell contents. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Jamaica, United States of America.	LOW	LOW	LOW	UNKNOWN	UNKNOWN
	Erebidae	*Euproctis minor*	Tussock moth	Malvaceae and Poaceae, including sugarcane.	Above ground parts. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India, Indonesia.	MEDIUM	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Erebidae	*Euproctis xanthorrhoea*	Tussock moth	Sugarcane, rice, lima bean, jute, kenaf.	Above ground parts.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India, Indonesia, Pakistan.	MEDIUM	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Erebidae	*Laelia suffusa*	White tussock moth	Sugarcane, rice.	Consumes leaves, impact can be severe if left unmanaged.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, Sri Lanka, Java, India, Indonesia, Philippines, Malaysia.	MEDIUM	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Erebidae	*Mocis latipes*	Grass looper, small mocis moth, striped grass looper	Wide host range including *Saccharum officinarum* (sugarcane). [290]	Larvae ascend to the upper portions of the plant to feed at night and return to basal areas in the	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Antigua and Barbuda, Barbados, Belize, Canada, Cayman Islands, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica,	LOW	HIGH	HIGH	MEDIUM	LOW

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the internodes beneath may produce new leaves. In general, only one mature larva survives in a single stem because of food competition. The larva tunnels into the stem, making a small window near ground level; it then pupates in a cocoon near that opening. Damage is generally most severe in young plants that thrive in a humid environment.

[290] Additional hosts include: *Avena sativa* (oats), *Cenchrus ciliaris* (Buffel grass), *Cenchrus echinatus* (southern sandbur), *Chloris gayana* (Rhodes grass), *Cynodon plectostachyus* (African stargrass), *Digitaria decumbens* (pangolagrass), *Digitaria sanguinalis* (large crabgrass), *Hyparrhenia rufa* (Jaragua grass), *Lolium multiflorum* (Italian ryegrass), *Megathyrsus maximus* (Guinea grass), *Oryza sativa* (rice), *Paspalum dilatatum* (dallisgrass), *Paspalum notatum* (Bahia grass), *Pennisetum glaucum* (pearl millet), *Pennisetum purpureum* (elephant grass), Poaceae (grasses), *Setaria viridis* (green foxtail), *Sorghum bicolor* (sorghum), *Sorghum halepense* (Johnson grass), *Stenotaphrum secundatum* (buffalo grass), *Triticum aestivum* (wheat), *Urochloa decumbens* (signal grass), *Urochloa mutica* (para grass), *Zea mays* (maize).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera					morning.[291]			Martinique, Mexico, Nicaragua, Panama, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States of America, Argentina, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Venezuela.					
Lepidoptera	Erebidae	*Orgyia leucostigma*	White-marked tussock moth	Maple, chestnut, pawpaw, barberry, birch, pecan, hazel, quince, persimmon, fig, iris, jasmine, butternut, walnut, privet, orange, honeysuckle, apple, mulberry, apricot, cherry, plum, peach, pear, oak, azalea, blackberry, raspberry, willow, lime, elm, blueberry, sugarcane, maize.	The young larvae chew small holes in leaves and can skeletonize them. The older larvae consume entire leaves, feeding from the edge in to leave just the main veins and/or midrib. Entire trees and shrubs may be defoliated during an outbreak, with egg-laden cocoons spun up amongst bare twigs.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Canada, United States of America.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Erebidae	*Psalis pennatula* (syn. *Dasychira pennatula*)	Hairy rice caterpillar	Rice, sugarcane, maize, lucerne.	Leaves. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India, Indonesia, Myanmar.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Erebidae	*Sphrageidus virguncula* (syn. *Euproctis virguncula*)	Tussock moth	Malvaceae and Poaceae, including sugarcane.	Above ground parts. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India, Indonesia.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN

[291] Reinert (1975) noted that first-stage larvae feed in a narrow line on the upper cell layers of the leaves, whereas fourth- through seventh-stage larvae feed on entire leaves. Damage extends from minimal feeding to complete defoliation, depending on the severity of an outbreak. Heavy populations on grass (3.0-7.6 larvae/m^2) can cause defoliation to the bare stolons.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Erebidae	*Spilosoma obliqua*	Jute hairy caterpillar	Jute (Corchorus spp.), sugarcane.	Above ground parts. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Afghanistan, Pakistan, India, Bhutan, Bangladesh, Myanmar.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Eupterotidae	*Dreata petola*		Sugarcane, bamboo, maize.	Impact unknown	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Indonesia.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Gracillariidae	*Callisto pulchella*	Santo Domingo cane butterfly	Sugarcane.	Caterpillar feeds on above ground parts, scale of impact undetermined.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Dominican Republic.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Hesperiidae	*Nyctelius nyctelius*	Sugarcane skipper	Sugarcane.	Consumes leaves, can cause minor damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico, Trinidad and Tobago, Argentina, Guyana, Peru, Venezuela.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Hesperiidae	*Panoquina nero*	Nero skippers	Sugarcane.	Consumes leaves, can cause minor damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Jamaica, Puerto Rico.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
Lepidoptera	Hesperiidae	*Panoquina sylvicola*	Purple-washed skipper	Sugarcane, maize, Poaceae.	Leaf	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Venezuela.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Hesperiidae	*Parnara guttatus*	Rice skipper	Poaceae including bamboo, rice and sugarcane.	Preferred host is rice. Defoliation is readily recognized. The larvae are large and remove significant amounts of leaf tissue. The damage usually occurs in patches and most commonly in the reproductive growth stage of rice and sugarcane.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, Cambodia, China, India, Indonesia, Japan, North Korea, Pakistan, South Korea, Taiwan, Russia.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Hesperiidae	*Pelopidas mathias*	Dark small-branded swift; Black branded swift	Rice, sugarcane, bamboo, millet, ryegrass, lemongrass, rice, oats, barley, sorghum, wheat, maize.	The large larvae do most of the defoliation and feed edgewise on the margins and tips of the leaves, removing large sections of leaf tissue to the midrib. A few large larvae can cause noticeable defoliation viewed while walking through a field or along the field border.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Angola, Botswana, Cameroon, Congo, Côte d'Ivoire, Egypt, Ethiopia, Gabon, Guinea, Kenya, Liberia, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Uganda, Zimbabwe, Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Oman, Pakistan, Philippines, Saudi Arabia, Sri Lanka, Syria, Thailand, Vietnam, Yemen, Papua New Guinea.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Limacodidae	*Quasithosea syhoffi* (syn. *Thosea sithoffi*)	Oil palm slug	Sugarcane.	Leaves. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Indonesia.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Limacodidae	*Thespea bicolor* (syn. *Parasa bicolor*)	Slug moth	Sugarcane, rice, bamboo	Leaf.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are		Bangladesh, China, India.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera						the most likely pathways for long distance spread.							
	Noctuidae	*Busseola fusca*	African maize stalk borer	Wide host range including *Saccharum officinarum* (sugarcane). [292]	First-instar larvae feed in the young terminal leaf whorls producing characteristic patterns of small holes and 'window-panes' where tissues have been eaten away. [293]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Congo (DRC, ROC), Côte d'Ivoire, Eritrea, Eswatini, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Malawi, Mali, Mozambique, Nigeria, Rwanda, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe.	LOW	HIGH	HIGH	MEDIUM	LOW
	Noctuidae	*Chrysodeixis includens*	Soybean looper	Wide host range including *Saccharum officinarum* (sugarcane). [294]	The early larval stages of this pest (first to third instars) feed on the palisade layer of leaf undersides, leaving the upper leaf cuticle	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bermuda, Canada, Costa Rica, Cuba, Honduras, Nicaragua, Puerto Rico, United States of America, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Peru.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

[292] Additional hosts include: *Eleusine coracana* (finger millet), *Hyparrhenia rufa* (Jaragua grass), *Hyparrhenia tamba*, *Megathyrsus maximus* (Guinea grass), *Oryza sativa* (rice), *Pennisetum glaucum* (pearl millet), *Pennisetum purpureum* (elephant grass), *Rottboellia cochinchinensis* (itch grass), *Sorghum bicolor* (sorghum), *Sorghum bicolor* subsp. *verticilliflorum*, *Sorghum halepense* (Johnson grass), *Zea mays* (maize).

[293] Later they eat into the growing points, which may be killed so that the dead central leaves form characteristic dry, withered 'dead-hearts'. Older larvae tunnel extensively in stems, eating out long frass-filled galleries which may weaken stems and cause breakages.

[294] Additional hosts include: *Abelmoschus esculentus* (okra), *Allium sativum* (garlic), *Amaranthus deflexus* (Perennial Pigweed), *Amaranthus hybridus* (smooth pigweed), *Amaranthus spinosus* (spiny amaranth), *Ananas comosus* (pineapple), *Apium graveolens* (celery), *Arachis hypogaea* (groundnut), *Asparagus officinalis* (asparagus), *Aster*, *Begonia*, *Bidens pilosa* (blackjack), *Brassica napus* var. *oleifera*, *Brassica oleracea* (cabbages, cauliflowers), *Brassica oleracea* var. *italica* (broccoli), *Brassica oleracea* var. *viridis* (collards), Brassicaceae (cruciferous crops), *Cajanus cajan* (pigeon pea), *Calendula officinalis* (Pot marigold), *Capsicum annuum* (bell pepper), *Celosia argentea* (celosia), *Chenopodium album* (fat hen), *Chrysanthemum* (daisy), *Citrullus lanatus* (watermelon), *Crotalaria spectabilis* (showy rattlepod), *Cucumis sativus* (cucumber), Cucurbitaceae (cucurbits), *Cyamopsis tetragonoloba* (guar), *Cyphomandra betacea* (tree tomato), *Daucus carota* (carrot), *Dianthus caryophyllus* (carnation), *Eruca vesicaria* (purple-vein rocket), *Eryngium foetidum*, *Eupatorium*, *Euphorbia pulcherrima* (poinsettia), *Fevillea cordifolia*, *Geranium* (cranesbill), *Gerbera jamesonii* (African daisy), *Glycine max* (soyabean), *Gossypium* (cotton), *Gossypium hirsutum* (Bourbon cotton), *Helianthus annuus* (sunflower), *Hibiscus rosa-sinensis* (China-rose), *Hydrangea* (hydrangeas), *Impatiens walleriana* (busy lizzy), *Ipomoea batatas* (sweet potato), *Ixora coccinea* (flame-of-the-woods), *Lactuca sativa* (lettuce), *Lantana*, *Lepidium virginicum* (Virginian peppercress), *Lolium perenne* (perennial ryegrass), *Manihot esculenta* (cassava), *Matthiola incana* (stock), *Medicago sativa* (lucerne), *Mentha* (mints), *Mentha arvensis* var. *piperascens* (Japanese mint), *Mentha spicata* (Spear mint), *Nasturtium officinale* (watercress), *Nicotiana rustica* (wild tobacco), *Nicotiana tabacum* (tobacco), *Passiflora edulis* (passionfruit), *Peperomia obtusifolia* (pepper-face), *Persea americana* (avocado), *Phaseolus* (beans), *Phaseolus lunatus* (lima bean), *Phaseolus vulgaris* (common bean), *Philodendron*, *Phyllanthus urinaria* (leafflower), *Physalis* (Groundcherry), *Pisum sativum* (pea), *Portulaca grandiflora* (Rose moss), *Portulaca oleracea* (purslane), *Pueraria montana* var. *lobata* (kudzu), *Rumex* (Dock), *Rumex crispus* (curled dock), *Saintpaulia ionantha* (African violet), *Schefflera actinophylla* (umbrella tree), *Senecio bicolor* (dusty miller), *Sida rhombifolia*, *Solanum* (nightshade), *Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Solanum tuberosum* (potato), *Solidago* (Goldenrod), *Sonchus* (Sowthistle), *Sonchus oleraceus* (common sowthistle), *Sorghum bicolor* (sorghum), *Stictocardia tiliifolia* (spottedheart), *Triticum aestivum* (wheat), *Urera baccifera*, *Verbena* (vervain), *Vicia faba* (faba bean), *Vigna unguiculata* (cowpea), *Xanthium strumarium* (common cocklebur), *Zea mays* (maize).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera					and wax layer intact. This appears as a clear, irregular area on the leaves resembling a window, resulting in feeding damage sometimes referred to as 'window panes'. [295]								
	Noctuidae	*Feltia repleta* (syn. *Agrotis repleta*)	Cutworm	Peanut, Brassicaceae, pigeon pea, Cucurbitaceae, sweet potato, beans, sugarcane, tomato, potato.	A single cutworm may cut down and kill several seedlings early in the growing season opening gaps in the stand, causing losses due to yield reduction and replating of affected areas.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Trinidad and Tobago, French Guiana, Guyana, Suriname, Venezuela.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Noctuidae	*Feltia subterranea*	Granulate cutworm	*Allium*, *Beta vulgaris* var. saccharifera (sugarbeet), Brassicaceae (cruciferous crops), *Capsicum annuum* (bell pepper), *Daucus carota* (carrot), *Gossypium* (cotton), *Manihot esculenta* (cassava), *Nicotiana tabacum* (tobacco), *Phaseolus* (beans), *Saccharum officinarum* (sugarcane), *Solanum lycopersicum* (tomato), *Solanum tuberosum* (potato), *Spinacia oleracea* (spinach), *Zea mays* (maize).	A single cutworm may cut down and kill several seedlings early in the growing season opening gaps in the stand, causing losses due to yield reduction and replating of affected areas.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Barbados, Bermuda, Cuba, Dominica, Dominican Republic, Honduras, Jamaica, Mexico, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, United States of America, Chile, Venezuela, Costa Rica, Panama, Colombia, Brazil, Uruguay.	LOW	HIGH	MEDIUM	UNKNOWN	UNKNOWN

[295] Larger instars will feed on the entire leaf, and heavy infestations can completely defoliate entire plants. All instars normally feed on the underside of leaves, and pupae also spin a loose cocoon there.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Noctuidae	*Mythimna humidicola*	Armyworm	Sugarcane.	Consumes leaves and can causes defoliation with varying yield loss.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Jamaica.	LOW	HIGH	HIGH	MEDIUM	LOW
	Noctuidae	*Mythimna inconspicua*	Armyworm	Sugarcane, grasses.	Consumes leaves and can causes defoliation with varying yield loss.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bahamas, Cuba, United States of America.	LOW	HIGH	HIGH	MEDIUM	LOW
	Noctuidae	*Mythimna latiuscula*	Armyworm	Oryza sativa (rice), Phaseolus (beans), Poaceae (grasses), Saccharum officinarum (sugarcane), Zea mays (maize), millet	Consumes leaves and can causes defoliation with varying yield loss	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Barbados, Cuba, Jamaica, Mexico, Puerto Rico, Trinidad and Tobago, United States of America, Argentina, Brazil, Guyana, Venezuela.	LOW	HIGH	HIGH	MEDIUM	LOW

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Noctuidae	*Mythimna unipuncta* (syn. *Pseudaletia unipuncta*)	Rice armyworm	Rice, oats, rye, tomato, cauliflower, quinoa, broccoli, potato, millet, beans, grasses, sugarcane, maize, lucerne, wheat	Leaves, panicles; potential impacts of baculoviruses if armyworm is a carrier/vector. [296]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Mali, Morocco, Niger, Senegal, Somalia, Togo, China, India, Iran, Israel, Turkey, Uzbekistan, Bulgaria, Czechia, Denmark, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, United Kingdom, Bahamas, Canada, Costa Rica, Cuba, Guatemala, Jamaica, Mexico, Panama, Puerto Rico, United States of America, Argentina, Bolivia, Brazil, Chile, Colombia, Paraguay, Uruguay, Venezuela.	LOW	HIGH	HIGH	MEDIUM	LOW
	Noctuidae	*Mythimna microgonia*	Armyworm	Sugarcane.	Consumes leaves and can causes defoliation with varying yield loss, however research also shows that most cane can recover form parasitised *Mythimna* sp. infestations and yield loss is minor at best. Well managed crops incur almost no damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Barbados.	LOW	HIGH	HIGH	MEDIUM	LOW

[296] Irregular defoliation of leaves, with the midrib often left intact, is typical on small grains. On maize, larvae may be found in the youngest furled leaves. When *M. unipuncta* infestations coincide with heading in small grains, larvae may cut off the seed heads (barley) or feed on panicles (wheat, rice). Evident quantities of frass pellets on the ground near plants or in leaf axis may also be used to detect infestations.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Noctuidae	*Mythimna salita*	Armyworm	Sugarcane.	Consumes leaves and can causes defoliation with varying yield loss, however research also shows that most cane can recover form parasitised *Mythimna* sp. infestations and yield loss is minor at best. Well managed crops incur almost no damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Barbados.	LOW	HIGH	HIGH	MEDIUM	LOW
	Noctuidae	*Sesamia calamistis*	African pink stem borer	*Carex* (sedges), *Cyperus papyrus* (papyrus), *Oryza sativa* (rice), *Pennisetum glaucum* (pearl millet), Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Triticum aestivum* (wheat), *Zea mays* (maize).	Larvae feed in stems, eating out frass-filled galleries. They do not usually feed on the young terminal leaves, so are less likely to cause the holing and scarification that is typical of attack by *Busseola fusca* and *Chilo* spp. [297]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Angola, Benin, Burkina Faso, Burundi, Cameroon, Comoros, Congo (DRC, ROC), Côte d'Ivoire, Eritrea, Ethiopia, Gambia, Ghana, Kenya, Madagascar, Malawi, Mali, Mauritius, Mozambique, Niger, Nigeria, Réunion, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe.	LOW	HIGH	HIGH	MEDIUM	LOW
	Noctuidae	*Sesamia cretica*	Corn stem borer, Greater sugarcane borer, Sorghum borer	Maize, sorghum, sugarcane, millet, rice, wheat.	Field symptoms resemble those of the many other lepidopterous stem borers that attack graminaceous crops. Feeding by young larvae in the rolled leaves of the leaf funnel produces characteristic repetitive patterns of holes and superficial	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Algeria, Cameroon, Chad, Egypt, Eritrea, Ethiopia, Kenya, Libya, Mali, Morocco, Niger, Nigeria, Somalia, Sudan, Togo, Tunisia, China (Yunnan), India, Iran, Iraq, Israel, Jordan, Kyrgyzstan, Lebanon, Pakistan, Saudi Arabia, Sri Lanka, Syria, Tajikistan, Thailand, Turkey, Uzbekistan, Yemen, Europe, Albania,	LOW	HIGH	HIGH	MEDIUM	LOW

[297] Stem tunnelling may kill growing points, resulting in 'deadheart' symptoms as terminal leaves die, and may also cause stem breakages. Larvae may also feed in maize cobs and in inflorescence stalks of other cereals.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera					scarification of the leaf tissues. Later in crop development growing points may be killed, producing characteristic dead central shoots (dead hearts). [298]			Bulgaria, Croatia, France (Corsica), Greece (Crete), Italy (Sardinia, Sicily), Montenegro, North Macedonia, Portugal, Russia, Serbia and Montenegro, Slovenia, Spain (Canary Islands).					
	Noctuidae	*Sesamia grisescens*	Pink stalk borer	*Saccharum* spp., *Pennisetum purpureum*, *Panicum maximum.*	The young larvae start feeding on the inner tissue of the leaf-sheath and fill the fed section with frass. As the larvae grow bigger, they start boring into the stalk near the node of the fully expanded internode. [299]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Indonesia, Papua New Guinea.	HIGH	HIGH	HIGH	EXTREME	EXTREME
	Noctuidae	*Sesamia inferens*	Asiatic pink stem borer; Purple stem borer; Noctuid moth	Oats, barley, rice, millet (*Echinochloa frumentacea*; *Eleusine coracana*; *Pennisetum glaucum*; *Setaria italica*), wheat, sorghum, maize, sugarcane, *Sorghum halepense* (Johnson grass), Job's tears.	Feeding occurs within the cane stem or base. When a stem is severed it wilts causing a dead heart. Feeding at the base often leads to wilting. These symptoms are common for most stem borers and not unique to *S. inferens.* [300]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, Bhutan, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, North Korea, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand, Vietnam, United States of America (Hawaii), Guam, Papua New Guinea, Solomon	HIGH	HIGH	HIGH	HIGH [301]	HIGH

[298] Older plants that survive initial attacks may have stem internodes that are extensively tunnelled, often with holes to the exterior. Late attack on sorghum, in which the peduncle is tunnelled, may prevent normal grain development, producing chaffy heads, and in severe attacks, the peduncles may snap.
[299] First they isolate the cabbage section of the stalk and feed gregariously into the meristematic tissue. They kill the growing point and this results in a 'dead-heart'. Usually the initially infested stalks (those with eggs) may not have enough feed for all the semi-mature larvae and so the larvae migrate to infest other stalks. Large entry holes are made but these do not necessarily result in dead-hearts. However, the bored stalks can easily break in strong winds. The rotting tissues attract saprophytic fungi and the weevil borer, *Rhabdoscelus obscurus*, which cause further damage. Before pupation, the larvae cut an exit hole that is usually 5-10 mm in diameter. Bored stalks usually have a low sucrose content, high levels of impurities and a high fibre content (Eastwood et al., 1998).
[300] It causes damage by consuming the inner side of the stem, which in wheat, causes "dead hearts" at the critical tillering stage with harvest reductions of over 11% reported in India (Chaitanya et. al, 2023).
[301] On 1st October 2024, the Sugarcane Technical Review Panel advised that this species be added to the High Priority Pest list for the Australian Sugarcane industry. To do so, the economic impact risk rating was changed from MEDIUM to HIGH to give an overall risk rating of HIGH (was previously MEDIUM).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera								Islands.					
	Noctuidae	*Sesamia nonagrioides*	Mediterranean corn stalk borer; pink stem borer	Wide host range including *Saccharum officinarum* (sugarcane). [302]	Larvae feed in stems, eating out frass-filled galleries. They do not usually feed on the young terminal leaves, so are less likely to cause the holing and scarification that is typical of attack by stem borers. [303]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Benin, Botswana, Burundi, Cabo Verde, Cameroon, Congo (DRC, ROC), Côte d'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Kenya, Mali, Morocco, Nigeria, Rwanda, Sudan, Tanzania, Togo, Uganda, Zambia, Iran, Israel, Syria, Turkey, Cyprus, France, Greece, Italy, Portugal, Spain.	LOW	HIGH	HIGH	MEDIUM	LOW
	Noctuidae	*Sesamia nonagrioides botanephaga*	Mediterranean corn stalk borer	Sugarcane.	Larvae feed in stems, eating out frass-filled galleries. They do not usually feed on the young terminal leaves, so are less likely to cause the holing and scarification that is typical of attack by stem borers. Stem tunnelling may kill growing points, resulting in 'dead heart' symptoms as terminal leaves die, and may also cause stem breakages. [304]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Congo, Ghana, Nigeria, Iran.	LOW	HIGH	MEDIUM	MEDIUM	LOW

[302] Additional hosts include: *Asparagus officinalis* (asparagus), *Carex* (sedges), *Cucumis melo* (melon), *Diospyros kaki* (persimmon), *Gladiolus* hybrids (sword lily), *Musa* (banana), *Oryza sativa* (rice), Poaceae (grasses),), *Solanum melongena* (aubergine), *Sorghum bicolor* (sorghum), *Strelitzia*, *Zea mays* (maize), *Zea mays* subsp. *mays* (sweetcorn),

[303] Stem tunnelling may kill growing points, resulting in 'dead heart' symptoms as terminal leaves die, and may also cause stem breakages. Larvae may also feed in maize cobs and in inflorescence stalks of other cereals. On some non-poaceous crops the larvae feed on flower buds, flowers and fruits as well as tunnelling in leaf and stem tissues.

