



Chapter 2

Protecting Australia's plant resources

Protecting Australia's plant resources

The damage to plants caused by pests varies from species to species, but it can be significant. It is estimated that every year between 20 and 40 per cent of crops are lost to plant pests and weeds globally¹⁰. Some invasive exotic pest species also have the potential to cause permanent damage to native plants in our unique natural ecosystems. Others can reduce the social value of public amenities such as parks and gardens.

This chapter covers the priority pest and disease threats to the environment and for each of the major plant production industries. It describes Australia's plant resources and environmental biosecurity, and summarises key features and biosecurity planning activities by most of the peak plant industry bodies.

Figure 5 shows the catchment scale land uses in Australia as at December 2018¹¹. The map shows the single dominant land use for a given area, based on the primary management objective of the land manager (as identified by state and territory agencies).

Improving preparedness for spotted wing drosophila

On 29 October 2018, growers, government biosecurity officers and international experts came together to consider the threat posed by spotted wing drosophila (*Drosophila suzukii*, SWD), an exotic fly of high biosecurity concern.

At the workshop, international researchers Professor Rufus Isaacs from Michigan State University, USA, and Dr Bethan Shaw from the National Institute of Agricultural Botany, UK, shared how berry growing industries in their countries were impacted by the arrival of SWD and highlighted the strategies that can be used to manage the pest.

Following the workshop, presentations to raise awareness of SWD were held between 30 October to 2 November in Wandin (Victoria), Launceston (Tasmania), Coffs Harbour (NSW) and Caboolture (Queensland), giving growers from a range of production regions a chance to hear from these international experts.

The events were held as part of a project PHA, cesar and New Zealand's Plant & Food Research are working on together to improve Australia's preparedness for the pest. The project is funded by Hort Innovation with the support of the strawberry, raspberry and blackberry, cherry and summerfruit R&D levies.

10. Savery, S. Ficke, A. Aubertot, J-N and Hollier, C (2012). Crop losses due to diseases and their implications for global food production losses and food security. *Food Security*, 4(4):519-537
11. ABARES (2018). Catchment scale land use of Australia. Accessed online 15 May 2019 agriculture.gov.au/abares/aclump/Pages/land-use/Catchment-scale-land-use-of-Australia-2018.aspx

Figure 5. Catchment scale land use in Australia

FIGURE LEGEND

Conservation and natural environments

- Nature conservation
- Managed resource protection
- Minimal use

Production from relatively natural environments

- Grazing native vegetation
- Production native forests

Production from dryland agriculture and plantations

- Plantation forests*
- Grazing modified pastures
- Cropping
- Perennial horticulture
- Seasonal horticulture
- Land in transition

Production from irrigated agriculture and plantations

- Irrigated plantation forests*
- Grazing irrigated modified pastures
- Irrigated cropping
- Irrigated perennial horticulture
- Irrigated seasonal horticulture
- Irrigated land in transition

Intensive uses

- Intensive horticulture

* commercial and other

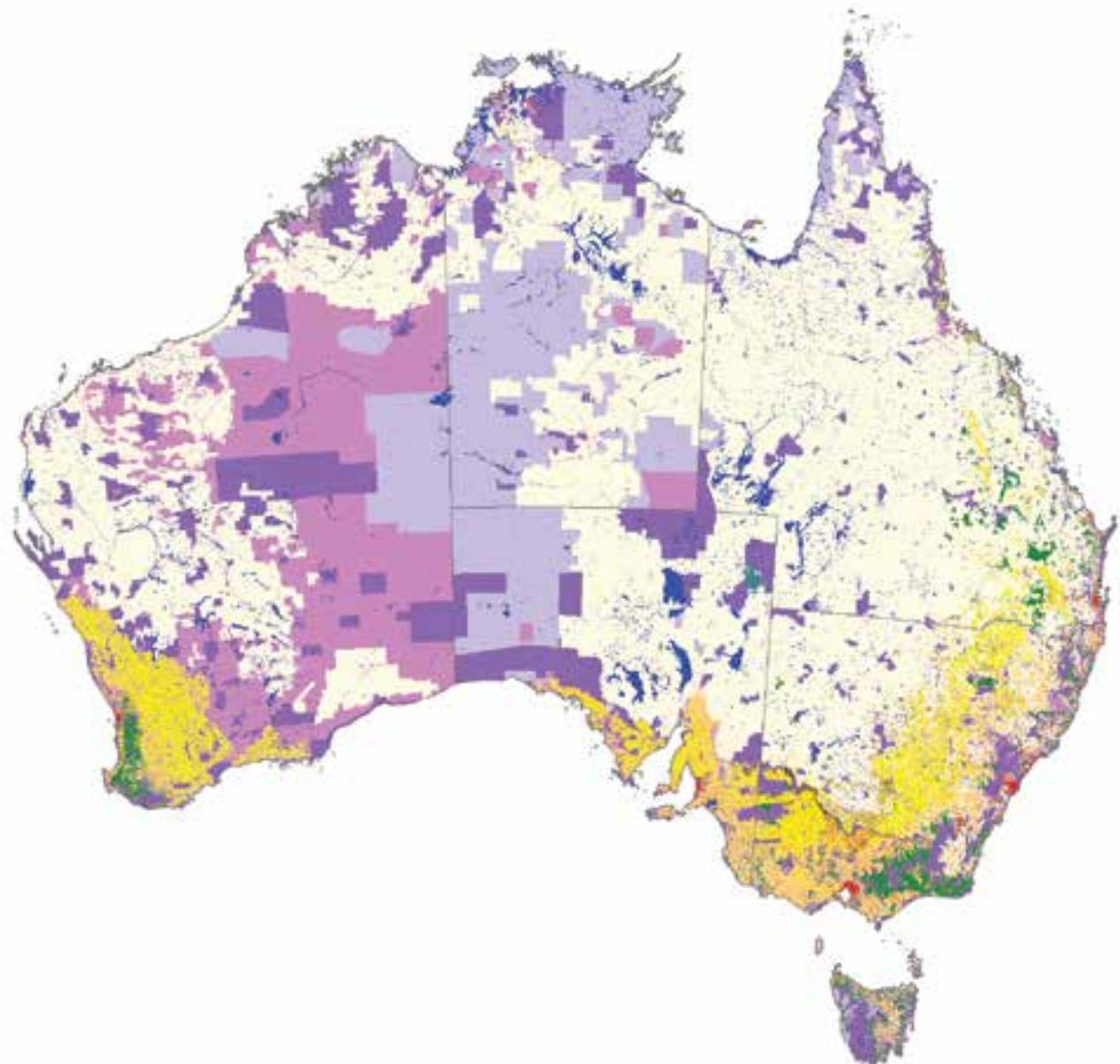


Image courtesy of the Department of Agriculture and Water Resources

Priority pests and diseases

Identifying exotic pest threats and the ways in which they might make it into Australia can significantly increase the chance of containing and successfully eradicating them should they arrive. Prioritising pests according to their potential impact allows biosecurity activities – such as surveillance, pathway analysis, and border screening and inspection – to target the most serious risks.

NATIONAL PRIORITY PLANT PESTS

Australia's least wanted plant pests and diseases were endorsed by the Plant Health Committee in June 2016. Australia's National Priority Plant Pests are listed in Table 3, with the top 10 featured in Table 4.