[304] Larvae may also feed in maize cobs and in inflorescence stalks of other cereals. On some non-poaceous crops the larvae feed on flower buds, flowers and fruits as well as tunnelling in leaf and stem tissues.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Noctuidae	*Sesamia penniseti*	Corn stalk borer	*Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Zea mays* (maize).	Larvae feed in stems, eating out frass-filled galleries. They do not usually feed on the young terminal leaves, so are less likely to cause the holing and scarification that is typical of attack by stem borers. Stem tunnelling may kill growing points, resulting in 'dead heart' symptoms as terminal leaves die, and may also cause stem breakages.[304]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Ghana, Nigeria, Côte d'Ivoire.	LOW	LOW	MEDIUM	MEDIUM	VERY LOW
	Noctuidae	*Sesamia poephaga*		Sugarcane, Maize, sorghum, (Sallam, 2006).[305]				West Africa to Sudan, Comoros and Madagascar (Sallam, 2006).	LOW[306]	HIGH	HIGH	HIGH[307]	MEDIUM
	Noctuidae	*Sesamia uniformis*	Shoot boring caterpillar	*Oryza sativa* (rice), *Erianthus arundinaceus*, *Saccharum spontaneum*, *Saccharum* spp. - hybrids (sugarcane), *Sorghum bicolor* (sorghum), *Triticum aestivum* (wheat), *Zea mays* (maize).	Larvae feed in stems, eating out frass-filled galleries. They do not usually feed on the young terminal leaves, so are less likely to cause the holing and scarification that is typical of attack by stem borers. Stem tunnelling may kill growing points, resulting in 'dead heart' symptoms as	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, India, Pakistan, Philippines.	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW

[305] Reported as a gramineous borer in western Africa (Hailemichael et. al, 2009).
[306] This species is not currently present in locations geographically close to Australia, being reported in West Africa to Sudan, Comoros and Madagascar (Sallam, 2006). Entry potential reduced considering the species is not found geographically close to Australia.
[307] Reductions in stalk weight and juice quality after internode formation has commenced. The closely related species, *Sesamia inferens* can cause reductions of cane weight up to 57% and 36% reduction in brix (Dey et. al, 2021).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera					terminal leaves die, and may also cause stem breakages. Larvae may also feed in maize cobs and in inflorescence stalks of other cereals. [308]								
	Noctuidae	*Spodoptera littoralis*	Cotton leafworm	Okra, Alliaceae, Scrophulariaceae, Fabaceae, Cucurbitaceae, Convovulaceae, Brassicaceae, Theaceae, Rutaceae, Apiaceae, Asteraceae, Rosaceae, Musaceae, Poaceae.	Affected plant parts include those above ground.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Wide geographic range. [309]	HIGH	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Nolidae	*Nola cereella* (syn. *Nola sorghiella*)	Sorghum webworm	*Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum).	Flowering parts, developing cane (larvae).	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Mexico, United States of America, Cuba, Caribbean, Puerto Rico, Suriname, Argentina.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Notodontidae	*Phalera combusta*	Moth	*Oryza sativa* (rice), Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Zea mays* (maize).	Foliage (larvae). Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India, Indonesia.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Nymphalidae	*Caligo illioneus*	Owl-eye butterfly	Poaceae; Sugarcane, banana.	Leaves, stem. Scale of impact unknown	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways		Trinidad and Tobago, Colombia, Guyana.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN

[308] On some non-poaceous crops the larvae feed on flower buds, flowers and fruits as well as tunnelling in leaf and stem tissues.
[309] Geographic range includes: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Democratic Republic of the, Congo, Republic of the, Côte d'Ivoire, Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gambia, Ghana, Guinea, Kenya, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Saint Helena, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe, Bahrain, China, India, Iran, Iraq, Israel, Jordan, Lebanon, Oman, Saudi Arabia, Syria, Turkey, United Arab Emirates, Yemen, Cyprus, France, Greece, Italy, Malta, Portugal, Spain.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera						for long distance spread.							
	Nymphalidae	*Discophora celinde*	Nymphalid butterfly	Sugarcane.	Leaves, stem. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Indonesia.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Nymphalidae	*Mycalesis horsfieldi*	Brush footed butterfly	Sugarcane and rice.	Above ground parts. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Indonesia, Malaysia.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Pyralidae	*Acigona steniellus*	Gurdaspur borer (Pandley, Singh & Singh, 2020).	Sugarcane (Sallam, 2006).	Reported to damage the top internodes of sugarcane and to cause a reduction in cane length, stalk weight and sucrose (Pandley, Singh & Singh, 2020; Shyamrao & Kumar, 2020). [310]			India, Pakistan (Sallam, 2006).	LOW [311]	UNKNOWN	UNKNOWN	MEDIUM [312]	UNKNOWN
	Pyralidae	*Algedonia coclesalis*	Bamboo leaf roller	Bamboo, sugarcane.	Leaves. Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		China, India, Indonesia, Malaysia.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN

[310] Reported in Pakistan in 2020 as a destructive pest of sugarcane and to severely damage sugarcane stalks of elite early maturing varieties (Co 0238, 0118, CoS 08272 and UP 05125) and mid-late maturing varieties (CoS 08276 and CoS 08279). Early maturing varieties are reportedly less affected by this borer (Pandley, Singh & Singh, 2020).

[311] This species is not currently present in locations geographically close to Australia, being only reported in India and Pakistan (Sallam, 2006). Entry potential reduced considering the species is not found geographically close to Australia.

[312] Reported to damage the top internodes of sugarcane and to cause a reduction in cane length, stalk weight and sucrose (Pandley, Singh & Singh, 2020; Shyamrao & Kumar, 2020). Reported in Pakistan in 2020 as a destructive pest of sugarcane and to severely damage sugarcane stalks of elite early maturing varieties (Pandley, Singh & Singh, 2020).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Pyralidae	*Cryptoblabes gnidiella*	Citrus pyralid; Honeydew moth	Wide host range including *Saccharum officinarum* (sugarcane). [313]	Above ground plant parts (larvae). Minor impact.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Egypt, Liberia, Morocco, Nigeria, Sierra Leone, South Africa, Zimbabwe, India, Israel, Lebanon, Malaysia, Pakistan, Thailand, Turkey, Austria, Cyprus, France, Greece, Italy, Malta, Portugal, Spain, Ukraine, Bermuda, United States of America (Hawaii), New Zealand, Brazil, Uruguay.	MEDIUM	HIGH	HIGH	UNKNOWN	UNKNOWN
	Pyralidae	*Elasmopalpus lignosellus*	Lesser corn stalk borer	Wheat, oat, rye, peanut, pigeon pea, soybean, common bean, cotton, rice, sugarcane, cowpea, wheat, maize, sorghum, linseed (flax).	Although there is some foliar feeding by *E. lignosellus* caterpillars, the bulk of the damage is done by the larvae boring into stems and an infestation is difficult to detect externally at first. [314]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Barbados, Bermuda, Costa Rica, Cuba, El Salvador, Guatemala, Jamaica, Mexico, Nicaragua, Panama, Puerto Rico, Trinidad and Tobago, U.S. Virgin Islands, Virgin Islands, United States of America, Argentina, Bolivia, Brazil, Chile, Colombia, French Guiana, Guyana, Paraguay, Peru, Uruguay, Venezuela.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Pyralidae	*Eldana saccharina*	African sugarcane borer	*Cyperus* (flatsedge), *Cyperus alternifolius* (Umbrella flatsedge), *Cyperus digitatus*, *Cyperus papyrus* (papyrus), *Megathyrsus*	Females prefer to oviposit on dry dead leaves and this partly accounts for its tendency to infest mature crops. [315]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways		Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Congo, Democratic Republic of the, Congo, Republic of the, Côte d'Ivoire,	LOW	HIGH	HIGH	EXTREME	HIGH

[313] Additional hosts include: *Actinidia*, *Allium sativum* (garlic), *Annona muricata* (soursop), *Averrhoa*, *Citrus limon* (lemon), *Citrus reticulata* (mandarin), *Citrus sinensis* (sweet orange), *Citrus* x *paradisi* (grapefruit), *Coffea* (coffee), *Diospyros kaki* (persimmon), *Eriobotrya japonica* (loquat), *Fatsia japonica* (Japanese aralia), *Feijoa*, *Ficus*, *Gossypium* (cotton), *Gossypium hirsutum* (Bourbon cotton), *Khaya senegalensis* (dry zone mahogany), *Malus* (ornamental species apple), *Mangifera indica* (mango), *Mespilus* (medlar), *Morella faya* (firetree), *Morus alba* (mora), *Nephelium lappaceum* (rambutan), *Nerium oleander* (oleander), *Oryza sativa* (rice), *Osmanthus*, *Paspalum dilatatum* (dallisgrass), *Pennisetum* (feather grass), *Persea americana* (avocado), *Phaseolus* (beans), *Philodendron*, *Pinus pinea* (stone pine), *Prunus* (stone fruit), *Punica granatum* (pomegranate), *Pyrus* (pears), *Quercus* (oaks), *Ricinus communis* (castor bean), *Schinus terebinthifolius* (Brazilian pepper tree), *Solanum melongena* (aubergine), *Sorghum bicolor* (sorghum), *Swietenia* (mahogany), *Vitis vinifera* (grapevine), *Zea mays* (maize).

[314] Larvae mine or girdle stems of seedlings, causing wilt, death (up to six rice shoots per larva), perforation of leaves, and dead hearts (for maize and sorghum), and attack young shoots in burnt sugarcane fields. Larvae initially feed on leaves and pods, moving to lower stems and roots causing wilting, stunting and sometimes plant death.

[315] Eggs hatch after about 6 days and the young larvae feed externally on epidermal tissues before penetrating the stems and eating out galleries; the process of penetration of the stem is aided if there is a

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera				*maximus* (Guinea grass), *Oryza sativa* (rice), *Phragmites australis* (common reed), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Typha latifolia* (broadleaf cattail), *Zea mays* (maize).		for long distance spread.		Equatorial Guinea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Réunion, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe, Saudi Arabia.					
	Pyralidae	*Maliarpha separatella*	African white rice borer (Polaszek et. al, 1994).	Sugarcane, Rice (Polaszek et. al, 1994; Sallam, 2006). [316]				Africa, Indian Ocean Islands, Burma (Sallam, 2006). [317]	LOW [318]	UNKNOWN	UNKNOWN	LOW [319]	UNKNOWN
	Pyralidae	*Polyocha depressella* (syn. *Emmalocera depressella*)	Sugarcane root borer	Sugarcane.	Feeds on infests the root system of sugarcane (does not actually bore into roots). Heavy infestations can cause significant destruction.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Bangladesh, India, Pakistan.	LOW	HIGH	HIGH	EXTREME	HIGH

crack or other blemish, otherwise they may feed externally until the third instar. The length of larval development is very variable and may take up to two months, and larvae pupate in a silken cocoon within the stems, or else externally behind a leaf sheath. The larva makes an exit hole in the stem prior to pupation which often has a large amount of frass hanging from it (Bosque-Perez and Shulthess, 1998). *E. saccharina* is the most serious sugarcane pest in tropical and sub-tropical Africa, and in situations of high pest pressure total crop failure can result. Damage and consequent crop loss in sugarcane generally increases with crop age. Where crops can be harvested on a 12-month cycle, E. saccharina populations and damage tend to be low. Where crops are harvested on a longer cycle, serious crop loss can result. In Swaziland, King (1989) estimated that, on average, every 1% of internodes damaged resulted in 1% loss of sugarcane yield. In South Africa, every 1% of internodes bored results in estimated losses of between 1% and 2% of stalk sucrose content. In Zimbabwe, it was estimated that *E. saccharina* caused losses of 5000 tons of sugar annually. Sampson and Kumar (1985) showed that for every 1% increase in stalk damage there was a corresponding increase of 0.214% in internode damage; however, the damage arose not only from *E. saccharina* but also *Chilo zacconius* and *Sesamia* spp. An economic injury level (EIL) and economic threshold (ET) have been developed in South Africa based on using the synthetic pyrethroid alpha-cypermethrin (Leslie, 2009). EIL was estimated to be between 5.8% and 7.3% of internodes bored, and ET was estimated to be 2% internodes bored, assuming a 40% treatment efficacy.

[316] Reported to be almost exclusively a pest of cultivated rice (*Oryza sativa* and *O. glaberrima*) hence, based on this strong host preference, is unlikely to be a pest of major concern to sugarcane (Polaszek et. al, 1994). Sugarcane not a major host plant.

[317] May also be found in China but record is uncertain (Sallam, 2006).

[318] This species is not currently present in locations geographically close to Australia, being reported in Africa, Indian Ocean Islands, Burma (Sallam, 2006). Entry potential reduced considering the species is not found geographically close to Australia.

[319] Reported to be almost exclusively a pest of cultivated rice (*Oryza sativa* and *O. glaberrima*) hence, based on this strong host preference, is unlikely to be a pest of major concern to sugarcane (Polaszek et. al, 1994).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera	Pyralidae	*Raphimetopus ablutellus*	Green borer	Sugarcane.	Feeds on stem, roots. Has the potential to cause damage.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		India.	LOW	HIGH	HIGH	MEDIUM	LOW
	Saturniidae	*Automeris illustris*		Sugarcane, *Eucalyptus*.	Consumes leaves, can cause substantial defoliation if unmanaged.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Venezuela.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Sphingidae	*Leucophlebia lineata*	Large candy-striped hawkmoth	*Saccharum officinarum* (sugarcane), *Zea mays* (maize).	Leaves (larvae). Scale of impact unknown.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Pakistan, India, Sri Lanka, Nepal, Thailand, Cambodia, Vietnam, China, Hong Kong, Taiwan, Malaysia, the Philippines, Indonesia (Sumatra, Java, Kalimantan, Flores, Sulawesi).	MEDIUM	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Tineidae	*Neodecadarchis flavistriata*	Sugarcane bud moth	Sugarcane, banana, coconut, pineapple.	Shoots, stems, external feeding. Can cause minor impact.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		United States of America (Hawaii).	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Tineidae	*Opogona sacchari*	Banana moth	Wide host range including *Saccharum officinarum* (sugarcane).[320]	Stems, leaves, inflorescences (larvae). The early stages of larval tunnelling in woody or fleshy stems are practically undetectable. At a	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Cabo Verde, Madagascar, Mauritius, Morocco, Nigeria, Réunion, Saint Helena, Seychelles, South Africa, China, Israel, Japan, Cyprus, France, Germany, Italy, Netherlands, Poland,	HIGH	HIGH	HIGH	MEDIUM	MEDIUM

[320] Additional hosts include: *Alpinia*, *Ananas comosus* (pineapple), *Bambusa* (bamboo), *Begonia*, *Bougainvillea spectabilis* (great bougainvillea), Bromeliaceae, Cactaceae (cacti), *Capsicum* (peppers), *Chamaedorea*, *Chamaedorea elegans* (parlour palm), *Dieffenbachia* (dumbcanes), *Dioscorea* (yam), *Dracaena*, *Eucalyptus* spp., *Euphorbia pulcherrima* (poinsettia), *Ficus*, *Heliconia*, *Hippeastrum*, *Maranta* (arrowroot), *Musa* (banana), *Philodendron*, Polyphagous (polyphagous), *Saintpaulia* (african violet), *Sansevieria* (snake plant), *Sinningia speciosa* (gloxinia), *Solanum melongena* (aubergine), *Strelitzia*, *Yucca*, *Zea mays* (maize).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Lepidoptera					later stage, fleshy plants (e.g. cacti) may be completely hollowed out. [321]			Portugal, Russia, Spain (Canary Islands), Switzerland, United Kingdom, Barbados, Bermuda, Guadeloupe, Honduras, United States of America (Florida, Hawaii), Brazil, Peru, Venezuela.					
	Tortricidae	*Archips fuscocupreanus*	Exotic leafroller moth; apple tortrix	Wide host range. [322]	Larvae feed on leaves, flowers, and occasionally fruit. There are two types of symptoms: feeding damage to the leaves, blossoms and developing fruit caused by the larvae; and the more characteristic folded or rolled damage to leaves and flower parts, caused when the larvae make shelters using silk.	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Japan, North Korea, South Korea, Russia, United States of America.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN

[321] In woody plants such as *Dracaena* and *Yucca* the larvae live on dead and living portions of the cortex and pith, and infested tissues may feel soft. Leaves may wilt because the caterpillars destroy the xylem and, in advanced stages, leaves may fall and th eplant may collapse.

[322] Hosts include: *Acer rubrum* (red maple), *Acer saccharum* (sugar maple), *Amelanchier alnifolia* (saskatoon serviceberry), *Amelanchier arborea* (Downy serviceberry), *Amelanchier canadensis* (thicket serviceberry), *Amelanchier laevis* (Allegheny serviceberry), *Aronia arbutifolia* (red chokeberry), *Beta vulgaris* (beetroot), *Carpinus betulus* (hornbeam), *Castanea sativa* (chestnut), *Celastrus orbiculatus* (Asiatic bittersweet), *Chaenomeles japonica* (Japanese quince), *Cornus* (Dogwood), *Cornus racemosa* (gray dogwood), *Cornus sericea* (redosier dogwood), *Corylus cornuta* (beaked hazel), *Crataegus* (hawthorns), *Crataegus crus-galli* (Cockspur hawthorn), *Crataegus magniflora*, *Crataegus nuda*, *Crataegus pedicellata*, *Crataegus scabrida*, *Crataegus viridis*, *Cudrania tricuspidata*, *Cydonia oblonga* (quince), *Diospyros* (malabar ebony), *Elaeagnus umbellata* (autumn olive), *Fragaria* (strawberry), *Fraxinus americana* (white ash), *Ilex verticillata* (common winterberry (USA)), *Juglans regia* (walnut), *Ligustrum acutissimum*, *Ligustrum vulgare* (common privet), *Linum usitatissimum* (flax), *Lonicera* (honeysuckles), *Lonicera caerulea*, *Lonicera fragrantissima*, *Lonicera japonica* (Japanese honeysuckle), *Malus* (ornamental species apple), *Malus baccata* (siberian crab apple), *Malus bracteata*, *Malus dawsoniana*, *Malus domestica* (apple), *Malus glabrata*, *Malus hupehensis* (hupeh crab-apple), *Malus ioensis* (prairie crab-apple), *Malus prunifolia* (plum-leaved crab apple), *Malus purpurea*, *Malus sikkimensis*, *Malus sublobata*, *Malus sylvestris* (crab-apple tree), *Malus toringo* (toringo crab-apple), *Malus toringoides*, *Malus yunnanensis*, *Malus zumi*, *Medicago sativa* (lucerne), *Morus alba* (mora), *Photinia villosa*, *Populus tremuloides* (trembling aspen), *Potentilla* (Cinquefoil), *Prunus armeniaca* (apricot), *Prunus avium* (sweet cherry), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus hillieri*, *Prunus laurocerasus* (cherry laurel), *Prunus maritima* (beach plum), *Prunus nigra* (Canada plumtree), *Prunus padus* (bird cherry), *Prunus pensylvanica* (pin cherry), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Prunus serotina* (black cherry), *Prunus serrulata* (Japanese flowering cherry), *Prunus verecunda*, *Prunus virginiana* (common chokecherrytree), *Prunus yedoensis*, *Pyrus calleryana* (bradford pear), *Pyrus communis* (European pear), *Pyrus dimorphophylla*, *Pyrus salicifolia* (willow-leaved pear), *Pyrus ussuriensis* (amur pear), *Rhododendron* (Azalea), *Ribes oxyacanthoides* (Northern gooseberry), *Ribes setosum*, *Ribes uva-crispa* (gooseberry), *Rosa* (roses), *Rosa multiflora* (multiflora rose), *Rosa rugosa* (rugosa rose), *Rubus idaeus* (raspberry), *Rumex crispus* (curled dock), *Salix bebbiana* (Bebb willow), *Solidago* (Goldenrod), *Sorbus forrestii*, *Sorbus yuana*, *Spiraea alba* (Narrowleaf meadowsweet), *Syringa julianae*, *Syringa oblata*, *Syringa villosa* (late lilac), *Toxicodendron radicans* (poison ivy), *Trifolium* (clovers), *Viburnum nudum* (possumhaw viburnum (USA)), *Sorbaronia alpina*.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
	Tortricidae	*Tetramoera schistaceana*	Grey borer of sugarcane	*Saccharum* spp., *Cyperus rotundus*, Poaceae spp.	On growing cane, young *T. schistaceana* larvae may feed from a scratch up to 1 cm long which they make on the surface of the bud or root band of a node, before entering the internode.[323, 324]	Flying (adults) allows for local dispersal. Introduction (regulated or unregulated pathways) of infested plants, plant products are the most likely pathways for long distance spread.		Madagascar, Mauritius, Réunion, China, Indonesia, Japan, Malaysia, Philippines, Sri Lanka, Taiwan, Vietnam.	MEDIUM	HIGH	HIGH	MEDIUM[325]	MEDIUM
Orthoptera													
Orthoptera	Acrididae	*Acrida cinerea*	Oriental longheaded grasshopper/ locust	Sugarcane, cotton, sweet potato, rice, millet, Poaceae sp.	Leaves, stem. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		China, Hong Kong, Japan, Macau, Mongolia, South Korea, Taiwan.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Acrididae	*Amblytropidia trinitatis* (syn. *Amblytropodia pulchella*)		Sugarcane.	Leaves, stem. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Trinidad and Tobago.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Acrididae	*Atractomorpha crenulata*	Tobacco grasshopper	Maize, cowpea, capsicum, rice, sunflower, sugarcane.	Leaves, stem. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Pakistan, India, Sri Lanka, Bangladesh, Myanmar, Vietnam, Indonesia.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Acrididae	*Chondracris rosea*	Citrus locust	Citrus, soybean, cotton, rice, sugarcane, maize, peanut, sweet potato.	C. rosea can cause considerable damage to sugarcane by stripping the	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		China, Hong Kong, Indonesia, Japan, Laos, Malaysia, Pakistan, Philippines, South Korea, Taiwan, Thailand, Vietnam.	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW

[323] A fine, straight, red line, starting from this damaged site, develops inside the internode as the result of infection by micro-organisms entering the wound. This coloration becomes more significant as time passes, as does the reduction in sugar content. However, the feeding track and colour change do not often cross to the next internode.

[324] At the young cane stage, *T. schistaceana* larvae hatch from the eggs, crawl down and enter the underground portion of a shoot, leaving a tiny hole at the entry site. After getting into the shoot, the larvae construct an ascending spiral gallery and damage the growing point by severing the leaf bases from the growing point, resulting in dead heart which becomes evident when the leaves open.

[325] In August 2024, the Sugarcane Technical Review Panel advised a rating change from LOW to MEDIUM as this species can be very destructive to young plant cane (as recently observed in Indonesia). This species has been categorised as an early shoot borer (ESB); attacking early growth period sugarcanes as well as mature crops (Wijayanti & Asbani, 2021). Substantial losses due to *T. schistaceana* have been reported in China (Wijayanti & Asbani, 2021).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Orthoptera					leaves. [326]								
	Acrididae	*Gastrimargus marmoratus* (syn. *Gastrimargus transversus*)	Short-horned grasshopper	Sugar, cereals, millet, rice.	Consumes leaves, considered a pest for multiple agricultural industries; scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Indonesia, Malaysia, South East Asia and Southern Africa.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Acrididae	*Hieroglyphus banian*	Rice grasshopper	*Cajanus cajan* (pigeon pea), *Dactyloctenium aegyptium* (crowfoot grass), *Lens culinaris* subsp. *culinaris* (lentil), *Oryza sativa* (rice), *Panicum miliaceum* (millet), *Pennisetum glaucum* (pearl millet), *Pennisetum purpureum* (elephant grass), *Pisum sativum* (pea), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Zea mays* (maize).	Leaves, ears (i.e. florets, stalks causing 'white ears' and grains). The leaves are completely eaten by nymphs and adults, leaving the midrib and stalk. In the ear head stage, the adults attack the ears, nibble at the tender florets or gnaw into the base of the stalks, leading to the formation of 'white ears' (Pradhan, 1983). [327]	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Bangladesh, Cambodia, China, India, Laos, Myanmar, Pakistan, Sri Lanka, Thailand, Vietnam.	LOW	HIGH	HIGH	MEDIUM	LOW
	Acrididae	*Hieroglyphus nigrorepletus*	Phadka grasshopper	Sugarcane, rice, millet, wheat, maize.	Consumes leaves, considered a pest for multiple agricultural industries; capable of minor damage.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		India.	LOW	HIGH	HIGH	MEDIUM	LOW
	Acrididae	*Neorthacris simulans*	Grasshopper	Sugarcane.	Consumes leaves, can cause minor damage.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		India.	LOW	MEDIUM	MEDIUM	LOW	VERY LOW

[326] According to Sonan (1940) C. rosea appears to be commonest in and around areas of small cultivation usually of graminaceous crops such as sugarcane and maize. It has also been recorded causing serious damage to citrus and hemp in Taiwan. Zhang et al. (1993) studied C. rosea in Wuhe county, Anhui in China and regard it as an important agricultural pest infesting soyabean, cotton, rice and sweet potato.

[327] Vigorous feeding by both nymphs and adults reduces the plants to bare stems; plant growth is arrested and the stems become thin. During serious infestation, the majority of plants do not produce grains. As well as direct damage by feeding, the grasshoppers deposit faeces on the leaf surface; fungi colonize the rotting faeces so that many plants become black. *H. banian* causes serious damage to its host crops, in particular to rice, jowar (sorghum), bajra (millet), maize and sugarcane. H. banian not only feeds on the leaves of the crop, but also damages tender ear heads, feeds on juicy grains, and cuts the stalks so that the ear heads fall. This aggravates the damage caused, leading to further losses in yield.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Orthoptera	Acrididae	*Nomadacris septemfasciata*	Red locust	*Citrus*, *Coffea* (coffee), *Eleusine coracana* (finger millet), *Gossypium herbaceum* (short staple cotton), *Manihot esculenta* (cassava), *Nicotiana tabacum* (tobacco), *Oryza sativa* (rice), Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Zea mays* (maize).	Above ground plant parts (typically leaves and seed heads). [328]	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Angola, Botswana, Burundi, Cabo Verde, Cameroon, Chad, Comoros, Congo (DRC), Eswatini, Ethiopia, Gabon, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Nigeria, Réunion, Rwanda, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe.	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
	Acrididae	*Oedaleus senegalensis*	Senegalese grasshopper	*Arachis hypogaea* (groundnut), *Medicago sativa* (lucerne), *Oryza sativa* (rice), *Pennisetum glaucum* (pearl millet), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Triticum aestivum* (wheat), *Vigna unguiculata* (cowpea), *Zea mays* (maize).	Above ground plant parts (typically leaves and seed heads). Damage to leaves and seed heads is characteristic of external chewing insects and there are no particular signs that would distinguish O. senegalensis damage from that of other acridids.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Algeria, Burkina Faso, Cabo Verde, Chad, Ethiopia, Guinea, Mali, Mauritania, Morocco, Niger, Nigeria, Senegal, Somalia, Sudan, Tanzania, Tunisia, Afghanistan, Bahrain, Georgia, India, Iran, Iraq, Jordan, Kuwait, Oman, Pakistan, Qatar, Saudi Arabia, Syria, Tajikistan, Turkmenistan, Yemen, Spain.	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
	Acrididae	*Orphulella punctata*	Locust	Coffee, cassava and Poaceae including rice and sugarcane.	Above ground parts. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		British Virgin Islands, Haiti, Mexico, Montserrat, Puerto Rico, Trinidad and Tobago.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Acrididae	*Oxya chinensis*	Rice grasshopper	Rice, cotton, millet, sorghum, wheat, maize, sugarcane.	*O. chinensis* feeds on tender rice leaves in the rice field, causing leaf damage. [329]	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Bangladesh, China, India, Indonesia, Malaysia, North Korea, Pakistan, South Korea, Thailand, United States of America.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN

[328] Symptoms are not very specific, and they depend on the type of plant/tree attacked and the degree of hunger of the pest. The leaves are usually the first plant parts to be attacked, and these can be chewed almost completely or if they are rather hard, the major veins, especially the mid ribs, are left (Lea, 1938). In cereals, varying proportions of the ripening grains are chewed back. When hungry, the locusts may chew stems and bark.
[329] Sometimes also affects the stem and ear of sugarcane.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Orthoptera	Acrididae	*Patanga succincta*	Bombay locust	Pigeon pea, tobacco, sugarcane, sorghum and maize.	Above ground parts. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		China, Hong Kong, India, Japan, Laos, Taiwan, Thailand, Vietnam.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Acrididae	*Schistocerca americana*	South American locust; American bird locust	Brassicaceae (cruciferous crops), *Citrus*, *Gossypium* (cotton), *Ipomoea batatas* (sweet potato), *Oryza sativa* (rice), *Phaseolus* (beans), *Pinus taeda* (loblolly pine), Poaceae (grasses), *Saccharum officinarum* (sugarcane), *Zea mays* (maize), oats, peanut, cereal rye.	Above ground parts. Scale of impact unknown	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		United States of America, Mexico, the Bahamas.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Acrididae	*Schistocerca cancellata*	South American locust	Cotton, sugarcane, maize, Brassicas, grasses.	Can form large swarms and disrupt production for sugarcane crops.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Puerto Rico, Argentina, Guyana, Paraguay, Peru, Venezuela.	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
	Acrididae	*Schistocerca gregaria*	Desert locust	Brassicas, cotton, sweet potato, rice, beans, citrus, sugarcane and maize.	Desert locust swarms can devastate any vegetation completely and	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Wide geographic range. [331]	LOW	HIGH	HIGH	MEDIUM	LOW

[331] Geographic range includes: Algeria, Benin, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Congo, Djibouti, Egypt, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Kenya, Libya, Mali, Mauritania, Mauritius, Morocco, Namibia, Niger, Nigeria, Senegal, Somalia, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Western Sahara, Afghanistan, Armenia, Bahrain, China, India, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Nepal, Oman, Pakistan, Saudi Arabia, Syria, Tajikistan, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan, Yemen, France, Greece, Italy, Malta, Portugal, Spain, United Kingdom, Venezuela.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Orthoptera					debark trees. [330]								
	Acrididae	*Schistocerca nitens*	Gray bird grasshopper; vagrant grasshopper	*Ananas comosus* (pineapple), Caryophyllaceae, *Casuarina* (beefwood), Chenopodiaceae, Euphorbiaceae, Fabaceae (leguminous plants), *Helianthus* (sunflower), Malvaceae, *Manihot esculenta* (cassava), Poaceae (grasses), *Pritchardia remota* (Remota loula palm), *Saccharum officinarum* (sugarcane), *Schinus* (pepper tree), *Vitis vinifera* (grapevine), *Zea mays* (maize).	Grasshoppers and locusts destroy an estimated 21 to 23% of range forage in western North American grasslands (Hewitt and Onsager, 1982; Rivera-Garcia, 1986; Branson, 2006). [332]	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		United States of America, Hawaii, Mexico, Central America, Colombia, Venezuela, Brazil, Peru, Bolivia, Argentina, Caribbean.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN

[330] Swarms are visible from a distance. In flight, when the density is high, they can give the impression of a sand wind masking the horizon for several dozen metres. When they land, the vegetation takes on a reddish or yellowish colour (immature vs mature swarms). High density hopper bands can often be spotted from the air and leave behind a sparse vegetation area. Desert locust is probably the oldest and most dangerous migratory pest globally. The magnitude of plagues and destruction they cause are due to exceptional gregariousness, mobility, voracity and size of hopper bands and swarms. When they rise to upsurge or plague levels, these desert locust outbreaks can be absolutely devastating, resulting in severe effects on national and regional food security and agricultural and agro-pastoral livelihoods of affected communities, particularly the poorest (Lecoq, 2019; USAID, 2020). The damage is often difficult to estimate, sometimes diffuse and not very obvious, but very serious in much smaller areas. In some countries, locusts are the determining factor between sufficient food for the people and starvation. A few figures related to the great invasions of the past (before the 1960s) include 7 million grapevines in Libya in 1944, 55,000 tonnes of grain in Sudan in 1954, vines and citrus destroyed in Morocco in 1954-1955, 6000 tonnes of oranges in Guinea in 1957, 167,000 tonnes of grain (enough to feed 1,000,000 people for a year) in Ethiopia in 1958, 4000 ha of cotton in India in 1962 (Steedman, 1990). This gives an idea of the magnitude of the threat when these invasions cannot be contained at an early stage. In recent years, damage caused by the desert locust has been better estimated (Brader et al., 2006). The 2003-2005 upsurge, for example, was conservatively assessed to have inflicted an average crop loss of ≈30% (Belayneh, 2005; Brader et al., 2006; Showler, 2018). In some countries, Burkina Faso, Mali and Mauritania, in 2004, crop losses of >80% have been recorded (Brader et al., 2006). Globally, in West Africa, more than 8 million people were affected, and up to 100% of cereal crops were lost in some areas (Cressman, 2021). In addition to this damage, there is the cost of control operations implemented to protect the crops locally, which will also help to stop the spread of the invasion, which could otherwise continue for many years and over larger areas. The 1986-1989 invasion, covering a large part of Africa and southwest Asia resulted in an area of 16.8 million hectares being treated and the total costs of the campaign may be estimated at about US $400 million (Brader et al., 2006). The major regional plague occurred in 2003-2005 required nearly USD 600 million (countries and donors) and 13 million L of insecticide sprayed by ground and aerial campaigns to bring the plague under control (FAO, 2017; Cressman, 2021). Accurate estimates of the benefits of control are hardly feasible (Showler, 2018; Showler et al., 2021). The total cash value of the crop damage may be modest by most standards, but even modest amounts of total damage may be very severe in some localities and cause disruptions in the local economy. In farming systems where >90% of the crops are produced for the personal subsistence of farmers, the use of simple cost-benefit ratios based on the market value of the crops can be difficult to apply in the case of a migratory pest. Indeed, desert locust is a transboundary pest, and for this highly mobile species the burden of control may fall on one country whereas the benefits may be accrued somewhere else completely (Lomer et al., 2001) or delayed in time as a longer invasion may have been avoided. In addition, because of public pressure desert locusts will be controlled, irrespective of the costs and benefits. Furthermore, damage is not limited to crops but must also incorporate the multiple social and environmental consequences of invasions, now better understood and considered, even if they are difficult to estimate.

[332] They cause a significant impact to the grazing industry from feeding, especially during droughts when forage is scarcer. Population outbreaks result in mass migrations from wild rangeland to adjacent cropland. At present, *S. nitens* impact has not been estimated in areas where it causes problems. After an outbreak occurs, the vegetation recovers relatively fast. S. nitens was found associated with sugarcane smut (fungus) whips in Hawaii where the grasshopper was common in infected fields and contained large quantities of spores (Bowler et al., 1977). Sugarcane harvest could force displaced insects to invade new areas and thereby possibly spread sugarcane smut whips.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Orthoptera	Acrididae	*Schistocerca nitens* sub. Columbina (syn. *Schistocerca columbina*)	Locust	Brassicas, cotton, sweet potato, rice, beans, citrus, sugarcane and maize.	Above ground parts. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Jamaica.	LOW	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Acrididae	*Valanga nigricornis*	Valanga grasshopper; Javanese grasshopper	Rice, sugarcane, maize, *Acacia mangium*.	Above ground plant parts (stem and leaves).	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Brunei, Cambodia, Indonesia, Malaysia, Papua New Guinea, the Philippines, Singapore, the Solomon Islands, Thailand, Vietnam, Australia (Christmas Island only), Guam, India, Micronesia, Palau.	HIGH	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Gryllotalpidae	*Neocurtilla hexadactyla*	Northern mole cricket	*Phaseolus* (beans), *Saccharum officinarum* (sugarcane), *Solanum lycopersicum* (tomato), *Vigna unguiculata* (cowpea), *Zea mays* (maize).	Typically nest below the surface (sub-terranean) and feed on available plant parts (roots). Scale of impact unknown.	Capable of limited flight light. Movement of contaminated soil (egg pods) may facilitate spread.		Canada (eastern), United States of America, Bolivia, Brazil, Colombia, Ecuador, Peru, French Guiana, Panama, Nicaragua, Caribbean.	LOW	MEDIUM	LOW	UNKNOWN	UNKNOWN
	Gryllotalpidae	*Neoscapteriscus variegatus*	Mole cricket	Tomato, sugarcane and maize.	Typically nest below the surface (sub-terranean) and feed on available plant parts (roots). Scale of impact unknown.	Capable of limited flight light. Movement of contaminated soil (egg pods) may facilitate spread.		Barbados.	LOW	MEDIUM	LOW	UNKNOWN	UNKNOWN
	Tettigoniidae	*Bucrates capitata*	Gray katydid grasshopper	Poaceae including sugarcane.	Above ground parts. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Venezuela.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Orthoptera	Tettigoniidae	*Conocephalus saltator*	Longhorned grasshopper; Katydid	*Glycine max* (soybean), *Oryza sativa* (rice), maize, sugarcane, pineapples.	Typically eat small insects where available and return to ancestral diet where small insects are not available, eating plants (leaves, fruit, inflorescences). Grasshoppers may nest and breed in the plants also. Ovipositor puncturing may allow pathways for rot to establish.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Caribbean, Central America, South America, Hawaii.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Tettigoniidae	*Neoconocephalus maxillosus*	Caribbean conehead; Longhorned grasshopper	Rice, sugarcane, Poaceae.	Above ground parts. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Barbados, Jamaica, Guyana.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Tettigoniidae	*Neoconocephalus triops*	Longhorned grasshopper	Poaceae including sugarcane.	Above ground parts. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Barbados, Bermuda, Mexico, United States of America, Venezuela.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Tettigoniidae	*Phlugis teres*	Katydid	Rice, soybean, sugarcane, banana.	Leaves, stem. Scale of impact unknown.	Capable of flight which facilitates local/regional dispersal. Movement of contaminated soil (egg pods) may facilitate spread.		Trinidad and Tobago, Suriname, Venezuela.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Psocoptera													
Psocoptera	Caeciliusidae	*Stenocaecilius casarum* (syn. *Caecilius casarum*)	Lizard barklouse; Bark lice	Poaceae spp inc. sugarcane.	Unknown impact.	Crawl.		Mozambique, Tanzania, Bermuda Islands, USA, Guatemala, Mexico, Panama, Chile, Guianas, Venezuela, Indonesia, New Guinea, Easter Island, Hawaii, Melanesia, Micronesia (http://psocodea.speciesfile.org). New record for Tanzania.	LOW	LOW	LOW	UNKNOWN	UNKNOWN
Thysanoptera													
Thysanoptera	Phlaeothripidae	*Haplothrips aculeatus*	Grass thrips	Wide host range including *Saccharum officinarum* (sugarcane).[333]	Affected plant parts include leaves and stems.	Adults with functional wings can disperse via wind-assisted flight. Pathway for long distance dispersal is most likely infested plants and plant products.		Bangladesh, China, Iran, Japan, North Korea, South Korea, Turkey, Vietnam, Belarus, Croatia, Czechia, Finland, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Slovakia, Slovenia, Spain, Sweden, United Kingdom, United States of America.	MEDIUM	MEDIUM	HIGH	MEDIUM	LOW
Thysanoptera	Phlaeothripidae	*Haplothrips ganglbaueri*	Thrips	Poaceae spp, inc. millet, sugarcane.	Affected plant parts include leaves. Scale of impact unknown.	Adults with functional wings can disperse via wind-assisted flight. Pathway for long distance dispersal is most likely infested plants and plant products.		India, Pakistan, Sri Lanka, Philippines.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN

[333] Additional hosts include: Alopecurus arundinaceus, Avena sativa (oats), Brassica oleracea var. alboglabra (Chinese kale), Chrysanthemum segetum, Cyperus rotundus (purple nutsedge), Daucus carota subsp. sativus, Fragaria ananassa (strawberry), Gossypium (cotton), Hordeum vulgare (barley), Juncus (rushes), Lupinus angustifolius (narrow-leaf lupin), Lygeum spartum, Oryza sativa (rice), Panicum (millets), Panicum miliaceum (millet), Phalaris brachystachys (short-spiked canarygrass), Phragmites australis (common reed), Secale cereale (cereal rye), Sorghum halepense (Johnson grass), sorghum, Trifolium pratense (red clover), Trifolium repens (white clover), Triticale, Triticum (wheat), Triticum aestivum (wheat), Typha (reedmace), Zea mays (maize).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential 112	Spread potential	Economic impact	Overall risk rating
Thysanoptera	Thripidae	*Anaphothrips sudanensis*	Thrips	Sugarcane, capsicum, rice, wheat, maize, garlic.	Affected plant parts include leaves.	Adults with functional wings can disperse via wind-assisted flight. Pathway for long distance dispersal is most likely infested plants and plant products.		India, China, Iraq, Taiwan, Philippines, Jamaica, Mexico.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Thripidae	*Florithrips traegardhi*	Ber leaf thrips	Amaranthus, Phaseolus (beans, common bean), capsicum, cashew, peanut, granate apple, kale, maize, millet, onion, rice, sorghum, sugarcane, tomato, wheat.	Affected plant parts include leaves, leaf sheaths and ears.	Adults with functional wings can disperse via wind-assisted flight. Pathway for long distance dispersal is most likely infested plants and plant products.		India, Yemen, Egypt, Kenya, Morocco, Senegal, Sudan, Iran, Bangladesh.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN
	Thripidae	*Fulmekiola serrata*	Oriental sugar cane thrips [334]	Sugarcane, tobacco.	The sugarcane thrips lacerates the leaf tissues of sugarcane with its sucking mouthparts and imbibes the plant sap, usually from the top section of the young leaf (Chatterjee and Roy, 1982). [335]	Adults with functional wings can disperse via wind-assisted flight. Pathway for long distance dispersal is most likely infested plants and plant products.		Mauritius, South Africa, Bangladesh, China, India, Indonesia, Japan, Malaysia, Pakistan, Philippines, Taiwan, Vietnam, Antigua and Barbuda, Barbados, Cuba, Dominica, Guadeloupe, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States, Guyana.	HIGH [336]	HIGH	HIGH	LOW [337]	LOW
	Thripidae	*Heterotermes philippinensis*	Philippine subterranean termite	Sugarcane, maize, ginger, colver, potato, cocoa, black pepper, pineapple, coconut, curcubits.	Affected plant parts include stem and roots. Scale of impact unknown.	Adults with functional wings can disperse via wind-assisted flight. Pathway for long distance dispersal is most likely infested plants and plant		Philippines. Madagascar, Mauritius.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN

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335 In cases of severe infestation, the upper half of the leaf turns dark red. The damaged leaf become distorted and dies, and the plant becomes stunted (Chatterjee and Roy, 1982). The effects of damage are mainly expressed on young canes; *F. serrata* may cause growth retardation and unhealthiness during drier periods. The damaged central leaf roll shows yellowish-white blotches when it unfurls. Afterwards, the blotches turn light or dark yellow and become irregular patches or stripes, which may cover most of a seriously damaged leaf. These patches and stripes turn brown or brownish-red and eventually the leaf turns greyish-white and dies. The damaged top section of the leaf becomes yellowish-brown or purplish-red and curls inwards longitudinally. The curled leaf and the rolled central leaf may twist together.

336 Wide distribution including China, Indonesia, India, Japan, Malaysia, Taiwan, Vietnam, Mauritius, South Africa.

337 Lacerates the leaf tissues of sugarcane with its sucking mouthparts and imbibes the plant sap, usually from the top section of the young leaf, causing leaf necrosis, leaf twisting and reduced cane growth. Greater damage in young canes. Yield losses up to 26% have been recorded (Way et. al, 2010).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [112]	Spread potential	Economic impact	Overall risk rating
Thysanoptera						products.							
	Thripidae	*Stenchaetothrips minutus*	Common thrip	Sugarcane.	Affected plant parts include leaves. Can have a significant impact.	Adults with functional wings can disperse via wind-assisted flight. Pathway for long distance dispersal is most likely in infested plants and plant products.		India, Japan.	MEDIUM	MEDIUM	HIGH	UNKNOWN	UNKNOWN

Pathogens

Table 18. *Pathogen Threat Summary Table.*

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
	Bacteria												
Bacteria	Enterobacteriaceae	*Enterobacter cloacae* subsp. *dissolvens* (syn. *Enterobacter dissolvens*, *Erwinia dissolvens*)	Bacterial stalk rot	Maize, sorghum, pearl millet, sugarcane, tobacco.	Affected plant parts include the stalk. Impact is stalk rot.	Local/regional movements may be due to the movement of residues/aerosols from infested fields. Soil, crop residues, and/ or infected plants are the most likely pathway for long distance dispersal.		India, Bulgaria, Spain, Canada, United States of America, Mexico, Egypt, China, Malaysia, Nigeria, Japan, Indonesia, Dominican Republic.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Bacteria	Erwiniaceae	*Pantoea agglomerans* (exotic strains)	Bacterial grapevine blight	Wide host range including *Saccharum officinarum* (sugarcane).[339]	Can cause significant damage to root, stems (rot), leaves (blight), seed, grains, residues.	Local/regional movements may be due to the movement of plants, plant material (fruit, seed), soil or residues/dust. Plants and plant products (e.g. grains, residues/dust) are the most likely pathway to disperse the bacteria long distances.		China (Beijing, Guangdong, Jilin, Shandong, Sichuan), Israel, Saudi Arabia, Austria, Germany, Italy, Poland, United Kingdom, Barbados, Cuba, United States of America, Mexico, New Zealand, Brazil, Venezuela, Spain, India, Canada, South Africa, Japan, France, Iran.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Bacteria	Microbacteriaceae	*Clavibacter michiganensis* subsp. *Nebraskensis*	Goss's bacterial wilt & leaf blight	Poaceae including sorghum, maize and sugarcane.	Pale greenish-yellow stripes (occasionally reddish depending on cultivar) with wavy and irregular margins occur following the leaf veins of infected maize	Vectors can naturally disperse bacteria over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal. Spores may be spread locally by wind, rain. The movement of infected plants and/or		Canada, United States of America.	LOW	UNKNOWN [342]	UNKNOWN	LOW	UNKNOWN

[338] Establishment potential.

[339] Additional hosts include: *Abelmoschus esculentus* (okra), *Allium sativum* (garlic), *Ananas comosus* (pineapple), *Carthamus tinctorius* (safflower), Citrus, *Daucus carota* (carrot), *Glycine max* (soybean), *Gossypium* (cotton), *Hordeum vulgare* (barley), *Impatiens balsamina* (garden balsam), *Juglans regia* (walnut), *Lathyrus odoratus* (sweet pea), *Malus domestica* (apple), *Mangifera indica* (mango), *Manihot esculenta* (cassava), *Morus* (mulberrytree), *Nicotiana tabacum* (tobacco), *Oryza sativa* (rice), *Pennisetum glaucum* (pearl millet), *Pyrus communis* (European pear), *Setaria italica* (foxtail millet), *Solanum lycopersicum* (tomato), *Solanum tuberosum* (potato), *Sorghum bicolor* (sorghum), *Tagetes erecta* (Mexican marigold), *Trifolium* (clovers), *Vitis vinifera* (grapevine), *Wisteria brachybotrys* (silky wisteria), *Wisteria floribunda* (Japanese wisteria), *Zea mays* (maize).

[342] The pathogen overwinters on infested crop residue in all plant parts including roots, stems and leaves (Gross and Vidaver, 1979).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
					plants. [340]	vectors could facilitate long distance dispersal. Spores may be spread locally by wind, rain. [341]							
Bacteria	Pseudomonadaceae	*Pseudomonas desaiana* (syn. *Burkholdia desaiana*)	Stinking rot	*Saccharum* spp.	Affected plant parts include the stem. Impact is stem rot.	Vectors can naturally disperse bacteria over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal. Spores may be spread locally by wind, rain.		India.	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN
	Pseudomonadaceae	*Pseudomonas syringae* pv. *Lapsa*	Bacterial stalk rot	Maize, sorghum, wheat, sugarcane.	Affected plant parts include stem, leaves, glumes, seed.	Local/regional movements may be due to the movement of seed, plants, soil or residues, aerosols from infested fields. Soil, crop residues, and/or infected plants or seeds are the most likely pathway for long distance dispersal.		Egypt, Nigeria, China, India, Iran, Pakistan, Germany, United States of America.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

[340] Pale greenish-yellow stripes (occasionally reddish depending on cultivar) with wavy and irregular margins occur following the leaf veins of infected maize plants. Discrete lesions, containing water-soaked streaks (freckles), appear parallel to the veins on leaves and are characteristic of the disease. Droplets of bacterial exudate may appear on the lesion surface. The spots are dark green to blackish in appearance and may result from direct infection of old or young leaves, or via the roots or stems of young plants. Early infection may cause seedlings to wilt, wither and die. Eventually, coalescence of stripes results in a leaf scorch reminiscent of drought effects (Schuster, 1975).