The pests were identified considering:

- the likelihood of them entering the country
- their ability to become established and spread
- the consequences for businesses, human health and the environment if they do
- the ability to demonstrate a need for and benefit from nationally coordinated action.

Identifying the National Priority Plant Pests enables decision makers to focus biosecurity activities to achieve higher returns on investments in risk management, facilitating an integrated and harmonised approach to prevent and prepare for pest threats.

Potential areas to focus national investment include:

- national pre-border or border measures to reduce the likelihood of entry
- controls on the movement of plant products that can carry regionalised pests interstate
- surveillance for early warning of the presence of pests, area freedom from pests and delimiting the extent of an incursion
- diagnostics, as a tool for border protection, surveillance and incursion responses
- contingency planning, which may highlight areas for improvement such as:
 - tracing the origin and spread of pests
 - developing mapping systems
 - breeding new plant varieties
 - negotiating access to markets
 - training to improve preparedness
 - pre-emptive registration of new pesticides for use in incursions
 - identifying possible biological control agents
 - identifying research needs
 - gaps in the regulatory system.

Table 3. Australia's National Priority Plant Pests

National priority plant pests	
<i>Xylella fastidiosa</i> and confirmed and unconfirmed vectors	Hessian fly, barley stem gall midge
Khapra beetle	Texas root rot
Exotic, economic fruit fly (both lure and non-lure responsive)	Wheat stem sawfly
Karnal bunt	Golden apple snail
Huanglongbing and Asian, African citrus psyllid complex	Barley stripe rust
Exotic gypsy moth	Cereal cyst nematode
<i>Solenopsis</i> spp. and other exotic invasive ant species	Sharka
Internal and external mites of bees	Exotic drywood termite
Giant African snail	Exotic subterranean termite
Brown marmorated stink bug	Exotic longhorn beetle (<i>Anoplophora</i> spp.)
Zebra chip and tomato potato psyllid complex	Red ring disease, pine wood nematode complex
Ug 99 wheat stem rust	Fusarium wilt
Russian wheat aphid (holocyclic form)	Sugarcane stalk borer
Citrus canker	Black sigatoka
Guava (Eucalyptus) rust (exotic strains)	Potato late blight
Air-borne <i>Phytophthora</i> spp.	Sunn pest
Exotic bees	Western plant bug, tarnished plant bug
Panama tropical race 4	Exotic sawyer beetles
Potato cyst nematode	Burning moth
Leafminers (<i>Liriomyza</i> spp.)	European canker
Fire blight	Dutch elm disease

For more information on National Priority Plant Pests go to agriculture.gov.au/pests-diseases-weeds/plant/national-priority-plant-pests-2016

Table 4. The top 10 National Priority Plant Pests

1. <i>Xylella fastidiosa</i>	 <p><i>Xylella fastidiosa</i> is a bacteria that could devastate horticultural crops, native flora and gardens as hundreds of native, commercial and ornamental plant species are susceptible. There is no treatment and no documented example of it ever being eradicated once it has become established. It could enter Australia with illegally introduced plant material or with infected sap sucking insects that can hitch a ride to Australia.</p> <p><i>Christine Horlock, QDAF</i></p>
2. Khapra beetle	 <p>Khapra beetle is a pest of stored grain that would have a major impact on the grains industry if it were to establish in Australia, threatening access to export markets. The beetle is small but tough: larvae can survive in a dormant state for up to two years with very little food. It could arrive in cargo, machinery, food or mail items, or be brought in by travellers in personal effects. Once here, it could spread easily via the movement of seed, straw, stored grain, cargo or machinery.</p> <p><i>Pest and Diseases Image Library, Bugwood.org</i></p>
3. Exotic fruit flies	 <p>Exotic fruit flies are one the world's most destructive group of horticultural pests and put at risk more 300 types of fruit and vegetables. While Australia already has some fruit flies, other exotic species such as spotted wing drosophila (<i>Drosophila suzukii</i>) (pictured left) are kept out by ongoing biosecurity measures.</p> <p><i>John Davis</i></p>
4. Karnal bunt	 <p>Karnal bunt is a disease caused by the fungus <i>Tilletia indica</i>, a highly invasive exotic grain pest which threatens Australia's wheat industry by its potential heavy impact on the quality and ability to sell infected crops. If introduced, Karnal bunt would be almost impossible to eradicate as its spores can persist in soil for up to four years.</p> <p><i>FAO</i></p>
5. Huanglongbing	 <p>Huanglongbing is a disease caused by <i>Candidatus Liberibacter asiaticus</i> and was previously known as citrus greening disease. One of the worst diseases of citrus trees worldwide, it spreads through the tree canopy, causing decline and then death of the tree. There is no cure – the only way to stop the disease is to destroy all infected trees.</p> <p><i>Pat Barkley</i></p>
6. Gypsy moths	 <p>Gypsy moths (<i>Lymantria</i> spp.) are destructive pests of forests and horticulture. They pose a high biosecurity risk to Australia because of their tendency to hitchhike and their high reproductive rate. If gypsy moths became established, they would be extremely difficult and expensive to manage, partly because of their broad host range.</p> <p><i>E. Bradford Walker, Vermont Department of Forests, Parks and Recreation, Bugwood.org</i></p>
7. Tramp ants	 <p>Tramp ants are a diverse group of aggressive, invasive ants that can rapidly establish and spread if introduced. Several species of tramp ants are amongst the most serious global invasive pests. Australia's environmental, economic, and social wellbeing are threatened by these ants, some of which have already been introduced and are now established.</p> <p><i>Scott Bauer, USDA Agricultural Research Service, Bugwood.org</i></p>
8. Mites of bees	 <p>Mites of bees such as varroa mite (<i>Varroa destructor</i>) would pose a serious threat to bees, reducing the numbers of unmanaged European honey bees and the pollination services they provide by 90 to 100 per cent if it established in Australia. Other exotic pests like tracheal mite (<i>Acarapsi woodi</i>) and tropilaelaps mite (<i>Tropilaelaps</i> spp.) would also seriously impact the honey bee and honey bee reliant plant industries.</p> <p><i>Scott Bauer, USDA Agricultural Research Service, Bugwood.org</i></p>
9. Giant African snail	 <p>Giant African snail (<i>Lissachatina fulica</i>) has a voracious appetite and eats more than 500 plant species, making it one of the most damaging land snails. It can also affect human health, infecting people with bacteria and parasites if handled with bare hands or if eaten raw or partially cooked.</p> <p><i>Pest and Diseases Image Library, Bugwood.org</i></p>
10. Brown marmorated stink bug	 <p>Brown marmorated stink bug (<i>Halyomorpha halys</i>) poses a high biosecurity risk because it affects a very wide range of horticulture and other crops and could also impact native and amenity plants. If it established in Australia it would be extremely difficult and expensive to manage and have a broad impact on the community. The ability of this stink bug to lie dormant and spread hidden in cargo has enabled it to make its way to new regions of the world and spread rapidly.</p> <p><i>Steven Valley, Oregon Department of Agriculture, Bugwood.org</i></p>

Environmental biosecurity

Environmental biosecurity is the protection of plants in the environment and those planted for social amenity from the risks and negative effects of pests and diseases entering, emerging, establishing or spreading in Australia.