[341] *C. nebraskensis* is a seedborne bacterium. It has been detected in seeds, both externally and internally, and may be found in the vicinity of the endosperm, scutellum and embryo. The concentration of bacteria was greatest at the base of the kernel. Vectors can naturally disperse bacteria over short distances.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Bacteria	Xanthomonadaceae	*Xanthomonas albilineans* (exotic strains- serological groups 2 or 3)	Leaf scald	*Saccharum* spp.	Partial or total chlorosis of leaves occurs and is accompanied by an inward curling of the leaves (scalding). Affected stalks may be stunted with the development of axillary buds (side shoots) bearing symptoms of the chronic phase. [343]	Local/regional movements may be due to the movement of seed, plants, soil or residues/aerosols from infested fields. Soil, crop residues, and/or infected plants or seeds are the most likely pathway for long distance dispersal.		Wide geographic range. [344]	HIGH	HIGH	HIGH	HIGH	HIGH
Bacteria	Xanthomonadaceae	*Xanthomonas axonopodis* pv. *vasculorum*	Sugarcane gumming disease	*Saccharum* complex species, *Zea mays*, *Dictyosperma album*, *Roystonea regia*, *Areca cathecu*, *Thysanolaena maxima*, *Tripsacum fasciculatum*.	Affected plant parts include leaves and stem.	Local/regional movements may be due to the movement of seed, plants, soil or residues/aerosols from infested fields. Soil, crop residues, and/or infected plants or seeds are the most likely pathway for long distance dispersal.		Wide geographic range. [345]	LOW	HIGH	HIGH	HIGH [346]	MEDIUM

[343] Foliar infection induced by airborne inoculum of *X. albilineans* is characterized by cream to yellow stripes starting at the tip or occasionally the margin of the leaf. Three phases are associated with the symptomatology of the disease: latent, chronic and acute phases. Latent infection or the absence of symptoms is a characteristic feature of the disease which occurs in tolerant varieties and under favourable conditions for plant growth. In the chronic phase, a typical white pencil-line stripe (1-2 mm wide) runs from several centimetres to almost the entire length of the leaf. At a later stage, the sharp margins of the stripe may become diffuse, and a red pencil line may be formed in the middle of the stripe. Partial or total chlorosis of leaves occurs and is accompanied by an inward curling of the leaves (scalding). Affected stalks may be stunted with the development of axillary buds (side shoots) bearing symptoms of the chronic phase. A longitudinal section of the stalk shows a reddish discoloration of the vascular bundles, particularly at the nodes. As the disease progresses, lysogenous cavities may be formed and the stalk dies. In the acute phase of the disease, sudden plant death occurs with few or no symptoms.

[344] Geographic range includes: Benin, Burkina Faso, Cameroon, Chad, Congo, Côte d'Ivoire, Eswatini, Gabon, Ghana, Kenya, Madagascar, Malawi, Mauritius, Morocco, Mozambique, Nigeria, Réunion, South Africa, Tanzania, Zimbabwe, Cambodia, China, India, Indonesia, Japan, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam, Barbados, Belize, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Guatemala, Jamaica, Martinique, Mexico, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, United States, Fiji, French Polynesia, Papua New Guinea, Argentina, Brazil, Colombia, Ecuador, French Guiana, Guyana, Suriname, Uruguay, Venezuela.

[345] Geographic range includes: Africa, Eswatini, Ghana, Madagascar, Malawi, Mauritius, Mozambique, Réunion, South Africa, Zimbabwe, Asia, North America, Antigua and Barbuda, Belize, Cuba, Dominica, Dominican Republic, Guadeloupe, Jamaica, Martinique, Mexico, Panama, Puerto Rico, Saint Kitts and Nevis, Trinidad and Tobago, United States of America, - Colorado, - Illinois, - Iowa, - Kansas, - Nebraska, Papua New Guinea, South America, Argentina, Brazil, - Parana, Colombia, French Guiana.

[346] In August 2024, the Sugarcane Technical Review Panel advised a rating change from LOW to HIGH based on potential economic impact caused.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
	Xanthomonadaceae	*Xanthomonas sacchari*	Sugarcane Leaf Chlorotic Streak Disease (Li et. al, 2022), Chlorotic streak disease of sugarcane (Sun et. al, 2017).	*Saccharum officinarum* (Sugarcane) (Li et. al, 2022; Sun et. al, 2017) [347]. *Oryza sativa* (Rice)(Ivayani et. al, 2022) [348].	*Xanthomonas sacchari* strain DD13 (*Xsa* DD13), which is pathogenic, closely related to *X. albilineans* and considered weakly virulent, has been reported as the causal agent of chlorotic streak disease of sugarcane in Guangxi (China) (Li et. al, 2022; Sun et. al, 2017). Symptoms of disease on sugarcane linked to *Xsa* DD13 include the appearance of chlorotic white streaks from the base to the tip of sugarcane leaves resembling pencil lines, as well as wilting (Sun et. al, 2017). The strain, *Xsa* LMG476, has been isolated from diseased sugarcane (Ivayani et. al, 2022; Mielnichuk et. al, 2020).	Generally, bacteria such as *Xanthomonas* sp., may be spread through splashes and running water (Ivayani et. al, 2022). For example, *X. albilineans*, a closely related species to *X. sacchari*, has been detected in water droplets on sugarcane leaves (Klett & Rott, 1994). Other species of the genus *Xanthomonas*, for example *X. albilineans*, is reportedly spread between sugarcane plants through mechanical transmission from the use of infected tools and equipment such as knives and harvesters, as well as planting of infected cuttings (setts) in propagation (Klett & Rott, 1994; Mielnichuk et. al, 2020). The *X. sacchari* strain NCPPB4393 (Xsa NCPPB4393) was isolated from an insect found on a diseased banana plant in 2007 in Tanzania in an area where sugarcane is also grown (Studholme et. al, 2011) [349].		Afghanistan (Ivayani et. al, 2022). China (*Xsa* DD13)(Li et. al, 2022; Sun et. al, 2017). Guadeloupe (*Xsa* LMG471, *Xsa* R1)(Ivayani et. al, 2022). Indonesia (*Xsa* LSE33)(Ivayani et. al, 2022). Iran (Ivayani et. al, 2022). Tanzania (Ivayani et. al, 2022).	LOW [350]	UNKNOWN [351]	HIGH [352]	UNKNOWN [353]	UNKNOWN

[350] Australia permits import of *Saccharum* spp. (sugarcane) as nursery stock in the form of tissue culture or setts (cuttings). Both forms require a valid import permit, must arrive via air freight only and be subsequently directed to the Department of Agriculture, Fisheries and Forestry Post Entry Quarantine facility in Victoria for disease screening and testing, of which diagnostic testing may be carried out by Sugar Research Australia (SRA) or the Queensland Department of Primary Industries. Import of sugarcane is therefore a well-regulated pathway (DAFF, 2025). In terms of potential entry on other hosts such as rice, Australia permits the import of Oryza spp. seed for sowing but not nursery stock (DAFF, 2024). Based on the biology of similar species such as *X. albilineans*, which is a xylem-limited pathogen, transmission on seed is unlikely (Studholme et. al, 2011). In terms of geographic distribution however, it is worth noting that X. sacchari has been found to occur geographically close to Australian in Indonesia (Ivayani et. al, 2022).

[351] *Xanthomonas sacchari* appears to have a limited host range with strains isolated from *Saccharum officinarum* (Sugarcane) and *Oryza sativa* (Rice)(Ivayani et. al, 2022; Li et. al, 2022; Sun et. al, 2017).

[352] Generally, bacteria such as *Xanthomonas* sp., may be spread through splashes and running water (Ivayani et. al, 2022). For example, *X. albilineans,* a closely related species to *X. sacchari*, has been detected in water droplets on sugarcane leaves (Klett & Rott, 1994). Based on the characteristics of the closely related species, *X. albilineans*, it is likely that *X. sacchari* could spread between sugarcane plants through mechanical transmission from the use of infected tools and equipment such as knives and harvesters, as well as planting of infected cuttings (setts) in propagation (Klett & Rott, 1994; Mielnichuk et. al, 2020).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
	Xanthomonadaceae	*Xanthomonas vasicola* pv. *vasculorum*	Bacterial leaf streak	Wide host range including *Saccharum officinarum* (sugarcane). [354]	Leaves (leaf streak; narrow long lesions with wavy water-soaked margins, bacterial ooze), stems (bacterial ooze; gummosis).	Local/regional movements may be due to the movement of plants, plant material (including seed, germplasm), residues, aerosols, vectors or equipment. [355]		Madagascar, South Africa, Zimbabwe, United States of America, Argentina, Brazil (Parana).	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Unknown	Undetermined	Bacteriosis	*Saccharum* spp.	Unknown.	Local/regional movements may be due to the movement of seed, plants, soil or residues, aerosols from infested fields. Soil, crop residues, and/or infected plants or seeds are the most likely pathway for long distance dispersal.			UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Fungi												

The X. sacchari strain NCPPB4393 (Xsa NCPPB4393) was isolated from an insect found on a diseased banana plant in 2007 in Tanzania in an area where sugarcane is also grown (Studholme et. al, 2011). Studholme et. al (2011) hypothesised the insect could have acquired the *X. sacchari* bacterium from sugarcane. Further information on the insect or its potential as a vector of this bacterium is unknown.

[350] Australia permits import of *Saccharum* spp. (sugarcane) as nursery stock in the form of tissue culture or setts (cuttings). Both forms require a valid import permit, must arrive via air freight only and be subsequently directed to the Department of Agriculture, Fisheries and Forestry Post Entry Quarantine facility in Victoria for disease screening and testing, of which diagnostic testing may be carried out by Sugar Research Australia (SRA) or the Queensland Department of Primary Industries. Import of sugarcane is therefore a well-regulated pathway (DAFF, 2025). In terms of potential entry on other hosts such as rice, Australia permits the import of Oryza spp. seed for sowing but not nursery stock (DAFF, 2024). Based on the biology of similar species such as *X. albilineans*, which is a xylem-limited pathogen, transmission on seed is unlikely (Studholme et. al, 2011). In terms of geographic distribution however, it is worth noting that X. sacchari has been found to occur geographically close to Australian in Indonesia (Ivayani et. al, 2022).

[351] *Xanthomonas sacchari* appears to have a limited host range with strains isolated from *Saccharum officinarum* (Sugarcane) and *Oryza sativa* (Rice)(Ivayani et. al, 2022; Li et. al, 2022; Sun et. al, 2017).

[352] Generally, bacteria such as *Xanthomonas* sp., may be spread through splashes and running water (Ivayani et. al, 2022). For example, *X. albilineans,* a closely related species to *X. sacchari*, has been detected in water droplets on sugarcane leaves (Klett & Rott, 1994). Based on the characteristics of the closely related species, *X. albilineans*, it is likely that *X. sacchari* could spread between sugarcane plants through mechanical transmission from the use of infected tools and equipment such as knives and harvesters, as well as planting of infected cuttings (setts) in propagation (Klett & Rott, 1994; Mielnichuk et. al, 2020).
The X. sacchari strain NCPPB4393 (Xsa NCPPB4393) was isolated from an insect found on a diseased banana plant in 2007 in Tanzania in an area where sugarcane is also grown (Studholme et. al, 2011). Studholme et. al (2011) hypothesised the insect could have acquired the *X. sacchari* bacterium from sugarcane. Further information on the insect or its potential as a vector of this bacterium is unknown.

[353] *Xsa* DD13 is pathogenic on sugarcane, having been reported as the causal agent of chlorotic streak disease of sugarcane in Guangxi (China), however, it considered weakly virulent (Li et. al, 2022; Sun et. al, 2017). Symptoms of disease on sugarcane linked to *Xsa* DD13 include the appearance of chlorotic white streaks from the base to the tip of sugarcane leaves resembling pencil lines, as well as wilting (Sun et. al, 2017). However, other strains such as *Xsa* LMG476, have also been isolated from diseased sugarcane (Ivayani et. al, 2022; Mielnichuk et. al, 2020). For other species of the genus *Xanthomonas* such as *X. albilineans*, planting of resistant sugarcane varieties is a primary strategy for avoiding leaf scald disease (Mielnichuk et. al, 2020; Rott & Davies, 2000). A similar strategy could possibly be appropriate for *X. sacchari*.

[354] Additional hosts include: *Andropogon gerardii* (Big bluestem), *Areca catechu* (betelnut palm), *Bromus tectorum* (downy brome), *Cyperus esculentus* (yellow nutsedge), *Dactylis glomerata* (cocksfoot), *Dictyosperma album*, *Eucalyptus grandis* (saligna gum), *Phleum pratense* (timothy grass), *Roystonea regia* (cuban royal palm), *Schizachyrium scoparium*, *Setaria verticillata* (bristly foxtail), *Setaria viridis* (green foxtail), *Sorghastrum nutans* (Indian grass), *Sorghum bicolor* (sorghum), *Sorghum halepense* (Johnson grass), *Zea mays* (maize).

[355] Infected plants, plant products/materials (including seed/germplasm), growing mediums or equipment are the most likely pathway for long distance dispersal. Means for dispersal are still largely unknown.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Fungi	Apiosporaceae	*Apiospora camptospora* (syn. *Papularia vinosa* - conidial state)	Culm and midrib rot	Sugarcane, maize, grasses.	Stem, leaf	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Bangladesh, Philippines, Jamaica, Cuba, India, Venezuela, New Zealand, Chile, Jamaica.	LOW	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Clavicipitaceae	*Myriogenospora aciculispora*	Myriogenospora leaf binding, tangle top of sugarcane	*Saccharum* spp.	Leaves, stems.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects		Brazil.	LOW	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Didymellaceae	*Phoma sorghina* var. *saccharum*	Twisted leaf disease	Sugarcane, pigeon pea.	Leaves, stems.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		China.	LOW	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Didymosphaeriaceae	*Didymosphaeria taiwanensis*	Leaf Blast	Sugarcane.	Leaves, stems.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Taiwan.	LOW	UNKNOWN	MED	UNKNOWN	UNKNOWN
	Elsinoaceae	*Elsinoë sacchari* (syn. *Sphaceloma sacchari*)	White speck (rash), sugarcane white rash	*Saccharum* spp.	The spots occur on the leaf blades, less frequently on the midribs and sheaths. They are yellowish or purple, oval, 1-4 mm long and up to 1 mm wide. [356]	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects		United States of America, Brazil; widespread. Asia, North and South America, the Caribbean, Oceania. It is recorded from Federated States of Micronesia, French Polynesia, Guam, and Marshall Islands; China.	UNKNOWN	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Incertae sedis (unknown)	*Bakerophoma sacchari*	Baker's leaf spot	*Saccharum* spp.	Leaf; scale of impact unknown.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Philippines.	UNKNOWN	UNKNOWN	LOW	UNKNOWN	UNKNOWN

[356] Later, the spots become light brown or whitish-grey with a reddish margin. They may join together and form streaks. Scale of impact is currently unknown. Economic impact - The disease is of little or no economic importance, so control treatments are unnecessary.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Fungi	Leptosphaeriaceae	*Saccharicola taiwanensis* (syn. *Leptosphaeria taiwanensis*)	Leaf blight	*Saccharum* interspecific hybrids, *S. officinarum.*	Leaf scorch.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Taiwan.	LOW	MEDIUM	HIGH	LOW	VERY LOW
	Massarinaceae	*Helminthosporium purpurascens*	Helminthosporium leaf spot, target blotch	Sugarcane.	Leaf spot.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Libya, India, Pakistan, Saudi Arabia.	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN
	Massarinaceae	*Helminthosporium portoricense*	Helminthosporium leaf spot, target blotch	Sugarcane.	Leaf spot.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Puerto Rico.	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN
	Microbotryaceae	*Sphacelotheca erianthi*	Floral smut	Sugarcane.	Head smut.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		India, Pakistan.	LOW	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Microbotryaceae	*Sphacelotheca indica* (syn. *Sorosporium indicum*)	Floral smut	Sugarcane, wheat (Poaceae).	Head smut.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		India.	LOW	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Microbotryaceae	*Sphacelotheca macrospora*	Covered smut	Poaceae especially *Miscanthus* sp., *Saccharum* spp.	Head smut.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Taiwan.	UNKNOWN	UNKNOWN	LOW	LOW	UNKNOWN
	Mycosphaerellaceae	*Cercospora acerosum* [357]	Black spot	Sugarcane.	Leaf spot.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		North America.	UNKNOWN	UNKNOWN	LOW	UNKNOWN	UNKNOWN

[357] This name not in Species Fungorum, the name is in USDA but nothing else.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Fungi	Mycosphaerellaceae	*Cercospora longipes*	Brown spot, brown leaf	*Saccharum* complex species.	Large number of reddish, rust-like spots on both surfaces of leaves; spots then coalesce followed by complete distortion of leaves; can be severe in parts of India	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		India, Cuba, Dominican Republic, Jamaica, Puerto Rico, Malawi, Uganda, Mauritius, Indonesia, Brazil, China.	MEDIUM	HIGH	HIGH	LOW	LOW
	Mycosphaerellaceae	*Deightoniella papuana*	Veneer blotch	*Saccharum* spp.	Causes discolouration and streaking, blotching of leaves. [358]	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Papua New Guinea, Solomon Islands, Indonesia, Philippines.	UNKNOWN	UNKNOWN	LOW	LOW	UNKNOWN
	Mycosphaerellaceae	*Didymella holci* (syn. *Mycosphaerella holci*)	Glume blight	Poaceae including sugarcane.	Causes discolouration, blight of leaves.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Ghana, Sierra Leone, South Africa, Sudan, Tanzania, China, India, Japan, Malaysia, Pakistan, Sri Lanka, Taiwan, Cuba, Dominican Republic, Haiti, Jamaica, United States, Brazil, French Guiana, Guyana, Suriname.	UNKNOWN	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Mycosphaerellaceae	*Mycosphaerella striatiformans*	Leaf-splitting disease	Sugarcane.	Can cause minor impacts to leaves. Attacks leaf tissues between veins, causing characteristic yellow striping. Finally, each stripe breaks down into stringy yellow shreds, but midrib remains erect.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Brazil, United States of America (Hawaii), Fiji, Indonesia (Java).	UNKNOWN	UNKNOWN	LOW	LOW	UNKNOWN

[358] The leaf spots are at first small, oval, light green to pale yellow, with thin red margins. Later, they become surrounded by a number (2-12) of progressively larger spots, each with a light green interior (turning light brown), and outlined by a 0.5-1 mm dark red border. The spots can reach 60 cm long by 1-1.5 cm wide. The spot has a veneer pattern, particularly on the upper surface. The underside of the leaf becomes black as the fungus forms spores.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Fungi	Mycosphaerellaceae	*Passalora vaginae* (syn. *Mycovellosiella vaginae*)	Red leaf spot of sugarcane	Sugarcane.	Causes spotting. Discolouration of leaves. Ellipsoid bright red spots on leaf sheaths sharply delimited from the normal green colour of the surrounding tissues. The spots enlarge and collapse to form irregular reddish lesions which penetrate through to the inner sheaths. In later stages, a greyish green mould may develop on the affected areas more abundantly on the inside of the sheath.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects		Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico, Trinidad and Tobago, Guyana; Afghanistan, Barbados, Belize, Benin, Brazil, Burkina Faso, China, Colombia, Cote d'Ivoire, Ecuador, Ghana, USA (Hawaii), Honduras, India, Indonesia, Japan, Madagascar, Malawi, Malaysia, Mali, Martinique, Mauritius, Mexico, Mozambique, Nicaragua, Peru, Philippines, Reunion, Senegal, South Africa, Taiwan, Thailand, Togo, Venezuela, Vietnam, Zimbabwe.	UNKNOWN	UNKNOWN	LOW	LOW	UNKNOWN
	Mycosphaerellaceae	*Pseudocercospora atrofiliformis* (syn. *Cercospora atrofiliformis*)	Black stripe	Poaceae.	Causes streaking. Discolouration of leaves. Dark brown to black streaks 5-36 mm long by 0.5-1.2 mm wide on the leaf blades, between veins.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		South America, Taiwan.	UNKNOWN	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Phaeosphaeriaceae	*Stagonospora bicolor* (syn. *Saccharicola bicolor*)	Leaf scorch	Sugarcane, barley, Lawn grass (*Axonopus compressus*).	Latent plant pathogen that can render host plant prone to infection.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Iceland, Malaysia.	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Fungi	Phaeosphaeriaceae	*Stagonospora sacchari*	Sugarcane scorch; leaf scorch	*Saccharum* complex species, *Miscanthus sinensis*, *M. floridulus*.	*S. sacchari* attacks the leaves of sugarcane, especially during the critical growth stage 4-5 months after planting. The initial symptoms of leaf scorch are small white to yellowish spots on the leaf blades, 3-8 days after inoculation. [359]	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		South Africa, India, Indonesia, Japan, Philippines, Taiwan, Thailand, Vietnam, Panama, Papua New Guinea, Argentina, Venezuela.	MEDIUM	HIGH	HIGH	HIGH	HIGH
	Pleosporaceae	*Curvularia ischaemi*	Curvularia leaf spot	Sugarcane	When infected, multiple disease spots gradually emerge, eventually leading to leaf wilting and necrosis. Symptoms were primarily visible on older leaves; the yield effect was limited. This has the potential to cause significant damage to sugarcane crop varieties and yield reduction.	Dispersal via spores is likely, more likely still is transportation via human assistance.		China.	LOW	UNKNOWN	UNKNOWN	MEDIUM	UNKNOWN
	Pomatiidae	*Hendersonina sacchari*	Collar rot	*Saccharum* spp. and cereals including barley.	Stem rot.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Brazil, India.	UNKNOWN	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Pucciniaceae	*Puccinia erythropus*	Rust	Poaceae including sugarcane, silvergrass, *Cnanchum sublanceolatum*.	Leaf discolouration, wilting and defoliation.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		China, Japan, Philippines, Taiwan, Russia, New Caledonia.	UNKNOWN	UNKNOWN	LOW	UNKNOWN	UNKNOWN
	Saccotheciaceae	*Pseudoseptoria obtusa* (syn. *Selenophoma obtusa*)	Black stem rot	Poaceae.	Stem rot.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		United States of America.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

[359] Leaf lesions are initially small (0.5-3.0 x 0.3-1.0 mm) and red or brown, with a chlorotic halo. They elongate along the vascular bundles, forming spindle-shaped streaks which coalesce to form large spots (5 x 0.3 to 17 x 1.0 cm), with straw-coloured centres and reddish margins. On older leaves the spots do not usually elongate into streaks. On susceptible varieties, abundant pycnidia were produced on the lesions 5 weeks after inoculation. Multiple and critical point models have been used to predict yield losses. Models based on the area of leaf infected at 9-10 months after planting accurately predicted cane and sugar yield losses at around 30% (Sampang, 1985).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential[338]	Spread potential	Economic impact	Overall risk rating
Fungi	Trichosphaeriaceae	*Nigrospora sacchari*	Scald	Sugarcane.	Leaf scald.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects		Antigua and Barbuda.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Uropyxidaceae	*Macruropyxis fulva*	Fungi	Sugarcane.	Causes tawny rust in sugarcane, can lead to yield loss.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Southern Africa.	LOW	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Ustilaginaceae	*Sporisorium cruentum*	Loose kernel smut	*Sorghum bicolor* (sorghum), *Saccharum officinarum* (sugarcane), *Sorghum* spp.	Plants affected by loose kernel smut can display a reduction in plant height, stalk diameter, leaf width and increased tillering. Occasionally, the tillers are smutted, while the primary head is not.[360]	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.		Wide geographic range.[361]	LOW	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Ustilaginaceae	*Sporisorium sacchari* (syn. *Ustilago courtoisi*, *Sphacelotheca schweinfurthiana*, *S. sacchari*)	Floral smut	*Saccharum* spp. Including sugarcane, reed grass, ravenna grass, wild sugarcane.	Floral smut can impact plant height, stalk diameter and leaf growth. Infected heads are characteristically looser, bushy and a dark green colour due to hypertrophy of the glumes.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects		Bangladesh, China, India, Iran, Malaysia, Pakistan, Philippines, Thailand, Italy, Colombia.	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN
	Xylariaceae	*Sphacelotheca macrospora*	Root and basal stem rot	*Saccharum* spp. All *Saccharum* and *Miscanthus*	Can cause root and stem decay.[362]	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored		United States; Puerto Rico, Taiwan.	LOW	HIGH	MEDIUM	LOW[363]	VERY LOW

[360] In addition, secondary infection may occur when spores from a smutted head infect late developing heads of healthy plants, causing them to become smutted. Infected heads are characteristically looser, bushy and a dark green colour due to hypertrophy of the glumes.
[361] Geographic range includes: Botswana, Burundi, Cameroon, Central African Republic, Chad, Congo (DRC), Egypt, Eritrea, Eswatini, Ethiopia, Gambia, Ghana, Kenya, Malawi, Mauritius, Morocco, Mozambique, Niger, Nigeria, Rwanda, Senegal, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe, Afghanistan, China, India, Iran, Iraq, Israel, Japan, Lebanon, Myanmar, Pakistan, South Korea, Taiwan, Turkey, Yemen, Bulgaria, Cyprus, Czechia, Germany, Greece, Hungary, Italy, Poland, Russia, Serbia, Montenegro, Barbados, Costa Rica, Cuba, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Puerto Rico, United States of America (California), Argentina, Brazil, Venezuela.
[362] Yellowing and wilting of mature sugarcane. Symptoms rarely found in young sugarcane. Root and basal stem tissues of diseased plants are rotted, and basal stem tissues appear light brown and reddish. Black lines are usually found in the diseased stem and a carbonaceous sterile base later develops. White-tipped, upright, sterile stroma bearing abundant conidia are produced on the surface of diseased stems during the spring rainy season. Black, unbranched or occasionally branched, cylindrical to clavate ascostroma may also be found April to June [assume northern hemisphere summer]. Many ratoon plants die because of the disease. If the pathogen infects the canes at later stages in their growth, the diseased ratoons are retarded in growth. They contain fewer stalks that are shorter and thinner than normal. Eventually diseased plants die.
[363] On 1st October 2024, the Sugarcane Technical Review Panel advised an economic impact risk rating of LOW.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
				species, *Chloris barbata*, *Cynodon dactylon*, *Imperata cylindrica*, *Cyperus rotundus*, *Zea mays*, *Sorghum bicolor*.		by insects.							
Fungi	Xylariaceae	*Xylaria bambusicola*	Root and Basal Stem Rot disease [364]	Sugarcane, Bamboo (Okane et. al, 2008; Selvaraj et. al, 2024).				Indonesia, Taiwan (Selvaraj et. al, 2024), Thailand (Okane et. al, 2008).[365]	HIGH[366]	HIGH[366]	HIGH[366]	UNKNOWN[366, 367]	UNKNOWN
	Xylariaceae	*Xylaria cf warburgii/Xylaria arbuscula*	Sugarcane root and basal stem rot	*Saccharum* hybrid.	Attack roots and stem, and whole plant.	Spread of microscopic spores by wind, water, soil, through infected plant material.		Indonesia, Taiwan.	HIGH	HIGH	HIGH	HIGH	HIGH
		Basidiomycete fungus	Ramu orange leaf	*Saccharum* spp.	Leaf.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.			UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
		Fomes sp.	Zonate foot rot	*Saccharum* spp.	Root.	Spread of microscopic spores by wind, water, through infected plant material, possibly vectored by insects.			UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Nematodes												
	Aphelenchoididae	*Robustodurus arachidis* (syn. *Aphelenchoides arachidis*)	Groundnut testa nematode	*Arachis hypogaea* (peanut), *Oryza sativa* (rice),	Roots, pods, testa, seed (discolouration, shrivelling, marketability). Predisposes seeds to fungal infection by	*Aphelenchoides arachidis* is primarily disseminated by infested peanut hulls, seeds and/or soil.		Egypt, Nigeria, South Africa.	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

[364] (Selvaraj et. al, 2024).
[365] Isolated from root and basal stem rot disease (RBSR)-infected sugarcane plantations in Indonesia (Selvaraj et. al, 2024).
[366] Risk rating based on related species *Xylaria* cf *warburgii* and *Xylaria arbuscula*.
[367] The economic impact of *Xylaria bambusicola* is unknown.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Nematodes				*Pennisetum glaucum* (pearl millet), *Saccharum officinarum* (sugarcane), *Sorghum bicolor* (sorghum), *Zea mays* (maize).	*Fusarium* sp., *Macrophomina phaseolina*, *Rhyzoctonia solani* and *Sclerotium rolfsii.*								
	Belonolaimidae	*Belonolaimus longicaudatus*	Sting nematode	Barley, cereal rye, common bean, cowpea, field pea, maize, millet (Pennisetum glaucum), peanut, soybean, sunflower, wheat, carrot, citrus, sugarcane, turfgrass.	Root system (stubby-looking root system develops): *Belonolaimus longicaudatus* kills the root meristem (primary as well as lateral roots) and halts root/plant growth. [368]	Motile ectoparasite in sandy soil types. Soil, plants with residual soil (e.g. turf etc.) and equipment could spread this nematode long distances.		India, Pakistan, Saudi Arabia, Turkey, Bahamas, Bermuda, Costa Rica, Mexico, Puerto Rico, United States of America.	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
	Dolichodoridae	*Quinisulcius acutus* (syn. *Tylenchorhynchus acutus*)	Stylet-stunt nematode	Common bean, maize, sorghum, soybean, lucerne, sugarcane, elms, tobacco, cotton.	The root systems of infected plants are usually poorly developed with very few feeder roots. [369]	*Tylenchorhynchus acutus* is an ectoparasite and reproduction as well as pathogenicity is greatest in loam soil. Soil, plants or products with residual soil, and/or equipment could spread this nematode long distances.		India, Pakistan, Turkey, Canada, Cuba, United States of America, Venezuela.	MEDIUM	HIGH	HIGH	UNKNOWN [370]	UNKNOWN

[368] *B. longicaudatus* feeds ectoparasitically near the root tip and along the root resulting in a reduced root system with stubby side branches and terminal galling. Dark lesions may appear on the outer root surface at the point of penetration. Above-ground symptoms include severe stunting, wilting in dry conditions, leaf chlorosis and, in severe cases, death of the plant.

[369] This poor root development is often associated with non-specific above-ground symptoms such as stunted, unthrifty plants with chlorotic foliage. The tissues near the root tip sometimes become swollen (Saeed et al., 1986; Swarup and Sosa-Moss, 1990). Although this species of nematode has been associated with unthrifty stunted growth of many plants, few investigations have been carried out to establish damage threshold levels or the extent of yield losses caused by this pest. In most instances *T. acutus* occurs alongside other major plant-parasitic nematodes which complicates the assessment of damage. However, increased yield of sorghum (Swarup and Sosa-Moss, 1990), and *Phaseolus vulgaris* (Sikora and Greco, 1990) has been observed following chemical treatment of soils heavily infested with this species of nematode.

[370] Despite causing decline in yield and growth reduction of infested plant species, *T. acutus* is not considered to be of major economic importance.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Nematodes	Heteroderidae	*Heterodera sacchari*	Sugarcane cyst nematode	*Axonopus compressus* (carpet grass), *Cynodon dactylon* (Bermuda grass), *Echinochloa colona* (junglerice), *Eleusine indica* (goose grass), *Oryza sativa* (rice), *Panicum* (millets), *Paspalum conjugatum* (buffalo grass), *Saccharum officinarum* (sugarcane), *Saccharum spontaneum* (wild sugarcane), sorghum, *Urochloa brizantha* (palisadegrass), *Zea mays* (maize).	Root system (presence of cysts on the roots, the proliferation of roots, and/or shallow root systems), aboveground structures (yellowing, stunting, seed quality and or quantity reduced). [371]	The main way cyst nematodes spread locally is as motile nematodes or cysts in the soil. Water and irrigation may facilitate spread. Contaminated soil, plants with residual soil, plant material and equipment could spread this nematode over long distances. Cysts can persist in suitable environments for months to years.		Benin, Burkina Faso, Chad, Congo, Côte d'Ivoire, Gambia, Ghana, Liberia, Nigeria, Senegal, India (Delhi), Pakistan, Thailand.	MEDIUM	HIGH	HIGH	MEDIUM [372]	MEDIUM
	Heteroderidae	*Heterodera zeae*	Maize cyst nematode; Corn cyst nematode	Wide host range including *Saccharum officinarum*	Root system (presence of cysts on the roots, the proliferation of roots, and/or shallow root systems), aboveground structures (yellowing, poor tillering, stunting, patchy growth, smaller heads, and/or shrivelled grains).	The main way cyst nematodes spread locally is via motile nematodes or cysts in the soil. Water and irrigation may facilitate spread. Soil, plants with residual soil, and equipment could spread this nematode over long		Egypt, Afghanistan, China, India, Indonesia, Iran, Iraq, Nepal, Pakistan, Thailand, Greece, Portugal, United States of America.	MEDIUM	HIGH [375]	MEDIUM	HIGH	MEDIUM

[371] *H. sacchari* is a parasite of roots. Infected root systems are likely to be stunted and more so if significant invasion occurs early in the growth of the crop.
[372] There is very little published information on crop yield losses caused by *H. sacchari* in the field, although Jerath (1968) reported that infected sugarcane plants were between a third to a half the height of uninfected plants.
[375] Cysts can persist in suitable environments for months to years.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential[338]	Spread potential	Economic impact	Overall risk rating
Nematodes				(sugarcane).[373]	[374]	distances.							
	Heteroderidae	*Meloidogyne africana*	Root-knot nematode	Coffee, corn, cowpea, sugarcane.	Root system (presence of cysts on the roots, the proliferation of roots, and/or shallow root systems).	The main way cyst nematodes spread locally is via motile nematodes or cysts in the soil. [376]		India, Kenya, Argentina.	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
	Heteroderidae	*Meloidogyne kikuyensis*	Root-knot nematode	Coffee, cowpea, kikuyu grass, sugarcane.	Root system (presence of cysts on the roots, the proliferation of roots, and/or shallow root systems).	The main way cyst nematodes spread locally is via motile nematodes or cysts in the soil. Water and irrigation may facilitate spread. Soil, plants with residual soil, and equipment could spread this nematode over long distances.		Kenya, South Africa, Tanzania.	LOW	MEDIUM[375]	MEDIUM	MEDIUM	LOW
	Hoplolaimidae	*Helicotylenchus erythrinae*	Spiral nematode	Sugarcane, maize, ginger, clover, potato, cocoa, black pepper, pineapple, coconut, cucubits.	Nematodes cause injury to the outer layers of root tissue, as well as disruption and progressive deterioration of the roots system and, consequently, the plant's capacity for the uptake of water and nutrients is affected negatively. [377]	Local movement usually via crawling/burrowing; long distance dispersal is typically achieved through transport of soil or infested plant material.		China, Czech Republic, Dominica, Panama, Trinidad and Tobago, United States, New Zealand, Brazil, French Guiana.	LOW	LOW	LOW	UNKNOWN	UNKNOWN
	Hoplolaimidae	*Hoplolaimus columbus*	Columbia lance nematode	Cotton, soybean, maize, wheat, sugarcane, millet.	Root system (altered root growth patterns, e.g. taproot stunting, increase in secondary roots near surface), whole plant (dwarfing, wilting, chlorosis	*Hoplolaimus columbus* is a motile ecto- and endo-parasite that seems to prefer sandy and sandy loam soils. Soil, plants and equipment could spread		Egypt, India, Pakistan, Trinidad and Tobago, Barbados, United States of America.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN

[373] Additional hosts include: *Abelmoschus esculentus* (okra), *Allium cepa* (onion), *Avena sativa* (oats), *Beta vulgaris* (beetroot), *Brassica oleracea* var. *capitata* (cabbage), *Carica papaya* (pawpaw), *Cicer arietinum* (chickpea), Citrus, *Citrus limon* (lemon), *Cocos nucifera* (coconut), *Glycine max* (soybean), *Gossypium* (cotton), *Hordeum vulgare* (barley), *Lagenaria siceraria* (bottle gourd), *Malus domestica* (apple), *Mangifera indica* (mango), *Musa* (banana), *Oryza sativa* (rice), *Pinus gerardiana* (Himalayan edible pine), Poaceae (grasses), *Prunus persica* (peach), *Psidium guajava* (guava), *Punica granatum* (pomegranate), *Setaria italica* (foxtail millet), *Solanum melongena* (aubergine), *Solanum tuberosum* (potato), *Sorghum bicolor* (sorghum), *Sorghum sudanense* (Sudan grass), *Triticum aestivum* (wheat), *Vicia faba* (faba bean), *Vigna radiata* (mung bean), *Zea mays* (maize), *Zea mays* subsp. *mexicana* (teosinte).

[374] In general, as is the case with other plant parasitic nematodes, the disease is characterized by patches appearing in the field; in these the infested plants exhibit poor unthrifty growth, are stunted and are pale green in colour. The root system is also poorly developed. As well as being stunted, the infested maize plants have also been reported to have retarded leaf emergence with reduced fresh and dry weights.

[376] Water and irrigation may facilitate spread. Soil, plants with residual soil, and equipment could spread this nematode over long distances. Cysts can persist in suitable environments for months to years.

[377] Production losses may vary depending on size of infestation, in heavy infestations losses can be significant.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Nematodes					and/or yield (amount and quality)).	this nematode long distances.							
Nematodes	Hoplolaimidae	*Hoplolaimus indicus*	Lance nematode	Wide host range including *Saccharum officinarum* (sugarcane).[378]	Root system (altered root growth patterns e.g. taproot stunting, increase in secondary roots near surface), whole plant (dwarfing, wilting, chlorosis and/or yield (amount and quality)).[379]	*Hoplolaimus indicus* is a motile ecto- and endo-parasite. Infested soil, plants, and equipment could spread this nematode long distances.		Ghana, Libya, Bangladesh, China, India, Iran, Nepal, Pakistan.	LOW	HIGH	LOW	MEDIUM	VERY LOW
Nematodes	Hoplolaimidae	*Hoplolaimus pararobustus*	Lance nematode	Banana, oil palm, cotton, citrus, coffee, cowpea, grapevine, guava, mango, papaya, pineapple, rice, roses, sorghum, sugarcane, tea, wheat.	Attacked roots show dark brown narrow pustules about 1-2 mm long and parallel to the root axis. As the nematodes move deeper into the cortex, the necrosis becomes more extensive giving rise to elongate, ulcerated lesions.[380]	*Hoplolaimus* is a motile ecto- and endo-parasite. Infested soil, plants, and equipment could spread this nematode long distances.		Angola, Burkina Faso, Cameroon, Congo, Côte d'Ivoire, Egypt, Gabon, Gambia, Ghana, Guinea, Kenya, Madagascar, Malawi, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, South Africa, Tanzania, Togo, Uganda, Zimbabwe, China, Pakistan, Sri Lanka, Dominica, Grenada, Saint Lucia, Saint Vincent and the Grenadines.	LOW	MEDIUM	LOW	MEDIUM	VERY LOW
Nematodes	Longidoridae	*Longidorus laevicapitatus*	Needle nematode	Sugarcane.	Can cause damage by feeding on root cells and through the transmission of nepoviruses.	Soil, plants, plant products/materials and/or equipment could spread this nematode long distances.		Brazil, Argentina.	LOW	MEDIUM	LOW	HIGH	LOW

[378] Additional hosts include: *Abelmoschus esculentus* (okra), *Anacardium occidentale* (cashew nut), *Arachis hypogaea* (peanut), *Basella*, *Brassica oleracea* (cabbages, cauliflowers), *Brassica oleracea* var. *botrytis* (cauliflower), *Brassica oleracea* var. *capitata* (cabbage), *Brassica rapa* (field mustard), *Cajanus cajan* (pigeon pea), *Calotropis procera* (apple of sodom), *Capsicum annuum* (bell pepper), *Capsicum frutescens* (chilli), *Casuarina* (beefwood), *Chrysanthemum* (daisy), Citrus, *Citrus jambhiri* (rough lemon), *Cucumis sativus* (cucumber), *Cyamopsis tetragonoloba* (guar), *Cynodon dactylon* (Bermuda grass), *Eleusine coracana* (finger millet), *Gossypium* (cotton), *Ipomoea batatas* (sweet potato), *Mangifera indica* (mango), *Musa* (banana), *Nerium oleander* (oleander), *Oryza sativa* (rice), *Pennisetum glaucum* (pearl millet), *Phoenix dactylifera* (date-palm), *Pinus roxburghii* (chir pine), *Pisum sativum* (pea), *Poncirus trifoliata* (Trifoliate orange), *Prunus persica* (peach), *Psidium* (guava), *Psidium guajava* (guava), *Punica granatum* (pomegranate), *Raphanus sativus* (radish), *Ricinus communis* (castor bean), *Senna siamea* (yellow cassia), *Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Solanum tuberosum* (potato), *Sorghum bicolor* (sorghum), *Trifolium alexandrinum* (Berseem clover), *Triticum aestivum* (wheat), *Vigna mungo* (black gram), *Vigna radiata* (mung bean), *Vigna unguiculata* (cowpea), *Zea mays* (maize).

[379] Feeding by the nematode results in superficial lesions at the site of attack, reduced root growth and stunting of the above ground parts. Leaves may become distorted and chlorotic, and yield reduced.

[380] Although *H. pararobustus* is of common occurrence, its economic impact appears to be low; other more damaging nematodes are usually present in much larger numbers, particularly on banana and plantain.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Nematodes	Longidoridae	*Xiphinema insigne*	Nematode	Sugarcane, bamboo, bougainvillea, orange, mango, pear, ginger, grapes, black pepper, lichi, arabica coffee, Tea.	Known to inhabit, infest and feed on roots, Scale of impact unknown.	Local movement usually via crawling/burrowing; long distance dispersal is typically achieved through transport of soil or infested plant material.		Ethiopia, South Africa, China, India, Pakistan, South Korea, Taiwan, Trinidad and Tobago.	LOW	LOW	LOW	UNKNOWN	UNKNOWN
	Meloidogynidae	*Meloidogyne ethiopica*	Root-knot nematode	Wide host range including *Saccharum officinarum* (sugarcane). [381]	Root system (knotting, galls, swelling), whole plant (stunting, chlorosis, wilting, reduced vigour and/or reduced yield). Data is lacking on the extent of damage and the environmental and economic impact this nematode may cause on its different host plants.	The wide distribution of *M. ethiopica* in Chile was probably caused by contaminated grapevine seedlings. [382]		Ethiopia, Kenya, Mozambique, South Africa, Tanzania, Zimbabwe, Brazil, Chile, Peru. [383]	LOW	MEDIUM	MEDIUM	MEDIUM	LOW

[381] Additional hosts include: *Acacia mearnsii* (black wattle), *Actinidia deliciosa* (kiwifruit), *Agave sisalana* (sisal hemp), *Ageratum conyzoides* (billy goat weed), *Allium cepa* (onion), *Apium graveolens* (celery), *Asparagus officinalis* (asparagus), *Avena sativa* (oats), *Beta vulgaris* (beetroot), *Brassica oleracea* (cabbages, cauliflowers), *Brassica oleracea* var. *capitata* (cabbage), *Canavalia ensiformis* (jack bean), *Capsicum annuum* (bell pepper), *Capsicum frutescens* (chilli), *Carthamus tinctorius* (safflower), *Citrullus lanatus* (watermelon), *Clitoria ternatea* (butterfly-pea), *Crotalaria anagyroides*, *Crotalaria juncea* (sunn hemp), *Crotalaria lanceolata*, *Cucumis sativus* (cucumber), *Cucurbita* (pumpkin), *Cucurbita pepo* (marrow), *Datura stramonium* (jimsonweed), *Daucus carota* (carrot), *Eleusine coracana* (finger millet), *Ensete ventricosum* (Abyssinian banana), *Fagopyrum esculentum* (buckwheat), *Fragaria ananassa* (strawberry), *Glycine max* (soybean), *Gossypium hirsutum* (Bourbon cotton), *Helianthus annuus* (sunflower), *Hordeum vulgare* (barley), *Jatropha curcas* (jatropha), *Lablab purpureus* (hyacinth bean), *Lactuca sativa* (lettuce), *Lupinus albus* (white lupine), *Lupinus angustifolius* (narrow-leaf lupin), *Medicago sativa* (lucerne), *Mucuna pruriens* (velvet bean), *Neonotonia wightii* (perennial soybean), *Nicotiana tabacum* (tobacco), *Ornithopus compressus*, *Oryza sativa* (rice), *Oxalis corniculata* (creeping woodsorrel), *Pennisetum glaucum* (pearl millet), *Phaseolus vulgaris* (common bean), *Pisum sativum* (pea), *Polymnia sonchifolia*, *Prunus persica* (peach), *Setaria italica* (foxtail millet), *Sida rhombifolia*, *Solanum lycopersicum* (tomato), *Solanum melongena* (aubergine), *Solanum nigrum* (black nightshade), *Solanum tuberosum* (potato), *Spinacia oleracea* (spinach), *Tephrosia candida* (white tephrosia), *Triticum aestivum* (wheat), *Vicia faba* (faba bean), *Vicia sativa* (common vetch), *Vicia villosa* (hairy vetch), *Vigna catjang*, *Vigna radiata* (mung bean), *Vigna umbellata* (rice bean), *Vigna unguiculata* (cowpea), *Vitis vinifera* (grapevine), *Zea mays* (maize), *Zea mays* subsp. *mexicana* (teosinte).

[382] In Chile, the prohibition on producing seedlings in areas with root-knot nematodes, and on the movement of infested seedlings into new growing areas, seem not to be effective, considering that many nursery plants across the country are severely infected with *M. ethiopica*.

[383] This nematode was probably introduced into Rio Grande do Sul State, Brazil, accidentally from Chile (Curico locality) in 1989 on kiwi seedlings. Soil, plants, plant products/materials and/or equipment could spread this nematode long distances.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Nematodes	Meloidogynidae	*Meloidogyne exigua*	Coffee root-knot nematode	Wide host range including *Saccharum officinarum* (sugarcane).[384]	Root system (galls, swelling), whole plant (stunting, chlorosis, wilting, reduced vigour and/or reduced yield).[385]	Soil, plants, plant products, materials and/or equipment could spread this nematode long distances.		Turkey, France, Costa Rica, Dominican Republic, El Salvador, Guadeloupe, Guatemala, Honduras, Martinique, Nicaragua, Puerto Rico, Trinidad and Tobago, Bolivia, Brazil, Colombia, French Guiana, Peru, Suriname, Venezuela.	LOW	MEDIUM	MEDIUM	UNKNOWN	UNKNOWN
	Pratylenchidae	*Hirschmanniella oryzae*	Rice root nematode	Wide host range including *Saccharum officinarum* (sugarcane).[386]	Affected plant parts include roots.	Local movement usually via crawling/burrowing; long distance dispersal is typically achieved through transport of soil or infested plant material.		Africa, Asia, Europe, North America, South America.	LOW	LOW	LOW	UNKNOWN	UNKNOWN
	Pratylenchidae	*Pratylenchus delattrei*	Lesion nematode	Common bean (Castillo and Vovlas), maize, oats, pearl millet, peanut, pigeon pea, sorghum, wheat (Van Biljon and Meyer), cotton, sugarcane,	Affected plant parts include the root system. Scale of impact unknown.	Soil, plants with residual soil (ectoparasite), and/or equipment could spread this nematode long distances.		Madagascar, Cape Verde, Sudan, South Africa, Oman, Iran, Pakistan, India, Vietnam, South Korea.	LOW	LOW	LOW	UNKNOWN	UNKNOWN

[384] Additional hosts include: *Allium cepa* (onion), *Bidens pilosa* (blackjack), *Canavalia*, *Capsicum annuum* (bell pepper), *Citrullus lanatus* (watermelon), *Citrus*, *Citrus aurantium* (sour orange), *Coffea* (coffee), *Coffea arabica* (arabica coffee), *Coffea eugenioides*, *Cucumis sativus* (cucumber), *Cyphomandra betacea* (tree tomato), *Glycine max* (soybean), *Hevea brasiliensis* (rubber), *Ipomoea acuminata*, *Miconia*, *Musa* (banana), *Oryza sativa* (rice), *Phaseolus vulgaris* (common bean), *Pilea*, *Poncirus trifoliata* (Trifoliate orange), *Solanum lycopersicum* (tomato), *Solanum nigrum* (black nightshade), *Stachys arvensis* (staggerweed), *Zea mays* (maize).