The 'environment' includes Australia's natural terrestrial, inland water and marine ecosystems, and its natural and physical resources. 'Social amenity' includes the social, economic and cultural aspects of the environment, such as tourism, human infrastructure, cultural assets and national image.

Environmental biosecurity is distinct from agricultural biosecurity, which focuses on pests and diseases that could have an economic impact on Australia's agricultural productivity. Although distinct, there may be a significant overlap in pests that affect plants grown for agricultural purposes and those found in the natural environment or that have social amenity in urban spaces. Examples include growing eucalypt and tea tree species as commercial crops for harvest and the propagation of native plants by production nurseries for landscaping and home gardeners.

An example of two pests that together can affect both agricultural crops and native vegetation is Australia's top biosecurity threat *Xylella fastidiosa* and an insect that can carry and spread the disease it causes, the glassy winged sharpshooter. They can cause and spread disease in production crops such as grapevines and olives, along with acacia, grevillea and Myrtaceae species that are significant in the environment, urban and rural settings, and also garden plants such as lavender and oleander.

The National Biosecurity Committee and the Environment and Invasives Committee (see page 19) administer environmental biosecurity. The committees include representatives from national and state agriculture and environment departments to ensure cross agency awareness and action on environmental biosecurity issues.

The National Environmental Biosecurity Response Agreement (NEBRA) establishes national emergency response arrangements, including for cost-sharing, for responding to biosecurity incidents such as pests and diseases that primarily impact on the environment or social amenity and where the response is for the public good. The agreement was signed by the Commonwealth, state and territory governments in January 2012.

Australia's preparedness for biosecurity incidents is also developed through training, simulation exercises and planning. Planning allows stakeholders to determine pests of highest priority, analyse the risks they pose, and to put in place practices and procedures to rapidly detect and respond to an incursion. This work minimises the impact if a pest incursion occurs and reduces the chance of pests becoming established.

In November 2018, a simulation exercise tested the response to a detection of *Xylella fastidiosa*. The exercise centred on the decision-making process and the eradication strategy implemented in response to the presence of both the bacterium and its insect carrier. See page 195 for more information.

Environmental biosecurity can make use of and build on many aspects of the system established for production biosecurity. The approach to environmental biosecurity is similar to that for production pests and diseases, involving preparedness, response, management and actions taken to address the issues.

In Australia environmental Biosecurity Roundtables are held twice each year to facilitate discussion on environmental biosecurity issues, to identify potential solutions to shape future actions and share information on initiatives. The roundtables are an initiative of the Australian Government Department of Agriculture and Water Resources (DAWR) and the Department of the Environment and Energy.

In 2018, the Inspector-General for Biosecurity conducted a review of environmental risk management in Australia. The review was instigated to examine how effectively the DAWR manages environmental biosecurity concerns. The report was not released as of the end of 2018.

It is anticipated that in late 2019 the inaugural national priority list of exotic environmental pests, weeds and diseases will be announced by the office of the Chief Environmental Biosecurity Officer.



Biosecurity plan for acacia species



In 2018 a biosecurity plan for acacia species was produced by PHA with funding from the Australian Government Department of Agriculture and Water Resources.

Acacia is the largest genus of flowering plants in Australia, with more than 700 native species. In addition to being critical to many of Australia's ecosystems, some species are used in horticulture, forestry and for revegetation programs.

A number of exotic plant pests have the potential to impact on Australian acacia species and the stakeholders who depend on them. One of the major pest threats is *Xylella fastidiosa*.

By identifying and prioritising the key biosecurity risks through developing the biosecurity plan, stakeholders are better placed to reduce the social and economic costs of pest incursions on acacia growers, the environment and the wider community.

The plan will be updated in 2019 in collaboration with the office of the Chief Environmental Biosecurity Officer.



The Chief Environmental Biosecurity Officer, Ian Thompson. Image courtesy of the Department of Agriculture and Water Resources

Plant industry biosecurity preparedness

There are a number of ways that industries and governments can minimise the risks posed by exotic pests to plant industries. One is to identify the exotic pests that pose the greatest risk to an industry through biosecurity planning. The planning process also prioritises activities to mitigate the risks associated with these pests and improve biosecurity overall for an industry.

Contingency planning can also prepare an industry for exotic pest incursions. A contingency plan identifies the information needed when planning an emergency response to an exotic pest. Industries can also improve awareness of exotic pests and biosecurity practices by developing a biosecurity manual for use by producers.

BIOSECURITY PLANNING

One of the first steps to reduce the biosecurity risks to an industry is to develop a biosecurity plan for the crop(s) produced. A risk assessment is made to identify high priority pests and guide the biosecurity activities undertaken by industry and government. Each of PHA's plant industry members has developed a biosecurity plan in partnership with governments. Developing a biosecurity plan is a requirement for Emergency Plant Pest Response Deed signatories and they are generally funded by a research and development corporation (RDC) or plant industry peak body. See Table 5 for a list of biosecurity plans prepared by PHA.

Table 5. Current biosecurity plans covering Australia's plant industries

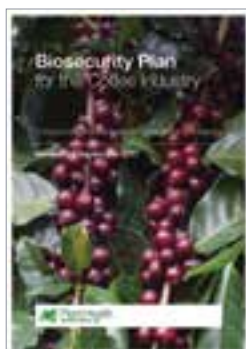
Industry plans		
Apple and Pear BP (Version 3.0)	Honey bee IBP (Version 1.1)	Plantation forest IBP (Version 2.0)
Avocado IBP (Version 2.01)	Lychee BP (Version 1.0)	Potato IBP (Version 2.0)
Banana IBP (Version 2.0)	Mango IBP (Version 2.1)	Rice IBP (Version 3.0)
Blueberry BP (Version 1.0)	Melon IBP (Version 1.0)	Rubus IBP (Version 1.0)
Cherry BP (Version 3.0)	Nursery IBP (Version 3.0)	Strawberry IBP (Version 2.0)
Citrus BP (Version 3.0)	Nuts BP (Version 3.0)	Sugarcane IBP (Version 3.0)
Coffee BP (Version 3.0)	Olive BP (Version 2.0)	Summerfruit IBP (Version 1.0)
Cotton BP (Version 3.0)	Onion IBP (Version 2.0)	Tomato BP (Version 1.0)
Cut flower BP (Version 1.0)	Papaya IBP (Version 1.0)	Truffle BP (Version 1.0)
Ginger IBP (Version 1.0)	Passionfruit IBP (Version 1.0)	Vegetable BP (Version 3.0)
Grains BP (Version 3.0)	Pineapple BP (Version 2.0)	Viticulture IBP (Version 3.0)

To identify and prioritise exotic plant pests, experts from the industry and government(s) are brought together to form a Technical Expert Group. Pest risk assessments take into account the pest's likelihood of entry, establishment and spread, as well as the economic impact if it established in Australia. The assessment includes all entry pathways including legal, illegal, accidental or through natural dispersal. This is broader than the Department of Agriculture and Water Resources Import Risk Assessment process which focuses only on specific regulated import pathways (see **page 130**).

The exotic pests that pose the greatest risk with the largest potential economic impact for an industry are deemed to be High Priority Pests. Table 6 lists all of the High Priority Pests identified in the 33 biosecurity plans developed by PHA. The same pests are also listed throughout **Chapter 3** with the crops that they affect.