[385] *M. exigua* causes root galls on coffee and other plants. On coffee in humid valleys and near rivers and streams, coffee trees are most susceptible. The symptoms of rapid yellowing and leaf-fall spread along lines of trees and in a heavy infestation trees may die and are easily uprooted. Roots show small galls about the size of a hemp seed and root hairs and rootlets are destroyed. Mature, pyroid females are found in fibrovascular bundles and in parenchymatous tissue where they form lesions that are later invaded by microorganisms. Experimentally infected seedlings are stunted compared with controls.

[386] Additional hosts include: *Abelmoschus esculentus* (okra), *Alternanthera sessilis* (sessile joyweed), *Amaranthus caudatus* (love-lies-bleeding), *Boerhavia diffusa* (red spiderling), *Cyperus difformis* (small-flowered nutsedge), *Cyperus iria* (rice flatsedge), *Cyperus rotundus* (purple nutsedge), *Digitaria ciliaris* (southern crabgrass), *Echinochloa colona* (junglerice), *Echinochloa crus-galli* (barnyard grass), *Eclipta prostrata* (eclipta), *Eichhornia crassipes* (water hyacinth), *Eleocharis spiralis*, *Eleusine indica* (goose grass), *Fimbristylis ferruginea*, *Fimbristylis globulosa* (Globular fimbristylis), *Fimbristylis littoralis* (lesser fimbristylis), *Gossypium hirsutum* (Bourbon cotton), *Ischaemum rugosum* (saramollagrass), *Leptochloa chinensis* (Chinese sprangletop), *Leptochloa fascicularis* (bearded sprangletop), *Ludwigia perennis*, *Monochoria vaginalis* (pickerel weed), *Nelumbo nucifera* (sacred lotus), *Oryza sativa* (rice), *Paspalum distichum* (knotgrass), *Pennisetum glaucum* (pearl millet), *Phoenix dactylifera* (date-palm), *Polygonum plebeium* (small knotweed), *Scirpus maritimus* (saltmarsh bulrush), *Solanum lycopersicum* (tomato), *Triticum aestivum* (wheat), *Urochloa ramosa* (browntop millet), *Vallisneria spiralis* (eelweed), *Zea mays* (maize).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
				weeping lovegrass, Rhodes grass.									
	Oomycetes												
Oomycetes	Peronosporaceae	*Peronosclerospora miscanthi*	Leaf-splitting disease	Sugarcane, onion, bell pepper, watermelon, orange, coffee, cucumber, tomato, soyabean, rubber, banana, rice, maize.	Leaf streaking.	Spread with infected planting material. Wind-borne spores for short distance dispersal, due to short lifespan of spores.		China, Philippines, Fiji.	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN
	Peronosporaceae	*Peronosclerospora philippinensis*	Downy mildew	*Saccharum* interspecific hybrids, *S. officinarum*, oats, sorghum, maize, *Zea mays*.	Leaf streaking.	Spread with infected planting material. Wind-borne spores for short distance dispersal, due to short lifespan of spores.		Mauritius, Bangladesh, China, India, Indonesia, Nepal, Pakistan, Philippines, Taiwan, Thailand.	MEDIUM	HIGH	HIGH	HIGH	HIGH
	Peronosporaceae	*Peronosclerospora sacchari*	Sugarcane downy mildew	*Saccharum* complex species, *Zea mays*.	Leaf streaking.	Spread with infected planting material. Wind-borne spores for short distance dispersal, due to short lifespan of spores.		Nigeria, China, India, Indonesia, Nepal, Philippines, Taiwan, Thailand, Vietnam, Fiji, Papua New Guinea, Timor Leste.	MEDIUM	HIGH	HIGH	HIGH	HIGH
	Peronosporaceae	*Peronosclerospora spontanea*	Spontaneum downy mildew	*Saccharum* interspecific hybrids, *S. officinarum*, *S. spontaneum*.	Leaf streaking.	Spread with infected planting material. Wind-borne spores for short distance dispersal, due to short lifespan of spores.		Philippines, Thailand.	LOW	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Peronosporaceae	*Sclerophthora northii* (syn. *Sclerospora northii*) [387]	Leaf-splitting disease	*Saccharum* spp.	Leaf streaking. Can cause downy mildew disease.	Spread with infected planting material. Wind-borne spores for short distance dispersal, due to short lifespan of spores.		Fiji, Vanuatu, Tahiti.	LOW	UNKNOWN	UNKNOWN	LOW	UNKNOWN

[387] May be Peronosclerospora northii.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Oomycetes	Plasmodiophoraceae	*Ligniera vasculorum*	Sugarcane dry top rot	*Saccharum* spp.	Initially, spindle leaves wither and drying of the leaf tips occurs. More drying and necrosis of spindle leaves occurs with the eventual death of the shoot apex and stalk. [388]	The disease is spread by two methods. First, dispersal occurs via infected stalks that are used as vegetative planting material to establish new plantings. This method of spread allows *L. vasculorum* to spread long distances and become established in previously non-infested fields. [389]		Barbados, Cuba, Puerto Rico, United States of America, Colombia, Venezuela.	LOW	LOW	LOW	LOW	NEGLIGIBLE
	Phytoplasma												
Phytoplasma	Acholeplasmataceae [390]	Sugarcane yellow leaf phytoplasma 16SrXVI-A	Sugarcane yellow leaf phytoplasma (with vector)	Sugarcane.	Whole plant; stunting of plant growth, shoot proliferation, apical bunches of small yellowed leaves (sometimes pink) and abnormalities. Symptoms consist of yellowing leaves with a bright yellow midrib, often when the rest of the lamina is still green. [391]	Abiotic factors are not involved in natural spread of the sugarcane yellow leaf phytoplasma. Yellow leaf phytoplasma is naturally transmitted by the leafhoppers and planthoppers.		Morocco, India, Cuba.	LOW	HIGH	HIGH	UNKNOWN	UNKNOWN
	Acholeplasmataceae [392]	Sugarcane yellow leaf phytoplasma 16SrXVI-A	Sugarcane yellow leaf phytoplasma (without vector)	Sugarcane.	Whole plant; stunting of plant growth, shoot proliferation, apical bunches of small yellowed leaves (sometimes pink) and abnormalities. [393]	Abiotic factors are not involved in natural spread of the sugarcane yellow leaf phytoplasma. Yellow leaf phytoplasma is naturally transmitted by the leafhoppers and		Morocco, India, Cuba.	LOW	LOW	LOW	UNKNOWN	UNKNOWN

[388] Symptoms of dry top rot are similar to drought stress. Most stalks show no internal symptoms at the shrivelled top of the stalks. Entire plants may die. Finally, the dead leaves become detached from the stalks exposing withered stalks with shrunken internodes.
[389] Although the method of infection is not completely known, once the soil in a field is infested with the pathogen healthy plants derived from disease-free cuttings can become infected. Spread by true seed of sugarcane is not known. However, spread occurs by the movement of infected sugarcane stalks that are used to vegetatively propagate the crop. In Puerto Rico, cutting infected stalks for use in vegetative propagation spread the disease (Stevenson, 1975). Planting resistant cultivars and the use of disease-free planting material in propagating sugarcane are recommended to control the disease.
[390] 16Sr16XVI-A
[391] Pink colouration may also occur as well as early drying of leaves from the edges.
[392] 16Sr16XVI-A
[393] Symptoms consist of yellowing leaves with a bright yellow midrib, often when the rest of the lamina is still green. Pink colouration may also occur as well as early drying of leaves from the edges.

Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
					planthoppers.							
Acholeplasmataceae [394]	*'Candidatus* Phytoplasma' 16SrI	Dwarf disease of sugarcane (with vector)	*Saccharum* spp.	Whole plant.	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		United States of America, Canada, Chile, Colombia, Iran, Mexico.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Acholeplasmataceae [395]	*'Candidatus* Phytoplasma' 16SrI	Dwarf disease of sugarcane (without vector)	*Saccharum* spp.	Whole plant.	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		United States of America, Canada, Chile, Colombia, Iran, Mexico.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Acholeplasmataceae [396]	*'Candidatus* phytoplasma fraxini' (16SrVII-B) [397]	Ash Y [398]	At the species level not specific to a particular strain,	*Candidaus* phytoplasma bacteria are obligate biotrophs restricted to plant phloem and insects	This phytoplasma may be spread locally by insect vectors, for example, *Amplicephalus funzaensis*		At the species level not specific to a particular strain, *'Ca.* Phytoplasma fraxini' is reported to	UNKNOWN [401]	LOW (without vector) [402] HIGH (with	LOW (without	UNKNOWN [406]	UNKNOWN (without vector) UNKNOWN

[394] 16Sr1-A
[395] 16Sr1-A
[396] EPPO, 2001
[397] This phytoplasma belongs to the ash yellows group (Böhm et. al, 2024). Multiple strains of '*Candidatus* Phytoplasma fraxini' exist including 16SrVII-A, 16SrVII-B, 16SrVII-C, 16SrVII-D, 16SrVII-E, 16SrVII-F, and 16SrVII-G (EPPO, 2025).
[398] This phytoplasma was formerly referred to as Ash Y (EPPO, 2025).
[401] Long distance dispersal is likely through movement of infested plant material (EPPO, 2025). At the species level not specific to a particular strain, '*Candidatus* Phytoplasma fraxini' has a wide host range which may suggest a greater likelihood of entry based on a greater number of potential import pathways. With respect to the potential of this phytoplasma to enter on sugarcane, risk may be low considering the importation of sugarcane is a well-regulated pathway (DAFF, 2025). Australia permits import of *Saccharum* spp. (sugarcane) as nursery stock in the form of tissue culture or setts (cuttings). Both forms require a valid import permit, must arrive via air freight only and be subsequently directed to the Department of Agriculture, Fisheries and Forestry Post Entry Quarantine facility in Victoria for disease screening and testing, of which diagnostic testing may be carried out by Sugar Research Australia (SRA) or the Queensland Department of Primary Industries. Molecular tests can be used to confirm the absence of phytoplasmas in planting material (EPPO, 2025). *Candidaus* phytoplasma bacteria are obligate biotrophs restricted to plant phloem and insects (Böhm et. al, 2024).
[402] The host range of phytoplasmas are considered to be primarily dictated by the feeding habits of its insect vectors (EPPO, 2025). Hence, in the absence of a suitable insect vector, infection is unlikely to spread to new host plants beyond the initial infected host plant.
[406] A 2020 study was the first worldwide to report an association between 16SrVII group phytoplasmas and sugarcane leaf yellowing, having isolated phytoplasmas from sugarcane in Brazil exhibiting yellow leaf syndrome (YLS) that had high genetic similarity (99% similarity of nucleotide sequences and the 16S rDNA gene sequence) to 16SrVII-B Ash yellows phytoplasmas from Argentina and Brazil (Oliveira et. al, 2020). Yellow leaf syndrome (YLS) has been reported to be caused by more than one pathogen, including Sugarcane yellow leaf virus (ScYLV) and phytoplasmas, and has symptoms that include yellow of leaf midribs and necrosis of leaf tissue (Oliveira et. al, 2020). Due to the multiple pathogens contributing to YLS, further investigation would be required to isolate the specific impact of 16SrVII-B phytoplasma on sugarcane.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
				'*Candidatus* Phytoplasma fraxini' has a wide host range including *Fraxinus* spp. (ash) and *Syringa* spp. (Böhm et. al, 2024) [399]. Evidence suggests sugarcane is also a host of phytoplasma 16SrVII-B [400].	(Böhm et. al, 2024). Members of the 16SrVII group include ash-yellow pathogens which are named for their ability to cause chlorosis in plants (Böhm et. al, 2024). On *Fraxinus* spp. (ash) and *Syringa* spp. (lilac), '*Candidatus* phytoplasma fraxini' has been reported to cause yellowing, shoot proliferation and suppressed root growth (Böhm et. al, 2024).	(Hemiptera: Cicadellidae) and *Exitianus atratus* (Hemiptera: Cicadellidae) (EPPO, 2025). Other insect species are also potential vectors. Potential vectors of '*Candidatus* Phytoplasma fraxini' include: *Colladonus clitellarius, Graminella nigrifrons, Paraphlepsius irroratus, Paratanus exitiosus, Philaenus spumarius* and *Scaphoideus intricatus* (EPPO, 2023b). Long distance dispersal is likely through movement of infested plant material (EPPO, 2025).		occur in Argentina, Brazil, Canada, Chile, Colombia, United States of America, Iran and Italy (EPPO, 2023). '*Ca.* Phytoplasma fraxini' strain 16SrVII-B has been reported in South America (EPPO, 2023).		vector) [403]	vector) [404] HIGH (with vector) [405]		(with vector)

[399] At the species level not specific to a particular strain, hosts of '*Candidatus* Phytoplasma fraxini' include: *Acacia melanoxylon, Amaranthus dubius, Artemisia annua, Cenchrus clandestinus, Convolvulus arvensis, Croton* sp., *Cymbalaria muralis, Erigeron bonariensis, Eugenia neomyrtifolia, Fragaria x ananassa, Fraxinus americana, Fraxinus angustifolia, Fraxinus bungeana, Fraxinus excelsior, Fraxinus latifolia, Fraxinus nigra, Fraxinus ornus, Fraxinus pennsylvanica, Fraxinus profunda, Fraxinus quadrangulata, Fraxinus sogdiana, Fraxinus uhdei, Fraxinus velutina, Fraxinus, Fumaria capreolata, Galega officinalis, Gamochaeta purpurea, Gaultheria phillyreifolia, Gnaphalium cheiranthifolium, Holcus lanatus, Hypericum perforatum, Lepidium bipinnatifidum, Liquidambar styraciflua, Magnolia grandiflora, Medicago sativa, Paeonia lactiflora, Phoenix dactylifera, Pittosporum undulatum, Polygonum aviculare, Populus nigra, Prunus* sp., *Pyrus* sp., *Quercus humboldtii, Salix humboldtiana, Sambucus nigra, Senecio vulgaris, Solanum tuberosum, Sonchus oleraceus, Syringa josikaea, Syringa julianae, Syringa komarowii, Syringa laciniata, Syringa meyeri, Syringa nanceiana, Syringa oblata, Syringa persica, Syringa pubescens subsp. microphylla, Syringa pubescens subsp. patula, Syringa tomentella* subsp. *sweginzowii, Syringa tomentella subsp. yunnanensis, Syringa tomentella, Syringa villosa, Syringa vulgaris, Syringa x diversifolia, Syringa x henryi, Syringa x josiflexa, Syringa x prestoniae, Syringa, Taraxacum officinale, Ugni molinae, Vernonanthura brasiliana, Vitis vinifera* (EPPO, 2025).

[400] A 2020 study was the first worldwide to report an association between 16SrVII group phytoplasmas and sugarcane leaf yellowing, having isolated phytoplasmas from sugarcane in Brazil exhibiting yellow leaf syndrome (YLS) that had high genetic similarity (99% similarity of nucleotide sequences and the 16S rDNA gene sequence) to 16SrVII-B Ash yellows phytoplasmas from Argentina and Brazil (Oliveira et. al, 2020).

[403] This phytoplasma may be spread locally by insect vectors (EPPO, 2025). In the presence of a suitable insect vector, this phytoplasma could be naturally transmitted between host plants. At the species level not specific to a particular strain, '*Candidatus* Phytoplasma fraxini' has a wide host range suggesting a greater likelihood of encountering a suitable host were it to be vectored by a suitable insect.

[404] This phytoplasma relies on insect vectors for natural local dispersal between host plants (EPPO, 2025). This phytoplasma may be spread locally by insect vectors, for example, *Amplicephalus funzaensis* (Hemiptera: Cicadellidae) and *Exitianus atratus* (Hemiptera: Cicadellidae)(EPPO, 2025). *Amplicephalus funzaensis* does not appear to be present in Australia. *Exitianus atratus* also does not appear to be present in Australia, however, other members of the genus *Exitianus* are reported to occur in Australia. It is possible that native vectors could transmit this phytoplasma. Potential vectors of '*Candidatus* phytoplasma fraxini' include: *Colladonus clitellarius, Graminella nigrifrons, Paraphlepsius irroratus, Paratanus exitiosus, Philaenus spumarius* and *Scaphoideus intricatus* (EPPO, 2023b).

[405] This phytoplasma may be spread locally by insect vectors, for example, *Amplicephalus funzaensis* (Hemiptera: Cicadellidae) and *Exitianus atratus* (Hemiptera: Cicadellidae)(EPPO, 2025). *Amplicephalus funzaensis* does not appear to be present in Australia. *Exitianus atratus* does also not appear to be present in Australia, however, other members of the genus *Exitianus* are reported to occur in Australia. Other insect species are also potential vectors. Potential vectors of '*Candidatus* Phytoplasma fraxini' include: *Colladonus clitellarius, Graminella nigrifrons, Paraphlepsius irroratus, Paratanus exitiosus, Philaenus spumarius* and *Scaphoideus intricatus* (EPPO, 2023b). It is possible that native vectors could also transmit this phytoplasma in addition to any exotic vector that were to enter Australia.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Phytoplasma	Acholeplasmataceae [407]	Indian sugarcane yellow leaf phytoplasma 16SrI-B (with vector)	Indian sugarcane yellow leaf phytoplasma (with vector)	Sugarcane.	Symptoms consist of yellowing leaves with a bright yellow midrib, often when the rest of the lamina is still green. Pink colouration may also occur as well as early drying of leaves from the edges.	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		India.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Acholeplasmataceae [408]	Indian sugarcane yellow leaf phytoplasma 16SrI-B (without vector)	Indian sugarcane yellow leaf phytoplasma (without vector)	Sugarcane.	Symptoms consist of yellowing leaves with a bright yellow midrib, often when the rest of the lamina is still green. Pink colouration may also occur as well as early drying of leaves from the edges.	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		India.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Acholeplasmataceae [409]	Western X disease phytoplasma 16SrIII-A [410]	Western X disease phytoplasma (with vector)	Sugarcane.	Whole plant.	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		United States of America.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Acholeplasmataceae [411]	Western X disease phytoplasma 16SrIII-A [412]	Western X disease phytoplasma (without vector)	Sugarcane.	Whole plant.	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		United States of America.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

407 16Sr1-B
408 16Sr1-B
409 16SrIII-A
410 A' represents the subgroup. Within a given 16SrIII subgroup, different genotypes (sequevars) are present and can be distinguished by molecular markers (Pérez-López et. al , 2017).
411 16SrIII-A
412 A' represents the subgroup. Within a given 16SrIII subgroup, different genotypes (sequevars) are present and can be distinguished by molecular markers (Pérez-López et. al , 2017).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Phytoplasma	Acholeplasmataceae [413]	Sugarcane white leaf phytoplasma (16SrXI inc, 16SrXI-B and 16SrXI-D)	White leaf of sugarcane (SWLP) (with vectors)	Sugarcane.	The first foliar symptoms of sugarcane white leaf (SCWL) disease are cream-coloured or white stripes parallel to the midribs. As the disease progresses, stripes coalesce and extend along the entire leaf blades which appear severely chlorotic, while the vigour of the affected plants steadily decreases. [414]	Abiotic factors are not involved in natural spread of the sugarcane white leaf (SCWL) phytoplasma. SCWL phytoplasma is naturally transmitted by the leafhoppers *Matsumuratettix hiroglyphicus* and *Yamatotettix flavovittatus* (Matsumoto et al., 1968; Hanboongson et al., 2006). [415]		Bangladesh, Japan, Sri Lanka, Taiwan, Thailand, China.	MEDIUM	HIGH	HIGH	HIGH	HIGH
	Acholeplasmataceae [416]	Sugarcane white leaf phytoplasma (16SrXI inc, 16SrXI-B and 16SrXI-D)	White leaf of sugarcane (SWLP) (without vector)	Sugarcane.	The first foliar symptoms of sugarcane white leaf (SCWL) disease are cream-coloured or white stripes parallel to the midribs. As the disease progresses, stripes coalesce and extend along the entire leaf blades which appear severely chlorotic, while the vigour of the affected plants steadily decreases. [417]	Abiotic factors are not involved in natural spread of the sugarcane white leaf (SCWL) phytoplasma. SCWL phytoplasma is naturally transmitted by the leafhoppers *Matsumuratettix hiroglyphicus* and *Yamatotettix flavovittatus* (Matsumoto et al., 1968; Hanboongson et al., 2006). [418]		Bangladesh, Japan, Sri Lanka, Taiwan, Thailand, China.	LOW	LOW	LOW	HIGH	LOW

[413] 16SrXI -D

[414] The leaves are narrower and smaller than those of healthy plants, with a soft texture and are borne on slender, chlorotic shoots or tufted at the tips of slowly growing shoots. The affected plants are characterized by the excessive development of proliferating tillers with shortened internodes which gives the plants a bushy, broom-like appearance. Severely diseased plant parts fail to set fruits, decline and do not produce canes that can be milled. Losses due to sugarcane white leaf (SCWL) phytoplasma vary greatly depending on the susceptibility of the clones, the weather and other environmental conditions influencing sugarcane growth. In Taiwan, over 60 hectares of sugarcane were abandoned due to both high incidence and severity of SCWL disease whereas incidence of more than 10% occurred in 700 hectares.

[415] Like other phytoplasmas, SCWL agent is not seed-transmissible. However, it may be introduced into new areas through imported vegetative propagating materials such as seed canes, which may carry the pathogen undetected. The use of infected vegetative propagating material is responsible for long-distance movement of the pathogen and intentional introduction into new areas.

[416] 16SrXI -D

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[418] Like other phytoplasmas, SCWL agent is not seed-transmissible. However, it may be introduced into new areas through imported vegetative propagating materials such as seed canes, which may carry the pathogen undetected. The use of infected vegetative propagating material is responsible for long-distance movement of the pathogen and intentional introduction into new areas.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Phytoplasma	Acholeplasmataceae [419]	*'Candidatus* Phytoplasma sacchari' 16SrXI-B	Green grassy shoot (with vector)	Saccharum spp.	Symptoms of the disease include the bending of leaflets (termed flaccidity), foliar yellowing and marginal necrosis of the older leaves.	Vectors such as *Deltocephalus vulgaris*, *Maiestas portica* and *Cofana unimaculata* can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		India, Sri Lanka, Thailand, Vietnam, Yemen.	MEDIUM	HIGH	HIGH	HIGH	HIGH
Phytoplasma	Acholeplasmataceae [420]	*'Candidatus* Phytoplasma sacchari' 16SrXI-B	Green grassy shoot (without vector)	Saccharum spp.	Symptoms of the disease include the bending of leaflets (termed flaccidity), foliar yellowing and marginal necrosis of the older leaves.	Vectors such as *Deltocephalus vulgaris*, *Maiestas portica* and *Cofana unimaculata* can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.		India, Sri Lanka, Thailand, Vietnam, Yemen.	LOW	LOW	LOW	HIGH	LOW
Phytoplasma	Acholeplasmataceae [421]	*'Candidatus* Phytoplasma cirsii' [422]	Grassy shoot (with vector)	Saccharum interspecific hybrids, S. officinarum.	The disease is characterised by the production of numerous lanky tillers from the base of the affected shoots. Leaves become pale yellow to completely chlorotic, thin and narrow. The plants appear bushy and 'grass-like' due to reduction in the length of internodes premature and	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal. [424]		Vietnam, Thailand, India.	MEDIUM	HIGH	HIGH	HIGH	HIGH

[419] 16SrXI-B
[420] 16SrXI-B
[421] 16SrXI-D
[422] '*Candidatus* phytoplasma cirsii' has been identified as the current name for '*Candidatus* phytoplasma (16SrXI-D)' (Zhang et al. 2016). According to Wei & Zhao (2022), '*Ca*. Phytoplasma cirsii' is part of the 16SrXI-D subgroup and a member of the 16SrXI Rice yellow dwarf group of phytoplasmas alongside '*Ca*. Phytoplasma oryzae' and '*Ca*. Phytoplasma sacchari' (Wei & Zhao, 2022). In March 2025, following a recommendation to update the scientific name from the Plant Health Committee and based on evidence presented by Wei & Zhou (2022), including a GenBank accession number that matches that of '*Ca*. Phytoplasma cirsii' identified by Safarova et. al (2016), it was decided to update the scientific name from '*Candidatus* phytoplasma (16SrXI-D)' to '*Candidatus* phytoplasma cirsii'. This phytoplasma was previously referred to in this Biosecurity Plan as '*Candidatus* Phytoplasma' 16SrXI-D (potentially F).
[424] The primary spread of the phytoplasma is through diseased setts and cutting knifes. The pathogen is transmitted secondarily by aphids viz., *Rhopalosiphum maydis*, *Melanaphis sacchari* and *M. idiosacchari*. Sorghum and maize serves as natural collateral hosts.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Phytoplasma					continuous tillering. [423]								
Phytoplasma	Acholeplasmataceae[425]	*'Candidatus* Phytoplasma cirsii'[426]	Grassy shoot (without vector)	Saccharum interspecific hybrids, S. officinarum.	The disease is characterised by the production of numerous lanky tillers from the base of the affected shoots. Leaves become pale yellow to completely chlorotic, thin and narrow. The plants appear bushy and 'grass-like' due to reduction in the length of internodes premature and continuous tillering. [427]	Vectors can naturally disperse the phytoplasma over short distances. The movement of infected plants and/or vectors could facilitate long distance dispersal.[428]		Vietnam, Thailand, India.	LOW	LOW	LOW	HIGH	LOW
	Viruses												

[423] The disease appears nearly two months after planting. The affected clumps are stunted with premature proliferation of auxiliary buds. Cane formation rarely occurs in the affected clumps, if formed, thin with shorter internodes having aerial roots at the lower nodes. The buds on such canes usually papery and abnormally elongated.