Having identified the pests that pose the greatest risk to industry the next step is to develop and agree on effective biosecurity measures to protect against them. This involves the industry, governments, the relevant RDC and PHA working in partnership with each other. Agreed risk mitigation methods might include:

- developing contingency plans that will assist the response to particular plant pests, should they make it to Australia
- developing diagnostic protocols so that pests can be identified quickly
- promoting on-farm biosecurity measures among growers to limit the potential for entry and spread of pests
- developing surveillance plans so that incursions of exotic pests are detected early
- carrying out pre-emptive plant breeding programs to develop more resistant crop varieties
- gaining pre-emptive permit registration for pesticides that would be needed to manage pests.



The biosecurity plan is endorsed by the peak industry body and by all Australian governments through the Plant Health Committee. This means that key stakeholders in the plant biosecurity system have agreed on the priorities and risk mitigation efforts to protect that industry.

Since 2017, a Biosecurity Reference Panel of government and industry experts has been appointed to assess the progress of activities in individual plans. This ensures that by the end of a plan activities have been achieved, providing a significant boost in protection from pest threats. Biosecurity plans undergo formal reviews every four to five years to ensure they remain up-to-date, taking into consideration new research, incursions overseas and changes to potential entry pathways.



In 2018 revised biosecurity plans were produced for the vegetable, coffee and cherry industries.

Growers too can support Australia's biosecurity status by implementing biosecurity practices to protect their crops from established and exotic pests. See on-farm biosecurity in **Chapter 7** and biosecurity manuals for producers on **page 61**.

Table 6. High Priority Pest threats

Scientific name	Common name	High priority pest of
<i>Abaca bunchy top virus</i> (Babuvirus)	Abaca bunchy top virus	Banana
<i>Acarapis woodi</i>	Tracheal mite	Honey bee
<i>Achatina achatina</i>	Giant African snail	Vegetable
<i>Aleurolobus barodensis</i>	Sugarcane whitefly	Sugarcane
<i>Alternaria humicola</i>	Leaf spot	Vegetable
<i>Amyelois transitella</i>	Navel orangeworm	Nut
<i>Anastrepha ludens</i>	Mexican fruit fly	Citrus
<i>Anisogramma anomala</i>	Eastern filbert blight (hazelnut blight)	Truffle, Nut
<i>Anthonomus grandis</i>	Cotton boll weevil	Cotton
<i>Aphis fabae</i>	Black bean aphid	Vegetable
<i>Aphis gossypii</i> (exotic strains)	Cotton aphid	Cotton, Production nurseries
<i>Apis cerana</i> (exotic strains, genotypes and sub-species)	Asian honey bee	Honey bee
<i>Apis mellifera capensis</i>	Cape honey bee	Honey bee
<i>Apis mellifera scutellata</i>	African honey bee	Honey bee
<i>Apis mellifera scutellata</i> (hybrid)	Africanised honey bee	Honey bee
<i>Aristobia testudo</i>	Lychee longicorn beetle	Lychee
<i>Arthuriomyces peckianus</i>	Orange rust (long-cycled)	Rubus
<i>Ascochyta rabiei</i> (MAT1-1 is exotic, MAT1-2 is endemic)	Ascochyta blight	Grains
<i>Aspidiella hartii</i>	Yam scale (rhizome scale)	Ginger
<i>Aulacophora foveicollis</i>	Red pumpkin beetle	Vegetable
<i>Avocado sunblotch viroid</i> (asymptomatic strains)	Avocado sunblotch	Avocado
<i>Avocado sunblotch viroid</i> (symptomatic strains)	Avocado sunblotch	Avocado
<i>Bactericera cockerelli</i>	Tomato potato psyllid	Tomato, Potato
<i>Bactrocera carambolae</i>	Carambola fruit fly	Avocado, Tomato, Citrus, Mango, Papaya, Passionfruit, Vegetable, Viticulture

Table 6. High Priority Pest threats (continued)

Scientific name	Common name	High priority pest of
<i>Bactrocera cucurbitae</i>	Melon fruit fly	Vegetable
<i>Bactrocera dorsalis</i> (syn. <i>B. invadens</i> , <i>B. papayae</i> , <i>B. philippinensis</i>)	Oriental fruit fly	Apple and Pear, Avocado, Coffee, Cherry, Citrus, Lychee, Mango, Melon, Papaya, Passionfruit, Summerfruit, Tomato, Vegetable, Viticulture
<i>Bactrocera facialis</i>	Tropical fruit fly	Avocado, Passionfruit, Tomato
<i>Bactrocera kandiensis</i>	Fruit fly	Avocado, Citrus, Passionfruit
<i>Bactrocera kirki</i>	Fijian fruit fly	Avocado, Passionfruit
<i>Bactrocera latifrons</i>	Solanum fruit fly	Melon
<i>Bactrocera melanotus</i>	Fruit fly	Avocado, Passionfruit
<i>Bactrocera occipitalis</i>	Fruit fly	Citrus
<i>Bactrocera oleae</i>	Olive fly	Olive
<i>Bactrocera passiflorae</i>	Fijian fruit fly	Avocado, Papaya, Passionfruit, Vegetable
<i>Bactrocera psidii</i>	South Sea guava fruit fly	Passionfruit
<i>Bactrocera trivialis</i>	New Guinea fruit fly	Citrus, Vegetable
<i>Bactrocera xanthodes</i>	Pacific fruit fly	Avocado, Passionfruit
<i>Banana bunchy top virus</i> (Nanovirus)	Banana bunchy top disease	Banana
<i>Barley mild mosaic virus</i> (Bymovirus)	Barley mild mosaic virus	Grains
<i>Bean common mosaic virus</i> (Potyvirus), peanut stripe strain	Bean common mosaic virus	Grains
<i>Bemisia tabaci</i> (biotypes other than B and AN)	Silverleaf whitefly	Cotton, Melon, Production nurseries
<i>Bemisia tabaci</i> (types Asia 1, China 1, China 2, Asia II (1-8), Italy, Sub-Saharan Africa (1-4), Uganda, New World, Mediterranean, Middle East-Asia Minor 2, Indian Ocean)	Silverleaf whitefly	Cotton, Melon, Production nurseries, Tomato, Vegetable
<i>Blood disease bacterium</i>	Blood disease	Banana

Scientific name	Common name	High priority pest of
<i>Botrytis squamosa</i>	Leaf blight	Onion
<i>Burkholderia caryophylli</i> (syn. <i>Pseudomonas caryophylli</i>)	Bacterial wilt of carnation	Cut flower
<i>Bursaphelenchus</i> spp. including <i>B. xylophilus</i>	Pinewood nematode species complex	Forestry
<i>Cacoecimorpha pronubana</i>	Carnation tortrix	Cut flower
<i>Caliothrips fasciatus</i>	Bean thrips	Citrus
<i>Candidatus Liberibacter africanus</i>	Huanglongbing (African strain)	Citrus
<i>Candidatus Liberibacter americanus</i>	Huanglongbing (American strain)	Citrus
<i>Candidatus Liberibacter asiaticus</i>	Huanglongbing (Asiatic strain)	Citrus, Production nurseries
<i>Candidatus Liberibacter solanacearum</i> (syn. <i>Candidatus Liberibacter psyllaeurum</i>)	Zebra chip	Potato, Tomato, Vegetable
<i>Candidatus Phytoplasma pruni</i> (syn. X disease phytoplasma)	Peach X disease	Cherry, Summerfruit
<i>Candidatus Phytoplasma prunorum</i>	European stone fruit yellows	Cherry, Summerfruit
<i>Candidatus Phytoplasma solani</i>	Bois noir	Viticulture
<i>Carposina sasakii</i>	Peach fruit moth, small peach fruit borer	Apple and Pear
<i>Cephus cinctus</i>	Wheat stem sawfly	Grains
<i>Cephus pygmeus</i>	European wheat stem sawfly	Grains
<i>Ceratocystis fimbriata</i> sensu lato	Mango sudden decline syndrome	Coffee, Mango
<i>Ceratocystis manginecans</i>	Mango sudden decline syndrome	Mango
<i>Ceratocystis omanensis</i>	Mango sudden decline syndrome	Mango
<i>Ceratovacuna lanigera</i>	Sugarcane woolly aphid	Sugarcane
<i>Cercospora rubi</i>	Rosette	Rubus

Table 6. High Priority Pest threats (continued)

Scientific name	Common name	High priority pest of
<i>Ceutorhynchus assimilis</i> (syn. <i>Ceutorhynchus obstrictus</i>)	Cabbage seedpod weevil	Grains
<i>Ceutorhynchus napi</i>	Rape stem weevil	Grains
<i>Ceutorhynchus pallidactylus</i>	Cabbage stem weevil	Grains
<i>Cherry leaf roll virus</i> (Nepovirus) (exotic strains)	Blackline	Cherry, Rubus
<i>Chickpea chlorotic dwarf virus</i> (Mastrevirus)	Chickpea chlorotic dwarf virus	Grains
<i>Chickpea chlorotic stunt virus</i> (Polerovirus)	Chickpea chlorotic stunt virus	Grains
<i>Chilo auricilius</i>	Sugarcane internode borer	Sugarcane
<i>Chilo infuscatellus</i>	Yellow top borer of sugarcane	Sugarcane
<i>Chilo orichalcociliellus</i>	Coastal stem borer	Grains
<i>Chilo partellus</i>	Spotted stem borer	Grains
<i>Chilo sacchariphagus</i>	Sugarcane internode borer	Sugarcane
<i>Chilo terrenellus</i>	Sugarcane stem borer	Sugarcane
<i>Chilo tumidicostalis</i>	Spotted sugarcane stem borer	Sugarcane
<i>Chinavia hilaris</i> (syn. <i>Chinavia hilare</i>)	Green stink bug	Nut
<i>Chromatomyia horticola</i>	Pea leafminer	Cut flower
<i>Chrysoporthe austroafricana</i>	Eucalyptus canker disease	Forestry
<i>Citripestis sagittiferella</i>	Citrus fruit borer	Citrus
<i>Citrus leprosis virus</i> (unassigned)	Citrus leprosis disease	Citrus
<i>Citrus tristeza virus</i> (Closterovirus) (mandarin stem-pitting strain)	Mandarin stem-pitting	Citrus
<i>Cladosporium allii</i>	Leaf spot	Onion
<i>Colletotrichum higginsianum</i>	Anthraxnose	Vegetable
<i>Colletotrichum kahawae</i> subsp. <i>kahawai</i> (syn. <i>Colletotrichum coffeanum</i>)	Coffee berry disease	Coffee
<i>Colletotrichum lentis</i> (lentil affecting strain)	Lentil anthracnose, soybean anthracnose	Vegetable

Scientific name	Common name	High priority pest of
<i>Colletotrichum truncatum</i> (lentil strain)	Lentil anthracnose	Grains
<i>Conopomorpha sinensis</i>	Lychee fruit borer	Lychee
<i>Conotrachelus aguacatae</i>	Small avocado seed weevil	Avocado
<i>Conotrachelus nenuphar</i>	Plum curculio	Cherry, Summerfruit
<i>Conotrachelus perseae</i>	Small seed weevil	Avocado
<i>Coptotermes formosanus</i>	Formosan subterranean termite	Forestry
<i>Coptotermes gestroi</i>	Asian subterranean termite	Forestry
<i>Cotinis mutabilis</i>	Fig beetle	Pineapple
<i>Cotton leaf curl virus</i> (Begomovirus)	Cotton leaf curl disease	Cotton
<i>Cotton leafroll dwarf virus</i> (Polerovirus)	Cotton blue disease	Cotton
<i>Croesia curvalana</i>	Blueberry leaf-tier	Blueberry
<i>Cryphonectria parasitica</i>	Chestnut blight	Nut
<i>Cryptosporella umbrina</i>	Brown rose canker	Cut flower
<i>Cydia funebrana</i>	Plum fruit moth	Summerfruit
<i>Cydia inopinata</i> (syn. <i>Grapholita inopinata</i>)	Manchurian fruit moth	Apple and Pear
<i>Cylindrocopturus adspersus</i>	Sunflower stem weevil	Grains
<i>Daktulosphaira vitifoliae</i> (exotic strains)	Grapevine phylloxera	Viticulture
<i>Dasineura mali</i>	Apple leaf curling midge	Apple and Pear
<i>Deanolis sublimbalis</i> (syn. <i>Noorda albizonalis</i>)	Red banded mango caterpillar (red banded borer)	Mango
<i>Deformed wing virus</i> (Iflavivirus)	Deformed wing virus	Honey bee
<i>Delia antiqua</i>	Onion fly	Onion, Vegetable
<i>Delia floralis</i>	Summer cabbage fly	Vegetable
<i>Delia florilega</i>	Bean fly	Onion, Vegetable
<i>Dendroctonus ponderosae</i>	Mountain pine beetle	Forestry
<i>Dendroctonus valens</i>	Red turpentine beetle	Forestry
<i>Diabrotica barberi</i>	Northern corn root worm	Grains

Table 6. High Priority Pest threats (continued)

Scientific name	Common name	High priority pest of
<i>Diabrotica undecimpunctata</i>	Southern corn root worm	Grains
<i>Diabrotica virgifera</i>	Western corn root worm	Grains
<i>Diaphorina citri</i>	Asian citrus psyllid	Citrus, Production nurseries
<i>Diaporthe helianthi</i>	Sunflower stem canker	Grains
<i>Dickeya dianthicola</i> (syn. <i>Erwinia chrysanthemi</i> pv. <i>dianthicola</i>)	Slow wilt	Cut flower
<i>Dickeya</i> spp. (pineapple infecting strains) syn. <i>Erwinia chrysanthemi</i>	Bacterial fruit collapse, bacterial heart rot	Pineapple
<i>Dickeya</i> spp. (onion infecting exotic pathovars) syn. <i>Erwinia chrysanthemi</i>	Bacterial soft rot	Onion
<i>Drosophila suzukii</i>	Spotted wing drosophila	Apple and Pear, Blueberry, Cherry, Rubus, Summerfruit, Viticulture
<i>Dryocosmus kuriphilus</i>	Oriental chestnut gall wasp	Nut
<i>Dysaphis plantaginea</i>	Rosy apple aphid	Apple and Pear, Summerfruit
<i>Dysdercus</i> spp. (including <i>D. honestus</i> , <i>D. maurus</i> , <i>D. suturellus</i> (American species))	Cotton stainer	Cotton
<i>Dysmicoccus neobrevipes</i>	Grey pineapple mealybug	Pineapple
<i>East Asian passiflora virus</i> (Potyvirus)	East Asian passiflora virus	Passionfruit
<i>Echinothrips americanus</i>	Poinsettia thrips	Production nurseries
<i>Eldana saccharina</i>	African sugarcane stalkborer	Sugarcane
<i>Elytroteinus subtruncatus</i>	Fijian ginger weevil	Ginger
<i>Endocronartium harknessii</i>	Western gall rust	Forestry
<i>Epichoristodes acerbella</i>	South African carnation tortrix, South African carnation miner	Cut flower
<i>Ericaphis fimbriata</i> (with blueberry scorch Carlavirus)	Blueberry aphid	Blueberry
<i>Erionota thrax</i>	Banana skipper butterfly	Banana
<i>Erwinia amylovora</i>	Fire blight	Apple and Pear