[425] 16SrXI-D

[426] '*Candidatus* phytoplasma cirsii' has been identified as the current name for '*Candidatus* phytoplasma (16SrXI-D)' (Zhang et al. 2016). According to Wei & Zhao (2022), '*Ca*. Phytoplasma cirsii' is part of the 16SrXI-D subgroup and a member of the 16SrXI Rice yellow dwarf group of phytoplasmas alongside '*Ca*. Phytoplasma oryzae' and '*Ca*. Phytoplasma sacchari' (Wei & Zhao, 2022). In March 2025, following a recommendation to update the scientific name from the Plant Health Committee and based on evidence presented by Wei & Zhou (2022), including a GenBank accession number that matches that of '*Ca*. Phytoplasma cirsii' identified by Safarova et. al (2016), it was decided to update the scientific name from '*Candidatus* phytoplasma (16SrXI-D)' to '*Candidatus* phytoplasma cirsii'. This phytoplasma was previously referred to in this Biosecurity Plan as '*Candidatus* Phytoplasma' 16SrXI-D (potentially F).

[427] The disease appears nearly two months after planting. The affected clumps are stunted with premature proliferation of auxiliary buds. Cane formation rarely occurs in the affected clumps, if formed, thin with shorter internodes having aerial roots at the lower nodes. The buds on such canes usually papery and abnormally elongated.

[428] The primary spread of the phytoplasma is through diseased setts and cutting knifes. The pathogen is transmitted secondarily by aphids viz., *Rhopalosiphum maydis*, *Melanaphis sacchari* and *M. idiosacchari*. Sorghum and maize serves as natural collateral hosts.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Viruses	Acholeplasmataceae	Sugarcane Ramu stunt (with vector)	Ramu stunt (SRSV)	Saccharum interspecific hybrids, S. officinarum.	Whole plant; pale green or yellowish streak on leaves (varying in length); infected cane appears thinner/stunted with abnormal proliferation of the nodes and reduced internode length.[429]	The vector for the causal agent is thought to be the Delphacid planthopper *Eumetopina flavipes* (Kuniata et al., 1994). [430]		Papua New Guinea.	MEDIUM	HIGH	HIGH	EXTREME	EXTREME
Viruses	Acholeplasmataceae	Sugarcane Ramu stunt (without vector)	Ramu stunt (SRSV)	Saccharum interspecific hybrids, S. officinarum.	Whole plant; pale green or yellowish streak on leaves (varying in length); infected cane appears thinner/stunted with abnormal proliferation of the nodes and reduced internode length.[431]	The vector for the causal agent is thought to be the Delphacid planthopper *Eumetopina flavipes* (Kuniata et al., 1994). [432]		Papua New Guinea.	MEDIUM	LOW	LOW	EXTREME	MEDIUM

[429] The most pronounced symptoms are stunted growth - hence the name Ramu stunt - and plant death (Waller et al., 1987; Eastwood, 1990; Magarey et al., 1996). Initially leaves are shortened, stiff and erect and show either a pale green to chlorotic striping or a broad mosaic pattern (Suma and Jones, 2000). Shoots are often yellow and the leaves prematurely senesce, giving the crop a trashy, unkempt appearance (Magarey et al., 1996; Suma and Jones, 2000). Leaf patterns vary markedly with variety and crop and are at times uncharacteristic. There is a tendency for asymmetry across the leaf blade with one half showing more definite symptoms. Increased tiller numbers (Magarey et al., 1996) are found in several varieties and some have a grassy shoot appearance, though this is not definitive. Root system restrictions and death (Waller et al., 1987) are also associated with the disease. In some stools, individual tillers may be unthrifty and die while others produce a healthy stalk. In many cases in susceptible varieties, whole stools die giving rise to very large, or total, yield losses (Magarey et al., 1996; Suma and Jones, 2000). Complete ratoon failure has been noted as early as first ratoon.

[430] Natural transmission appears limited to that associated with the insect vector. Planting diseased vegetative material may spread the disease (the vegetative material is sometimes referred to as sugarcane 'seed material'). As vegetative propagation is normal for sugarcane, there is ample opportunity to spread the disease locally, nationally and internationally in this fashion. Spread outside planting material, or independent of an insect vector, is unknown. The vector for the causal agent is thought to be the Delphacid planthopper *Eumetopina flavipes* (Kuniata et al., 1994). Experimentation has shown that individuals of this species may transmit the disease when fed on diseased sugarcane and later transferred to healthy sugarcane plants. Symptoms took from 9 to 12 weeks to first appear. It is not known if the vector can transmit the disease trans-ovarially, or indeed which instars of the vector are able to acquire the causal agent. There are apparently several species of *Eumetopina* in Papua New Guinea; some of these species could transmit Ramu stunt. The disease usually spreads during the wetter times of the year in the commercial cropping area (January-March) (Waller et al., 1987). This most probably corresponds with the incidence of lush crop growth and a rapid build up in vector population. Natural transmission appears limited to that associated with the insect vector. Traditionally, disease spread may have occurred with transfer of planting material of the domesticated S. officinarum. Spread of the disease in the true seed of sugarcane has not been tested.

[431] The most pronounced symptoms are stunted growth - hence the name Ramu stunt - and plant death (Waller et al., 1987; Eastwood, 1990; Magarey et al., 1996). Initially leaves are shortened, stiff and erect and show either a pale green to chlorotic striping or a broad mosaic pattern (Suma and Jones, 2000). Shoots are often yellow and the leaves prematurely senesce, giving the crop a trashy, unkempt appearance (Magarey et al., 1996; Suma and Jones, 2000). Leaf patterns vary markedly with variety and crop and are at times uncharacteristic. There is a tendency for asymmetry across the leaf blade with one half showing more definite symptoms. Increased tiller numbers (Magarey et al., 1996) are found in a number of varieties and some have a grassy shoot appearance, though this is not definitive. Root system restrictions and death (Waller et al., 1987) are also associated with the disease. In some stools, individual tillers may be unthrifty and die while others produce a healthy stalk. In many cases in susceptible varieties, whole stools die giving rise to very large, or total, yield losses (Magarey et al., 1996; Suma and Jones, 2000). Complete ratoon failure has been noted as early as first ratoon.

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	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Viruses	Caulimoviridae	V	Sugarcane bacilliform virus	Sugarcane.	Whole plant, clear leaf symptoms (leaf fleck).	Most spread is suspected to be seed transmission.		Guadaloupe.	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
	Caulimoviridae	Sugarcane bacilliform Guadaloupe D virus	Sugarcane bacilliform virus	Sugarcane.	Whole plant, clear leaf symptoms (leaf fleck).	Most spread is suspected to be seed transmission.		Guadaloupe.	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
	Caulimoviridae	Sugarcane bacilliform IM virus	Sugarcane bacilliform virus	Sugarcane.	Whole plant, clear leaf symptoms (leaf fleck)	Most spread is suspected to be seed transmission.		Unknown.	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
	Caulimoviridae	Sugarcane bacilliform MO virus	Sugarcane bacilliform virus	Sugarcane.	Whole plant, clear leaf symptoms (leaf fleck).	Most spread is suspected to be seed transmission.		Morocco.	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
	Geminiviridae	Maize streak virus (Mastrevirus)[433] - with vector *Cicadulina mbila*	Maize streak virus	Maize, *Saccharum* spp.	Leaves.	The vector *Cicadulina mbila* is known to carry and transmit Maize streak virus. Movement without the vector is less likely.		Wide geographic range.[434]	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

able to acquire the causal agent. There are apparently a number of species of *Eumetopina* in Papua New Guinea; some of these species could transmit Ramu stunt. The disease usually spreads during the wetter times of the year in the commercial cropping area (January-March) (Waller et al., 1987). This most probably corresponds with the incidence of lush crop growth and a rapid build up in vector population. Traditionally, disease spread may have occurred with transfer of planting material of the domesticated S. officinarum. Spread of the disease in the true seed of sugarcane has not been tested. Spread outside planting material, or independent of an insect vector, is unknown.

[433] A disease referred to as Sugarcane streak is now acknowledged as a strain of Maize streak virus (Bock & Bailey, 1989).

[434] Geographic range includes: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Egypt, Eswatini, Ethiopia, Gabon, Ghana, Guinea, Kenya, Madagascar, Malawi, Mali, Mauritius, Mozambique, Niger, Nigeria, Réunion, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe, India, Indonesia, Yemen.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Viruses	Geminiviridae	Maize streak virus (Mastrevirus)[435] (without vector)	Maize streak virus	Maize, *Saccharum* spp.	Leaves.	The vector *Cicadulina mbila* is known to carry and transmit Maize streak virus. Movement without the vector is less likely.		Wide geographic range.[436]	LOW	LOW	LOW	MEDIUM	VERY LOW
	Geminiviridae	Maize striate mosaic virus (with vector)	Maize striate mosaic virus	Sugarcane, maize.	Streaks leaves and can restrict growth reducing yield.	The vector *Dalbulus maidis* is known to carry and disperse Maize striate mosaic virus. Movement without the vector is less likely.		Brazil.	LOW	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Geminiviridae	Maize striate mosaic virus (without vector)	Maize striate mosaic virus	Sugarcane, maize.	Streaks leaves and can restrict growth reducing yield.	The vector *Dalbulus maidis* is known to carry and disperse Maize striate mosaic virus. Movement without the vector is less likely.		Brazil.	NEGLIGIBLE	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Geminiviridae	Sugarcane streak Egypt virus (Mastrevirus) (with vector)	Sugarcane streak Egypt virus (SCSEV)	Sugarcane.	Streaks leaves and can restrict growth reducing yield.	Transmission is typically carried out by leafhoppers (Cicadellidae)		Egypt.	LOW	HIGH	HIGH	MEDIUM	LOW
	Geminiviridae	Sugarcane streak Egypt virus (Mastrevirus) (without vector)	Sugarcane streak Egypt virus (SCSEV)	Sugarcane.	Streaks leaves and can restrict growth reducing yield.	Transmission is typically carried out by leafhoppers (Cicadellidae)		Egypt.	LOW	LOW	LOW	MEDIUM	VERY LOW
	Geminiviridae	Sugarcane streak Mauritius virus (Mastrevirus) (with vector)	Sugarcane streak Mauritius virus (SCSMV)	Sugarcane.	Streaks leaves and can restrict growth reducing yield.	Transmission is typically carried out by leafhoppers (Cicadellidae)		Egypt.	LOW	HIGH	HIGH	MEDIUM	LOW
	Geminiviridae	Sugarcane streak Mauritius virus (Mastrevirus) (without vector)	Sugarcane streak Mauritius virus (SCSMV)	Sugarcane.	Streaks leaves and can restrict growth reducing yield.	Transmission is typically carried out by leafhoppers (Cicadellidae)		Egypt.	LOW	LOW	LOW	MEDIUM	VERY LOW

[435] A disease referred to as Sugarcane streak is now acknowledged as a strain of Maize streak virus (Bock & Bailey, 1989).
[436] Geographic range includes: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Egypt, Eswatini, Ethiopia, Gabon, Ghana, Guinea, Kenya, Madagascar, Malawi, Mali, Mauritius, Mozambique, Niger, Nigeria, Réunion, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe, India, Indonesia, Yemen.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Viruses	Geminiviridae	Sugarcane streak Reunion virus (Mastrevirus) (with vector)	Sugarcane streak Reunion virus (SCSRV)	Sugarcane.	Streaks leaves and can restrict growth reducing yield.	Transmission is typically carried out by leafhoppers (Cicadellidae)		Reunion.	LOW	HIGH	HIGH	MEDIUM	LOW
	Geminiviridae	Sugarcane streak Reunion virus (Mastrevirus) (without vector)	Sugarcane streak Reunion virus (SCSRV)	Sugarcane.	Streaks leaves and can restrict growth reducing yield	Transmission is typically carried out by leafhoppers (Cicadellidae)		Reunion.	LOW	LOW	LOW	MEDIUM	VERY LOW
	Geminiviridae	Sugarcane striate virus (Mastrevirus)	Sugarcane striate virus (SStrV)	Maize, Saccharum spp.	Leaves often symptomatic	Vegetative propagation of cane stalks can spread the germplasm		United States of America, Guadaloupe.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Geminiviridae	Sugarcane white streak virus (Mastrevirus)	Sugarcane white streak virus (SWSV)	Maize, Saccharum spp.	Symptoms associated with SWSV-infected plants include white leaf streaks.	Natural insect transmission, and the potential for rapid infection due to the vegetative propagative nature of sugarcane.		United States of America, Barbados.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Luteoviridae	Sugarcane yellow leaf virus (exotic strains)	Sugarcane yellow leaf virus	Sugarcane, grasses.	Yellowing of midrib extending to leaf blade; tissue necrosis (death); reduced photosynthesis, carbon assimilation and metabolism resulting in stunted growth	The vector Melanaphis sacchari is known to carry and transmit SYLV. Movement without the vector may include vegetative propagation.		Tunisia, Mexico, United States of America (Hawaii), Guadeloupe, Cuba, Brazil, Colombia, Peru, Mauritius, Reunion Island, India, China.	LOW[437]	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Potyviridae	Sorghum mosaic virus (Potyvirus)	Sorghum mosaic virus (SMV)	*Saccharum officinarum, Sorghum bicolor.*	Causal agent of the destructive sugarcane mosaic disease, leading to significant economic losses	Transmitted via several aphid species		Nigeria, Vietnam, China, United States of America, South America.	MEDIUM	LOW	MEDIUM	MEDIUM	LOW
	Potyviridae	Sugarcane mosaic virus (Potyvirus) (exotic strains)	Sugarcane mosaic virus (SCMV)	*Sorghum halepense, Saccharum officinarum.*	SCMV causes systemic infection of sugarcane, maize and various poaceous host plants: the whole plant, including roots, contains virus. However, the symptoms	SCMV is transmitted by aphid vectors in the non-persistent manner. Aphids introduce SCMV or other potyviruses from older infected crops of maize or		Wide geographic range. [440]	MEDIUM	HIGH	HIGH	MEDIUM	MEDIUM

[437] Although not a requirement on import permits, this virus is tested for in PEQ, with any detections subsequently destroyed.

[440] Geographic range includes: Angola, Cabo Verde, Cameroon, Congo, Côte d'Ivoire, Egypt, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Morocco, Nigeria, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, Zimbabwe, Bangladesh, Cambodia, China, India, Indonesia, Iran, Israel, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Turkey, Vietnam, Czech Republic, France, Germany, Greece, Hungary, Italy, Poland, Portugal, Romania, Serbia, Serbia and Montenegro, Spain, Ukraine, Antigua and Barbuda, Barbados, Belize, Costa Rica, Cuba, Dominican Republic, El Salvador, Guadeloupe, Guatemala, Haiti.

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Viruses					(mosaic and/or necrosis) are observed on the leaves and sometimes the stems. [438]	other hosts. [439]							
	Potyviridae	Sugarcane streak mosaic virus (Poacevirus)	Sugarcane streak mosaic virus (SCSMV)	*Saccharum* spp.	Streaks leaves and restrict growth reducing yield	Movement and dispersal are largely attributed to aphid vectors		India, Pakistan, China, Thailand, Vietnam, Indonesia, Myanmar.	MEDIUM	HIGH	HIGH	HIGH	HIGH
	Spinareoviridae	Reovirus	Reovirus (South Africa)	Sugarcane.	Causal agent for Fiji disease	Transmitted by the leafhopper *Perkinsiella vitiensis*.		South Africa.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Tombusviridae	Maize chlorotic mottle virus	Maize chlorotic mottle virus	Sugarcane, maize, ginger, colver, potato, cocoa, black pepper, pineapple, coconut, curcubits.	For field-grown maize infected with MCMV, growth is stunted with the formation of short internodes. Leaf symptoms begin as chlorotic stripes running parallel to the veins which later coalesce to produce elongated chlorotic blotches, finally resulting in leaf necrosis and epinasty. [441]	The vectors *Chaetocnema pulicaria*, *Diabrotica barberi*, *D. undecimpunctata*, *D. virgifera*, *Frankliniella williamsi*, *Oulema melanopus*, *Systena frontalis* are known to carry and transmit Maize stripe virus. Movement without the vector may include vegetative propagation.		Africa, Asia, Europe, North America, South America.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
	Unknown	Undetermined	Spike	Undetermined.	Unknown.			India.	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

[438] The mosaic symptoms typically appear as contrasting shades of green on a background of paler green to yellow chlorotic areas. Sometimes yellow stripes or streaks occur. The whole plant may become stunted when infection occurs early. The symptoms may depend on the virus strain, the host cultivar, the growth stage of the plant at the time of infection, and the environmental conditions, particularly temperature.

[439] Transmission of SCMV in vegetative planting material is an additional important method of spreading the virus. Mature sugarcane plants with mild symptoms may be used as planting material, and thus the virus may be distributed widely (Srisink et al., 1993).

[441] In severe infections of particularly susceptible lines, leaf necrosis can result in plant death. Male inflorescences have hard panicles, short rachis and few spikelets. Fewer ears and ear malformation can also occur in severe infections (Castillo, 1976).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
	Virgaviridae [442]	Genus *Pecluvirus* (Pandey et. al, 2017)	Indian peanut clump virus (IPCV), Sugarcane red leaf mottle (Dieryck et. al, 2009) [443, 444].	Wide host range including both monocotyledonous and dicotyledonous host plants (Pandey et. al,	On sugarcane, it has been suggested that red leaf mottle of sugarcane could potentially be associated with IPCV of which symptoms include stunting and mottling, with the latter observed to evolve into red streaks on leaves (Pandey	This virus is reportedly transmissible via sap, seed and soil-borne fungi such as *Polymyxa graminis*, the latter which is reported to have a wide host range (Delfosse et. al, 2002; Pandey et. al, 2017) [447]. IPCV can also be transmitted via		India (Pandey et. al, 2017; Reddy et. al, 1983). Pakistan (Dieryck et. al, 2009).	LOW [448]	MEDIUM [449]	MEDIUM [450]	UNKNOWN [451]	UNKNOWN

[442] Pandey et. al, 2017.
[443] This virus is considered distinct from peanut clump virus also of the family Virgaviridae and genus *Pecluvirus* (Pandey et. al, 2017; Reddy et. al, 1983). At least three different serotypes of IPCV are thought to exist (Dieryck et. al, 2009).
[444] The genome of this virus is comprised of bipartite positive sense single stranded RNA (Pandey et. al, 2017). There is evidence to suggest *P. graminis* is present in Australia including a specimen of *Polymyxa graminis* collected in New South Wales (Australia)(DAR48987b) is held in the NSW Plant Pathology Herbarium (DAR)(Cox, Luo & Jones, 2014).
[447] The fungus, *P. graminis*, whilst reported to prefer monocotyledonous hosts such as maize, pearl millet and sorghum, has been reported to be able to transmit IPCV to dicotyledonous crops (Pandey et. al, 2017). Notably, sugarcane is a monocotyledonous plant as a member of the Poaceae family. Seed transmission of the virus has been observed in groundnut, peanut, millet, wheat and maize (Pandey et. al, 2017). As a vector of the virus, conditions that favour the spread of *P. graminis* also favour the spread of the virus. *P. graminis* produces motile zoospores which can be dispersed in water, particularly in high rainfall, and temperatures from 23 to 30 degrees Celsius are considered favourable for virus transmission (Pandey et. al, 2017). *P. graminis* is also reported to vector at least 15 other viruses including members of the genera: Benyvirus, Bymovirus, Furovirus and Pecluvirus (Dieryck et. al, 2009).
[448] This virus has a limited geographic distribution being presently found only in India and Pakistan (Dieryck et. al, 2009; Pandey et. al, 2017; Reddy et. al, 1983). Potential entry pathways could be on infested seed, soil and sugarcane vegetative propagation material. Seed transmission of the virus has been observed in groundnut/peanut, millet, wheat and maize (Pandey et. al, 2017). Hence, this virus could be introduced to new areas through the importation on infected seed. Peanut/groundnut (*Arachis hypogaea*) seeds are allowed to be imported into Australia as restricted legume seed for sowing but must be sown at an approved arrangement site under a process management system or directed to the Department of Agriculture, Fisheries and Forestry Post Entry Quarantine facility in Victoria (DAFF, 2025b). Similarly, Millet (*Cenchrus* spp.) and Wheat (*Triticum* spp.) seeds are allowed to be imported into Australia as seed for sowing but must be sown at an approved arrangement site under a process management system or directed to the Department of Agriculture, Fisheries and Forestry Post Entry Quarantine facility in Victoria for growing out (DAFF 2024; DAFF, 2025c). Maize (*Zea mays*) seed for sowing is also allowed to be imported into Australia with the requirement that the seed is sown at an approved arrangement site under a process management system or directed to the Department of Agriculture, Fisheries and Forestry Post Entry Quarantine facility in Victoria for growing out (DAFF, 2024b). Certified maize seed from New Zealand or Idaho (United States of America) must be imported under a valid import permit and is subject to inspection by the Department of Agriculture, Fisheries and Forestry (DAFF, 2024b). With respect to sugarcane propagative material as a potential import pathway, Australia permits import of Saccharum spp. (sugarcane) as nursery stock in the form of tissue culture or setts (cuttings) – not seed. Both forms require a valid import permit, must arrive via air freight only and be subsequently directed to the Department of Agriculture, Fisheries and Forestry Post Entry Quarantine facility in Victoria for disease screening and testing, of which diagnostic testing may be carried out by Sugar Research Australia (SRA) or the Queensland Department of Primary Industries. Import of sugarcane is therefore a well-regulated pathway, hence the likelihood of import through infested sugarcane propagative material is estimated to be low (DAFF, 2025). Import in infested soil is unlikely given known hosts are not permitted for import as nursery stock into Australia.
[449] Both IPCV and its soil-borne fungus vector *Polymyxa graminis*, have a wide host range (Delfosse et. al, 2002). *Polymyxa graminis* has been reported as present in Australia (Cox, Luo & Jones, 2014). The presence of a suitable vector in combination with the wide host range of both the vector and IPCV, would increase the likelihood of the virus encountering a suitable host on which to establish.
[450] IPCV is transmissible by the soil-borne fungus, *Polymyxa graminis* (Pandey et. al, 2017). *P. graminis* is reported to have a wide host range and reproduce intensively on monocotyledonous host plants (Delfosse et. al, 2002; Pandey et. al, 2017). Hence, it is recommended to exclude monocotyledonous host plants from crop rotation to discourage population of P. graminis (Pandey et. al, 2017). Notably however, sugarcane is a monocotyledonous plant as a member of the Poaceae family. If possible, it would be advisable to avoid crop rotation with any other monocotyledonous plants. *Polymyxa graminis* is reported as present in Australia (Cox, Luo & Jones, 2014).
[451] IPCV is reported to cause little damage or no symptoms on monocotyledonous plants (Pandey et. al, 2017). Notably, sugarcane is a monocotyledonous plant as a member of the Poaceae family. In contrast, susceptible plants such as peanut are dicotyledonous (Pandey et. al, 2017). Disease caused by peanut clump viruses including IPCV are reported to mostly cause disease in local patches in sugarcane fields (Dieryck et. al, 2009). Sourcing sugarcane cuttings produced in disease-free areas is encouraged to reduce to risk of spreading IPCV (Dieryck et. al, 2009).