Scientific name	Common name	High priority pest of
<i>Erwinia herbicola</i> (exotic strains)	Avocado blast	Avocado
<i>Erwinia herbicola</i> pv. <i>gyssophila</i>	Bacterial gall	Cut flower
<i>Erwinia papayae</i>	Bacterial crown rot	Papaya
<i>Erwinia</i> spp.	Mushy canker	Papaya
<i>Erwinia tracheiphila</i>	Cucurbit bacterial wilt	Melon
<i>Eumerus amoenus</i>	Onion bulb fly	Onion
<i>Eumerus strigatus</i>	Lesser bulb fly	Onion, Vegetable
<i>Eumetopina flavipes</i>	Sugarcane leafhopper (vector of Ramu stunt disease)	Sugarcane
<i>Eurygaster integriceps</i>	Sunn pest	Grains
<i>Euschistus conspersus</i>	Conspere stink bug	Rubus
<i>Eutetranychus banksi</i>	Texas citrus mite	Coffee
<i>Frankliniella bispinosa</i>	Florida flower thrips	Citrus
<i>Frankliniella intonsa</i>	Flower thrips	Cut flower, Tomato
<i>Frankliniella tritici</i>	Eastern flower thrips	Cut flower
<i>Fusarium circinatum</i>	Pitch canker	Forestry
<i>Fusarium mangiferae</i>	Mango malformation	Mango
<i>Fusarium mexicanum</i>	Mango malformation	Mango
<i>Fusarium oxysporum</i> f. sp. <i>chrysanthemi</i>	Fusarium wilt of chrysanthemum	Cut flower
<i>Fusarium oxysporum</i> f. sp. <i>ciceris</i>	Fusarium wilt of chickpea	Grains
<i>Fusarium oxysporum</i> f. sp. <i>cubense</i>	Panama disease, tropical race 4	Banana
<i>Fusarium oxysporum</i> f. sp. <i>glycines</i>	Fusarium wilt of soybean	Grains
<i>Fusarium oxysporum</i> f. sp. <i>lupini</i>	Fusarium wilt of lupin	Grains
<i>Fusarium oxysporum</i> f. sp. <i>vasinfectum</i> (exotic races)	Fusarium wilt	Cotton
<i>Fusarium oxysporum</i> f.sp. <i>melonis</i> (exotic races)	Fusarium root and stem rot of melons	Melon
<i>Fusarium oxysporum</i> f.sp. <i>niveum</i> (exotic races)	Fusarium root and stem rot of melons	Melon

Table 6. High Priority Pest threats (continued)

Scientific name	Common name	High priority pest of
<i>Fusarium oxysporum</i> f.sp. <i>radicis-cucumerinum</i>	Fusarium root and stem rot of melons	Melon
<i>Fusarium proliferatum</i>	Mango malformation	Mango
<i>Fusarium</i> spp. (<i>F. ananatum</i> and <i>F. guttiforme</i> syn. <i>F. subglutinans</i> f.sp. <i>anasas</i>)	Fusariosis, fusarium stem rot, pineapple eye rot, fruitlet core rot	Pineapple
<i>Fusarium sterilihyphosum</i>	Mango malformation	Mango
<i>Fusarium virguliforme</i>	Sudden death syndrome	Grains
<i>Fusarium xylarioides</i> f. sp. <i>abyssiniae</i> and <i>F. xylarioides</i> f. sp. <i>canephorae</i>	Coffee wilt	Coffee
<i>Fusicladium effusum</i> (syn. <i>Cladosporium caryigenum</i>)	Pecan scab	Nut
<i>Globodera pallida</i> (pathotypes PA1, PA2)	Potato cyst nematode (white or pale)	Potato
<i>Globodera rostochiensis</i> (exotic strains)	Potato cyst nematode (golden)	Potato
Grapevine flavescence dorée phytoplasma	Flavescence dorée	Viticulture
Grassy shoot phytoplasma	Grassy shoot	Sugarcane
<i>Groundnut bud necrosis virus</i> (Tospovirus)	Bud necrosis disease	Grains, Vegetable
<i>Groundnut ringspot virus</i> (Tospovirus)	Groundnut ringspot virus	Grains
<i>Guignardia bidwellii</i>	Black rot	Viticulture
<i>Guignardia musae</i>	Banana freckle	Banana
<i>Gymnoconia nitens</i>	Orange rust (short-cycled)	Rubus
<i>Halyomorpha halys</i>	Brown marmorated stink bug	Apple and Pear, Cherry, Cotton, Nut, Rubus, Truffle, Vegetable
<i>Haplothrips chinensis</i>	Chinese thrips	Cut flower
<i>Harpophora maydis</i>	Late wilt	Grains, Vegetable
<i>Heilipus lauri</i>	Large seed weevil	Avocado
<i>Helicoverpa armigera</i> (carrying Bt resistance alleles)	Cotton bollworm	Cotton

Scientific name	Common name	High priority pest of
<i>Hemileia vastatrix</i>	Coffee leaf rust	Coffee
<i>Heterocrossa rubophaga</i>	Raspberry bud moth	Rubus
<i>Heterodera carotae</i>	Carrot cyst nematode	Vegetable
<i>Heterodera ciceri</i>	Chickpea cyst nematode	Grains, Vegetable
<i>Heterodera filipjevi</i>	Cereal cyst nematode	Grains
<i>Heterodera glycines</i>	Soybean cyst nematode	Grains
<i>Heterodera latipons</i>	Mediterranean cereal cyst nematode	Grains
<i>Heterodera sorghi</i>	Sorghum cyst nematode	Grains
<i>Homalodisca vitripennis</i> (syn. <i>Homalodisca coagulata</i>)	Glassy winged sharpshooter	Cherry, Citrus, Production nurseries, Summerfruit, Viticulture
<i>Homoeosoma electellum</i>	Sunflower moth	Grains
<i>Hoplostoma fuliginus</i>	Large hive beetle	Honey bee
<i>Hyalesthes obsoletus</i>	Cixiidae planthopper	Viticulture
<i>Hylesia nigricans</i>	Burning moth	Forestry
<i>Hypothenemus hampei</i>	Coffee berry borer	Coffee
<i>Hypothenemus obscurus</i>	Tropical nut borer	Nut
<i>Ips typographus</i>	Spruce bark beetle	Forestry
<i>Leptoglossus clypealis</i>	Leaf footed bug	Nut
<i>Leptoglossus occidentalis</i>	Western conifer seed bug	Nut
<i>Leptoglossus zonatus</i>	Western leaf footed bug	Nut
<i>Lettuce infectious yellows virus</i> (Crinivirus)	Lettuce infectious yellows virus	Production nurseries
<i>Liriomyza bryoniae</i>	Tomato leafminer	Melon, Tomato, Vegetable
<i>Liriomyza congesta</i>	Pea leafminer	Cut flower
<i>Liriomyza huidobrensis</i>	Serpentine leafminer	Cut flower, Melon, Production nurseries, Tomato, Vegetable
<i>Liriomyza sativae</i>	Vegetable leafminer, American leafminer	Melon, Onion, Tomato, Vegetable