	Family	Scientific name	Common name	Host range	Affected plant part and impact on crop	Movement and dispersal	Vector of exotic pathogens?	Geographic distribution	Entry potential	Est. Potential [338]	Spread potential	Economic impact	Overall risk rating
Viruses				2017) [445].	et. al, 2017). IPCV is reported to cause little damage or no symptoms on monocotyledonous plants (Pandey et. al, 2017). Notably, sugarcane is a monocotyledonous plant as a member of the Poaceae family. Disease caused by peanut clump viruses including IPCV are reported to mostly cause disease in local patches in sugarcane fields (Dieryck et. al, 2009) [446].	soil and through vegetative propagation of sugarcane cuttings (Dieryck et. al, 2009).							
	Virgaviridae	Peanut clump virus	Red leaf mottle	Sugarcane, groundnut, wheat, millet.	Affected plant part (and impact on crop).	Can naturally transmit in contaminated soil. *Polymyxa graminis* is also thought to be a vector.		Benin, Burkina Faso, Chad, Congo, Cote d'Ivoire, Gabon, Mali, Niger, Senegal, Sudan, India, Pakistan.	LOW	HIGH	HIGH	LOW	VERY LOW
			Dwarf disease of sugarcane	Sugarcane					UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
			Sereh	*S. officinarum*.					UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
			Ring mosaic	Undetermined.					UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
			Sembur	Undetermined.					UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
			White stripe	Undetermined.					UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

[445] Hosts include *Arachis hypogaea* (groundnut), pigeonpea, cowpea, chili, *Triticum aestivum* (wheat), *Hordeum vulgare* (barley), *Sorghum bicolor* (sorghum), *Saccharum officinarum* (sugarcane), *Zea mays* (maize) (Pandey et. al, 2017; Reddy et. al, 1983). Experimental hosts include *Nicotiana benthamina*, *N. glutinosa*, *Phaseolus vulgaris* cv. Topcrop, *Vigna unguiculata* cv. Pusa Komal and *Chenopodium amaranticolor* (Pandey et. al, 2017).

[446] On groundnut, symptoms include slight stunting, clumping, dark green colouration of leaves and reduction in pod size (Pandey et. al, 2017).

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Invertebrate Threat Summary Table

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Minaei, K. & Mound, L. A. (2008). The Thysanoptera Haplothripini (Phlaeothripidae) of Iran. *Journal of Natural History* 42: 2617–2658.	*Haplothrips ganglbaueri*
Mound, L. A. (2019). Identification of *Haplothrips* species from Malesia (Thysanoptera; Phlaeothripidae). *Zootaxa* 4623 (1): 041–050.	*Haplothrips ganglbaueri*
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Reference	**Related species**
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Department of Agriculture, Fisheries and Forestry (DAFF)(2025). BICON: Case: *Saccharum* spp. as nursery stock Effective 28 Feb 2025. Available online at: https://bicon.agriculture.gov.au/BiconWeb4.0/ImportConditions/Bookmark/GetBookmark?EvaluationStateId=cb1b4678-ed8a-4126-9cd8-c791f4de1a9d&EvaluationPhase=ImportConditions&CaseElementPk=2288077&QuestionId=47094. Accessed 5th March 2025.	*Xanthomonas sacchari*
Fang, Y., Lin, H., Wu, L., Ren, D., Ye, W., Dong, G., Zhu, L. & Guo, L. (2015). Genome sequence of *Xanthomonas sacchari* R1, a biocontrol bacterium isolated from the rice seed. *J Biotechnol*., Jul 20;206:77-8. doi: https://doi.org/10.1016/j.jbiotec.2015.04.014. Epub 2015 Apr 28. PMID: 25931193.	*Xanthomonas sacchari*
Habibi, S., Djedidi, S., Ohkama-Ohtsu, N., Sarhadi, W.A., Kojima, K., Rallos, R.V., Ramirez, M.D.A., Yamaya, H., Sekimoto, H. & Yokoyama, T. (2019). Isolation and screening of indigenous plant growth-promoting rhizobacteria from different rice cultivars in Afghanistan soils. *Microb Environ* 34 (4): 347-355. DOI: 10.1264/jsme2.ME18168.	*Xanthomonas sacchari*
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Hidayati, M., Suranto,, Susilowati, A. et. al (2022). DNA Probe as Biosensor Candidate for *Clavibacter michiganensis* subsp. *michiganensis* on Tomato Plants. *Jurnal Fitopatologi Indonesia*.	*Clavibacter michiganensis* subsp. *Nebraskensis*
Ivayani, Widiastuti, A., Suryanti, Suharjo, R. & Priyatmojo, A. (2022). Short Communication: First report of *Xanthomonas sacchari* causing rice sheath rot disease in Lampung, Indonesia, Biodiveristas, Volume 23, Number 12, pp. 6463-6470. doi: 10.13057/biodiv/d231245.	*Xanthomonas sacchari*
Klett, P. & Rott, P. (1994). Inoculum sources for the spread of leaf scald disease of sugarcane caused by *Xanthomonas albilineans* in Guadeloupe. *Journal of Phytopathology* 142: 283-291. https://doi.org/10.1111/j.1439-0434.1994.tb04541.x.	*Xanthomonas sacchari*
Li, M., Bao, Y., Li, Y. et al. (2022). Comparative genome analysis unravels pathogenicity of *Xanthomonas albilineans* causing sugarcane leaf scald disease. *BMC Genomics* 23, 671. https://doi.org/10.1186/s12864-022-08900-2.	*Xanthomonas sacchari*
Mielnichuk, N., Bianco, M. I., Yaryura, P. M., Bertani, R. P., Toum, L., Daglio, Y., ... & Vojnov, A. A. (2021). Virulence factors analysis of native isolates of *Xanthomonas albilineans* and *Xanthomonas sacchari* from Tucumán, Argentina, reveals differences in pathogenic strategies. *Plant Pathology*, 70(5), 1072-1084.	*Xanthomonas sacchari*
Ortiz-Castro, M., Hartman, T., Coutinho,T., Lang, J.M., Korus, K., Leach, J.E., Jackson-Ziems, T. & Broders, K. (2020). Current Understanding of the History, Global Spread, Ecology, Evolution, and Management of the Corn Bacterial Leaf Streak Pathogen, *Xanthomonas vasicola pv. vasculorum*, *Phytopathology*, 110:6, 1124-1131. https://doi.org/10.1094/PHYTO-01-20-0018-PER.	*Xanthomonas vasicola pv. vasculorum*
Quecine, M.C., Araújo, W.L., Rossetto, P.B., Ferreira, A., Tsui, S., Lacava, P.T., Mondin, M., Azevedo, J.L. & Pizzirani-Kleiner, A.A. (2012). Sugarcane Growth Promotion by the Endophytic Bacterium *Pantoea agglomerans*, 33.1. *Appl Environ Microbiol 78*, 7511-7518. https://doi.org/10.1128/AEM.00836-12.	*Pantoea agglomerans* (exotic strains)
Rao, G. P. (Ed.). (2004). Sugarcane Pathology, *Vol. 3: Bacterial and Nematode Diseases* (Vol. 3). CRC Press.	*Pseudomonas desaiana* (*Burkholdia desaiana*)

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Schuster, M.L. (1975). Leaf freckles and wilt of corn incited by *Corynebacterium nebraskense* Schuster, Hoff, Mandel, Lazar, 1972. *Research Bulletin Agricultural Experiment Station University of Nebraska*. 1972, No. 270.	*Clavibacter michiganensis* subsp. *Nebraskensis*
Studholme, D. J., Wasukira, A., Paszkiewicz, K., Aritua, V., Thwaites, R., Smith, J., & Grant, M. (2011). Draft Genome Sequences of *Xanthomonas sacchari* and Two Banana-Associated Xanthomonads Reveal Insights into the Xanthomonas Group 1 Clade. *Genes*, 2(4), 1050-1065. https://doi.org/10.3390/genes2041050.	*Xanthomonas sacchari*
Sugar Research Australia (2017). Information Sheet: Leaf scald. Available online at: https://sugarresearch.com.au/sugar_files/2017/02/Leaf-scald-IS13002.pdf.	*Xanthomonas albilineans* (exotic strains- serological groups 2 or 3)
Sun, H. J., Wei, J. J., Li, Y. S., Bao, Y. X., Cui, Y. P., Huang, Y. Z., ... & Zhang, M. Q. (2017). First report of sugarcane leaf chlorotic streak disease caused by *Xanthomonas sacchari* in Guangxi, China. *Plant Disease*, 101(6), 1029-1029. doi: https://doi.org/10.1094/PDIS-07-16-1010-PDN.	*Xanthomonas sacchari*

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Azuddin, N.F., Mohamad Noor Azmy, M.S. & Zakaria, L. (2023). Molecular identification of endophytic fungi in lawn grass (*Axonopus compressus*) and their pathogenic ability. *Sci Rep* 13, 4239. https://doi.org/10.1038/s41598-023-31291-7.	*Stagonospora bicolor (syn. Saccharicola bicolor)*
Bao, Y., Yao, W., Duan, Z., Powell, C. A., Chen, B., & Zhang, M. (2020). Genome Sequence of *Phoma sorghina* var. *saccharum* That Causes Sugarcane Twisted Leaf Disease in China. *Molecular Plant-Microbe Interactions*, 33(9), 1092-1094. https://apsjournals.apsnet.org/doi/abs/10.1094/PDIS-06-14-0661-RE.	*Phoma sorghina var. saccharum*
Campbell, W. P. (2011). The influence of associated microorganisms on the pathogenicity of *Helminthosporium sativum*. *Canadian Journal of Botany*. 34(6): 865-874. https://doi.org/10.1139/b56-068.	*Helminthosporium purpurascens*
Chen, J., Bao, H., Liu, S., Cai, Y., Li, W., Chen, J. & Shen, W. (2023). First Report of Ring Spot Disease on Sugarcane Caused by *Curvularia ischaemi* in China, *Plant Disease*, 107(5), 1627. https://doi.org/10.1094/PDIS-08-22-1793-PDN.	*Curvularia ischaemi*
Croft, B. & Magarey, R.C. (1997). Pest Risk Analysis of Sugarcane for the Northern Australia Quarantine Strategy - Part 2 Quarantine Pathogens, Bureau of Sugar Experiment Stations Queensland, Australia. Available online at: https://elibrary.sugarresearch.com.au/server/api/core/bitstreams/f5c31d23-c509-483e-b05c-4e81e144cb6d/content.	*Bakerophoma sacchari, Sphacelotheca erianthi, Sphacelotheca macrospora, Mycosphaerella striatiformans, Passalora vaginae (syn. Mycovellosiella vaginae), Pseudocercospora atrofiliformis (syn. Cercospora atrofiliformis)*
Croft, B.J., Piggin, C.M., Wallis, E.S. & Hogarth, D.M. (1996). Sugarcane germplasm conservation and exchange. *ACIAR Proceedings* No. 67, 134p. Available online at: https://ageconsearch.umn.edu/record/134739/files/PR067.pdf#page=34.	Basidiomycete fungus (Ramu orange leaf)

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European Plant Protection Organisation (EPPO) Global Database (n.d.). *Sorosporium indicum* (SOROIN). Available online at: https://gd.eppo.int/taxon/SOROIN/hosts.	*Sphacelotheca indica (syn. Sorosporium indicum)*
Eriksson, O. E., & Hawksworth, D. L. (2003). *Saccharicola*, a new genus for two *Leptosphaeria* species on sugar cane. *Mycologia*, 95(3), 426–433. https://doi.org/10.1080/15572536.2004.11833087.	*Saccharicola taiwanensis (syn. Leptosphaeria taiwanensis), Stagonospora bicolor (syn. Saccharicola bicolor)*
Gabel, A. W., & Tiffany, L. H. (1987). Host-Parasite Relations and Development of *Elsinoë panici*. *Mycologia*, 79(5), 737–744. https://doi.org/10.1080/00275514.1987.12025454.	*Elsinoë sacchari (syn. Sphaceloma sacchari)*
Gonsalves, A.K. & Ferreira, S.A. (1994). *Mycosphaerella*, General Information Summary, Crop Knowledge Master. Available online at: http://www.extento.hawaii.edu/kbase///Crop/Type/myc_prim.htm.	*Mycosphaerella striatiformans*
Jackson, G. (2020). Pacific Pests, Pathogens & Weeds: Sugarcane white rash (220) Fact Sheet, LUCID Central. Available online at: https://apps.lucidcentral.org/ppp_v9/text/web_full/entities/sugarcane_white_rash_220.htm.	*Elsinoë sacchari (syn. Sphaceloma sacchari)*
Jackson, G. (2020). Pacific Pests, Pathogens & Weeds: Sugarcane veneer blotch (219) Fact Sheet, LUCID Central. Available online at: https://apps.lucidcentral.org/ppp_v9/text/web_full/entities/sugarcane_veneer_blotch_219.htm.	*Deightoniella papuana*
Jinju, W., Zhanyun, D., Chenghua, H., Weihua, H., Meixin, Y., Haibin, L. & Hongqin, T. (2013). Preliminary Investigation on the Main Fungal Diseases of Sugarcane in Guangxi Province of China, *Plant Diseases and Pests*, 4(1), 28-32.	*Cercospora longipes*
Kanapathipillai, V.S. (1982). Seed Mycofloras of Hyacinth Beans (Lablab niger) and Long Beans (*Vigna sesquipedalis*) and Their Pathogenic Importance, *Transactions of the British Mycological Society*, 78(3), 503-508. doi:10.1016/s0007-1536(82)80157-5.	*Nigrospora sacchari*
Liu, L. (1969). A New Species of Helminthosporium Causing Leaf Spot Disease of Sugarcane in Puerto Rico, The *Journal of Agriculture of the University of Puerto Rico*, 55(1), 12-22. DOI: http://dx.doi.org/10.46429/jaupr.v55i1.11071. Available online at: https://revistas.upr.edu/index.php/jaupr/article/download/11071/9356.	*Helminthosporium po rtoricense*
Moharam, M. (2018). First report of loose kernel smut of sorghum caused by *Sporisorium cruentum* in Egypt. *New Disease Reports*, 37(1), 9-9.	*Sporisorium cruentum*
Nanjundaswamy, J.C., Naik, S.T. & Nandan, M. (2020). Bio efficacy of fungicides, biocontrol agents and botanicals against brown spot (*Cercospora longipes* Butler) of sugarcane. *International Journal of Chemical Studies*. https://doi.org/10.22271/chemi.2020.v8.i3aq.9665.	*Cercospora longipes*
Nyvall, R.F. (1989). Diseases of Sugarcane. In: Field Crop Diseases Handbook. *Springer*, Boston, MA. https://doi.org/10.1007/978-1-4757-5221-2_20.	*Pseudocercospora atrofiliformis (syn. Cercospora atrofiliformis)*
Okane, I., Toyama, K., Nakagiri, A., Suzuki, K., Srikitikulchai, P., Sivichai, S., … Læssøe, T. (2008). Study of endophytic Xylariaceae in Thailand: diversity and taxonomy inferred from rDNA sequence analyses with saprobes forming fruit bodies in the field. *Mycoscience*, 49(6), 359–372. doi:10.1007/s10267-008-0440-6 10.1007/s102.	*Xylaria bambusicola*
Putra, L.K. & Damayanti, T.A. (2012). Major Diseases Affecting Sugarcane Production in Indonesia, Functional Plant Science and Biotechnology, *Functional Plant Science and Biotechnology*, 6(2), 124-129, Global Science Books. Available online at: http://globalsciencebooks.info/Online/GSBOnline/images/2012/FPSB_6(SI2)/FPSB_6(SI2)124-129o.pdf.	*Stagonospora bicolor (syn. Saccharicola bicolor)*

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Rott, P. & Comstock, J.C. (2000). Minor fungal diseases In: A Guide to Sugarcane Diseases. Rott P, Bailey RA, Comstock JC, Croft BJ, Saumtally AS. France: CIRAD, 205. Available online at: https://www.google.com.au/books/edition/A_Guide_to_Sugarcane_Diseases/W4g5NXRvpZ8C?hl=en&gbpv=1&dq=Pseudocercospora+atrofiliformis&pg=PA205&printsec=frontcover.	*Pseudocercospora atrofiliformis* (syn. *Cercospora atrofiliformis*), *Deightoniella papuana*, *Mycosphaerella striatiformans* and Basidiomycete fungus (Ramu orange leaf)
Selvaraj, P., Muralishankar, V., Muruganantham, S., Tham, J.H.F., Saeroji, S., Susiyanti, E., Lau, K.J.X., Naqvi, N.I.. (2024) Draft genome sequence of *Xylaria bambusicola* isolate GMP-LS, the root and basal stem rot pathogen of sugarcane in Indonesia. *Microbiol Resour Announc* 13:e01043-23. https://doi.org/10.1128/mra.01043-23.	*Xylaria bambusicola*
Sampang, R. C. (1985). Component Analyses of Resistance, Mode of Spread and Yield Loss Assessment of Leaf Scorch of Sugarcane. PhD Thesis. Los Banos, Philippines: *University of the Philippines at Los Banos*.	*Stagonospora sacchari*
Sen, T. N. (1930). Appendix I. IV. Mycology. Appendix I. IV. *Mycology*.	*Hendersonina sacchari*
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van den Berg, J., Heyns, E. (1945). South African Hoplolaiminae. 4. The Genus *Helicotylenchus* Steiner, 1945. *Phytophylactica* (7)1.	*Helicotylenchus erythrinae*

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Venkatachalam, R. & Ilamurugu, K. (n.d.), Sugarcane: Major Disease: Grassy Shoot, Development of e Courses for Bachelor of Agriculture, Tamil Nadu Agricultural University. Available online at: http://www.eagri.org/eagri50/PATH272/lecture06/009.html.	Indian sugarcane yellow leaf phytoplasma 16SrI-B (with vector), Indian sugarcane yellow leaf phytoplasma 16SrI-B (without vector)
Viswanathan, R. (2021). Impact of yellow leaf disease in sugarcane and its successful disease management to sustain crop production. *Indian Phytopathology* 74, 573–586. https://doi.org/10.1007/s42360-021-00391-7.	Indian sugarcane yellow leaf phytoplasma 16SrI-B (with vector), Indian sugarcane yellow leaf phytoplasma 16SrI-B (without vector)
Wei, W. & Zhao, Y. (2022). Phytoplasma Taxonomy: Nomenclature, Classification and Identification, Biology, 11, 1119. https://doi.org/10.3390/biology11081119.	*'Candidatus* Phytoplasma cirsii'
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Batista, J.G., Boiteux, L.S., Melo, F.F.S., Miranda, B.E.C., Ribeiro, S.., Fonseca, M.E.N. & Pereira-Carvalho, R.C. (2021). First report of maize striate mosaic virus (Geminiviridae) in sugarcane (Saccharum officinarum), Australasian Plant Disease Notes, 16, 16. Available online at: https://link.springer.com/content/pdf/10.1007/s13314-021-00428-w.pdf.	Maize striate mosaic virus (with vector), Maize striate mosaic virus (without vector)
Bock, K.R., & Bailey, R.A., (1989). Chapter XX: Streak. In: Ricaud, C., Egan, B.T., Gillaspie, A.G. & Hughes, C.G. (1989) Diseases of Sugarcane: Major Diseases, Amsterdam, The Netherlands, Elsevier Science Publishers.	Maize streak virus
Boukari, W., Alcalá-Briseño, R.I., Kraberger, S., Fernandez, E., Filloux, D., Daugrois, J.H., Comstock, J.C., Lett, J.M., Martin, D.P., Varsani A., Roumagnac, P., Polston, J.E. & Rott, P.C. (2017). Occurrence of a novel mastrevirus in sugarcane germplasm collections in Florida, Guadeloupe and Réunion. *Virol J.,* 14(1):146. doi: 10.1186/s12985-017-0810-9. PMID: 28754134; PMCID: PMC5534050.	Sugarcane streak Reunion virus (Mastrevirus) (with vector), Sugarcane streak Reunion virus (Mastrevirus) (without vector)

VIRUSES	
Boukari, W, Filloux, D, Daugrois, J-H, Fernanadez, E., Mollov, D., Kaye, C., Hincapie, M., Sanchez, A., Wang, J., Roumagnac, P., Rott, P. (2020). Molecular detection of sugarcane striate virus and sugarcane white streak virus and their prevalence in the Miami World Collection of sugarcane and related grasses. *Plant Pathol*. 2020; 69: 1060–1069. https://doi.org/10.1111/ppa.13192.	Sugarcane white streak virus (Mastrevirus)
Castillo, J. C. (1976). Maize virus and virus-like diseases in Peru. In: Williams LE, Gordon DT, Nault LR, eds. Proceedings of the International Maize Virus Disease Colloquium and Workshop, 16-19 August 1976, The Ohio State University, Wooster, Ohio: Ohio Agricultural Research and Development Center, 40-44. Abstract available online at: https://www.cabidigitallibrary.org/doi/full/10.5555/19771337234.	Maize chlorotic mottle virus
Cox, B., Luo, H., & Jones, R. (2014). *Polymyxa graminis* isolates from Australia: Identification in wheat roots and soil, molecular characterization, and wide genetic diversity. *Plant Disease*, 98(11), 1567-1575. https://doi.org/10.1094/PDIS-02-14-0128-REs. Abstract available online at: https://research-repository.uwa.edu.au/en/publications/polymyxa-graminis-isolates-from-australia-identification-in-wheat.	Indian peanut clump virus (IPCV)
Croft, B.J., Piggin, C.M., Wallis, E.S. & Hogarth, D.M. (1995). Sugarcane Germplasm Conservation and Exchange, Report of an international workshop held in Brisbane, Queensland, Australia 28-30 June 1995, ACIAR Proceedings No. 67, 134p. Available online at: https://ageconsearch.umn.edu/record/134739/files/PR067.pdf#page=55.	Reovirus
Damayanti, T., & Putra, L. (2010). First occurrence of Sugarcane streak mosaic virus infecting sugarcane in Indonesia. *Journal of General Plant Pathology*, 77(1), 72-74.	Sugarcane streak mosaic virus (Poacevirus)
Delfosse, P., Reddy, A.S., Thirumala, K.D., Legrève, A., Risopoulos, J., Doucet, D., Shoba, P.D., Maraite, H. & Reddy, D.V.R. (2002). Dynamics of *Polymyxa graminis* and Indian peanut clump virus (IPCV) infection on various monocotyledonous crops and groundnut during the rainy season. *Plant Pathol* 51(5):546–560. https://doi.org/10.1046/j.1365-3059.2002.00752.x.	Indian peanut clump virus (IPCV)
Department of Agriculture, Fisheries and Forestry (DAFF)(2024). BICON: Case: *Cenchrus* spp. seed for sowing Effective 15 Dec 2024. Available online at: https://bicon.agriculture.gov.au/BiconWeb4.0/ImportConditions/Bookmark/GetBookmark?EvaluationStateId=12fcd314-938e-4416-80dd-4b7ef0145118&EvaluationPhase=ImportDefinition&CaseElementPk=2269373&QuestionId=25053. Accessed 5th March 2025.	Indian peanut clump virus (IPCV)
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