Table 6. High Priority Pest threats (continued)

Scientific name	Common name	High priority pest of
<i>Liriomyza trifolii</i>	American serpentine leafminer	Cut flower, Melon, Tomato, Vegetable
<i>Lissachatina fulica</i> (syn. <i>Achatina fulica</i>)	Giant African snail	Production nurseries, Tomato, Vegetable
<i>Lissorhoptus oryzophilus</i>	Rice water weevil	Rice
<i>Lobesia botrana</i>	European grapevine moth	Viticulture
<i>Lygus hesperus</i>	Western plant bug	Cotton, Strawberry, Vegetable
<i>Lygus lineolaris</i>	Tarnished plant bug	Cotton, Production nurseries, Strawberry
<i>Lymantria dispar</i>	Asian gypsy moth	Apple and Pear, Forestry, Nut, Production nurseries
<i>Lymantria mathura</i>	Rosy gypsy moth, pink gypsy moth	Apple and Pear
<i>Lymantria monacha</i>	Nun moth	Apple and Pear, Forestry, Truffle
<i>Magnaporthe grisea</i>	Rice blast	Grains, Rice
<i>Mayetiola destructor</i>	Hessian fly	Grains
<i>Mayetiola hordei</i>	Barley stem gall midge	Grains
<i>Meloidogyne enterolobii</i> (syn. <i>Meloidogyne mayaguensis</i>)	Root knot nematode	Vegetable
<i>Meloidogyne naasi</i>	Barley root knot nematode	Vegetable
<i>Monilinia fructigena</i>	Brown rot	Apple and Pear, Blueberry, Cherry, Summerfruit
<i>Monilinia mali</i>	Monilinia leaf blight, blossom wilt	Apple and Pear
<i>Monilinia polystroma</i>	Asiatic brown rot	Apple and Pear, Summerfruit
<i>Monilinia vaccinii-corymbosi</i>	Mummy berry, cotton ball disease	Blueberry
<i>Monochamus</i> spp. including <i>M. alternatus</i> , <i>M. galloprovincialis</i> , <i>M. titillator</i> , <i>M. scutellatus</i>	Longhorn beetles	Forestry
<i>Monosporascus cannonballus</i>	Monosporascus root rot	Melon

Scientific name	Common name	High priority pest of
<i>Mungbean yellow mosaic virus</i> (Begomovirus)	Mungbean yellow mosaic virus	Grains
<i>Mycosphaerella eumusae</i>	Eumusae leaf spot	Banana
<i>Nemorimyza maculosa</i>	Chrysanthemum leafminer	Cut flower
<i>Neonectria ditissima</i> (syn. <i>Nectria galligena</i> and <i>Neonectria galligena</i>)	European canker	Apple and Pear, Cherry
<i>Nysius huttoni</i>	Wheat bug	Grains
<i>Oligonychus ilicis</i>	Southern red mite	Coffee, Production nurseries
<i>Oligonychus perseae</i>	Persea mite	Avocado
<i>Orgyia thyellina</i>	White spotted tussock moth	Forestry
<i>Pantoea stewartii</i>	Stewart's wilt of maize	Grains
<i>Paracoccus marginatus</i>	Papaya mealy bug	Coffee, Papaya
<i>Paradasynus longirostris</i>	Hong Kong stink bug	Lychee
<i>Parasa lepida</i>	Blue striped nettle grub	Mango
<i>Passiflora chlorosis virus</i> (Potyvirus)	Passiflora chlorosis virus	Passionfruit
<i>Passionfruit crinkle virus</i> (Potyvirus)	Passionfruit crinkle virus	Passionfruit
<i>Passionfruit ringspot virus</i> (Potyvirus)	Passionfruit ringspot virus	Passionfruit
<i>Passionfruit severe leaf distortion virus</i> (Begomovirus)	Passionfruit severe leaf distortion virus	Passionfruit
<i>Passionfruit Sri Lankan mottle virus</i> (Potyvirus)	Passionfruit Sri Lankan mottle virus	Passionfruit
<i>Passionfruit vein clearing virus</i> (Rhabdovirus)	Passionfruit vein clearing virus	Passionfruit
<i>Passionfruit yellow mosaic virus</i> (Tymovirus)	Passionfruit yellow mosaic virus	Passionfruit
<i>Peach rosette mosaic virus</i> (Nepovirus)	Peach rosette mosaic virus	Summerfruit
<i>Peanut clump virus</i> (Pecluvirus)	Peanut clump virus	Grains
<i>Pennisetia hylaeiformis</i>	Raspberry crown borer	Rubus
<i>Pennisetia marginata</i>	Raspberry crown borer	Rubus

Table 6. High Priority Pest threats (continued)

Scientific name	Common name	High priority pest of
<i>Perkinsiella vastatrix</i>	Sugarcane plant hopper	Sugarcane
<i>Perkinsiella vitiensis</i>	Sugarcane plant hopper	Sugarcane
<i>Peronophythora litchii</i>	Brown blight	Lychee
<i>Peronosclerospora philippinensis</i>	Philippine downy mildew of maize	Grains, Sugarcane
<i>Peronosclerospora sacchari</i>	Sugarcane downy mildew	Sugarcane
<i>Peronosclerospora sorghi</i>	Downy mildew of sorghum	Grains
<i>Phialophora cinerescens</i>	Phialophora wilt	Cut flower
<i>Phymatotrichopsis omnivora</i> (syn. <i>Phymatotrichum omnivorum</i> , <i>Ozonium texanum</i>)	Texas root rot	Cotton
<i>Phytomyza gymnostoma</i>	Allium leafminer	Onion, Vegetable
<i>Phytophthora fragariae</i> var. <i>fragariae</i>	Red steele root rot	Strawberry
<i>Phytophthora infestans</i> (A2 mating type and exotic strains of A1 mating type)	Late blight	Potato, Vegetable
<i>Phytophthora kernoviae</i>	Phytophthora blight	Avocado
<i>Phytophthora mendei</i>	Trunk canker	Avocado
<i>Phytophthora pinifolia</i>	Dano foliar del pino	Forestry
<i>Phytophthora ramorum</i>	Sudden oak death	Avocado, Blueberry, Cut flower, Forestry, Nut, Production nurseries, Truffle
<i>Planococcus ficus</i>	Vine mealybug	Viticulture
<i>Planotortrix octo</i>	Green headed leaf roller	Cherry
<i>Plasmopara halstedii</i>	Downy mildew of sunflower	Grains
<i>Plum pox virus</i> (Potyvirus)	Plum pox virus	Cherry, Summerfruit
<i>Polychrosis viteana</i>	American berry moth	Viticulture
<i>Polyocha depressella</i>	Root borer	Sugarcane
<i>Pomacea canaliculata</i>	Golden apple snail	Production nurseries, Rice

Scientific name	Common name	High priority pest of
<i>Popillia japonica</i>	Japanese beetle	Rubus, Summerfruit
<i>Potato spindle tuber viroid</i> (Pospiviroidae)	Potato spindle tuber viroid	Potato
<i>Potato virus Y</i> (Potyvirus) (exotic strains)	Potato virus Y	Potato
<i>Prays oleae</i>	Olive moth	Olive
<i>Procontarinia</i> spp. (exotic species)	Mango gall midges	Mango
<i>Prostephanus truncatus</i>	Larger grain borer	Grains
<i>Pseudocercospora fijiensis</i> (syn. <i>Mycosphaerella fijiensis</i>)	Black sigatoka	Banana
<i>Pseudococcus cryptus</i> (syn. <i>Pseudococcus citriculus</i>)	Citrus mealybug, citriculus mealybug, cryptic mealybug	Coffee
<i>Pseudococcus maritimus</i>	Grape mealybug	Viticulture
<i>Pseudomonas avellanae</i> (syn. <i>P. syringae</i> pv. <i>avellanae</i>)	Bacterial canker	Truffle
<i>Pseudomonas syringae</i> pv. <i>syringae</i> (exotic races)	Bacterial canker	Avocado, Production nurseries
<i>Pseudothraupis wayi</i>	Coconut bug	Lychee
<i>Psila rosae</i>	Carrot rust fly	Vegetable
<i>Puccinia agrophila</i>		Vegetable
<i>Puccinia graminis</i> f. sp. <i>tritici</i> (exotic pathogenic races e.g. Ug 99)	Stem rust of wheat	Grains
<i>Puccinia opizii</i>	Lettuce rust	Vegetable
<i>Puccinia psidii</i> sensu lato (exotic variants)	Guava rust, Eucalyptus rust	Cut flower, Forestry, Production nurseries
<i>Puccinia</i> spp. (exotic species affecting <i>Allium</i> spp.)	Rust	Onion
<i>Puccinia striiformis</i> f. sp. <i>hordei</i>	Barley stripe rust	Grains
<i>Pucciniastrum coryli</i>	Hazelnut rust	Truffle
<i>Pyrilla perpusilla</i>	Sugarcane pyrilla	Sugarcane
<i>Rodopholus similis</i> (exotic strains)	Burrowing nematode	Ginger

Table 6. High Priority Pest threats (continued)

Scientific name	Common name	High priority pest of
<i>Raffaelea lauricola</i>	Laurel wilt	Avocado
<i>Ralstonia solanacearum</i> , race 2	Moko	Banana
<i>Ralstonia solanacearum</i> , race 3 (exotic strains)	Bacterial wilt	Potato
<i>Ralstonia solanacearum</i> , race 4 (exotic strains) (syn. <i>Pseudomonas solanacearum</i>)	Bacterial wilt	Ginger
<i>Raspberry ringspot virus</i> (Nepovirus)	Raspberry ringspot virus	Rubus, Strawberry
<i>Rastrococcus spinosus</i>	Mango mealybug	Coffee
<i>Rhagoletis pomonella</i>	Apple maggot	Apple and Pear
<i>Rhizoctonia solani</i> f. sp. <i>sasaki</i> (AG 1)	Banded leaf and sheath spot	Grains, Vegetable
<i>Rhizoglyphus callae</i>	Bulb mite	Onion
<i>Rhizoglyphus setosus</i>	Bulb mite	Cut flower, Onion, Vegetable
<i>Rhodococcus fascians</i>	Leafy gall	Cut flower
<i>Rice grassy stunt virus</i> (Tenuivirus)	Rice grassy stunt virus	Rice
<i>Rice ragged stunt virus</i> (Oryzavirus)	Ragged stunt virus	Rice
<i>Rice tungro bacilliform virus</i> (unassigned)	Rice tungro bacilliform virus	Rice
<i>Rice tungro spherical virus</i> (Waikavirus)	Rice tungro spherical virus, waikavirus	Rice
<i>Riptortus dentipes</i>	Pod sucking bug	Grains
<i>Schizaphis graminum</i>	Greenbug	Grains
<i>Scirpophaga excerptalis</i>	Top shoot borer	Sugarcane
<i>Scirtothrips perseae</i>	Avocado thrips	Avocado
<i>Sesamia griseascens</i>	Stem borer	Sugarcane
<i>Slow paralysis virus</i> (If flavivirus)	Slow paralysis virus	Honey bee
<i>Soil-borne wheat mosaic virus</i> (Furovirus)	Soil-borne wheat mosaic virus	Grains
<i>Sphaceloma perseae</i>	Avocado scab	Avocado
<i>Spiroplasma citri</i>	Stubborn	Citrus
<i>Spodoptera eridania</i>	Southern armyworm	Cut flower
<i>Spodoptera frugiperda</i>	Fall armyworm	Cut flower
<i>Spodoptera littoralis</i>	Cotton leafworm	Cut flower

Scientific name	Common name	High priority pest of
<i>Stagonospora sacchari</i>	Leaf scorch	Sugarcane
<i>Stenomoma catenifer</i>	Avocado seed moth	Avocado
<i>Sternochetus frigidus</i>	Mango pulp weevil	Mango
<i>Strawberry latent ringspot virus</i> (Sadwavirus)	Strawberry latent ringspot virus	Rubus, Strawberry
<i>Strymon megarus</i> (as a vector of fusariosis)	Pineapple fruit borer	Pineapple
<i>Sugarcane streak mosaic virus</i> (Poacevirus)	Sugarcane streak mosaic	Sugarcane
<i>Teratosphaeria gauchensis</i>	Coniothyrium eucalyptus canker	Forestry
<i>Teratosphaeria zuluensis</i>	Coniothyrium eucalyptus canker	Forestry
<i>Tetranychus piercei</i>	Banana spider mite	Banana
<i>Thaumatotibia leucotreta</i> (syn. <i>Cryptophlebia leucotreta</i>)	False codling moth	Citrus, Cotton, Grains, Pineapple, Summerfruit, Vegetable
<i>Thrips tabaci</i> (exotic strains and biotypes)	Onion thrips	Onion
<i>Tilletia indica</i>	Karnal bunt	Grains
<i>Tomato black ring virus</i> (Nepovirus)	Tomato black ring virus	Strawberry
<i>Tomato ringspot virus</i> (Nepovirus)	Tomato ringspot virus	Rubus, Strawberry
<i>Tomicus piniperda</i>	Pine shoot beetle	Forestry
<i>Toxotrypana curvicauda</i>	Papaya fly	Papaya
<i>Trichoplusia ni</i>	Cabbage looper	Vegetable
<i>Trioza erytreae</i>	African citrus psyllid	Citrus
<i>Trogoderma granarium</i>	Khapra beetle	Grains, Nut, Rice
<i>Tropilaelaps clareae</i>	Tropilaelaps mite	Apple and Pear, Honey bee, Nut
<i>Tropilaelaps mercedesae</i>	Tropilaelaps mite	Apple and Pear, Honey bee, Nut
<i>Tuta absoluta</i>	South American tomato moth, tomato leafminer	Tomato, Vegetable
Unknown	Ramu stunt disease	Sugarcane, Vegetable

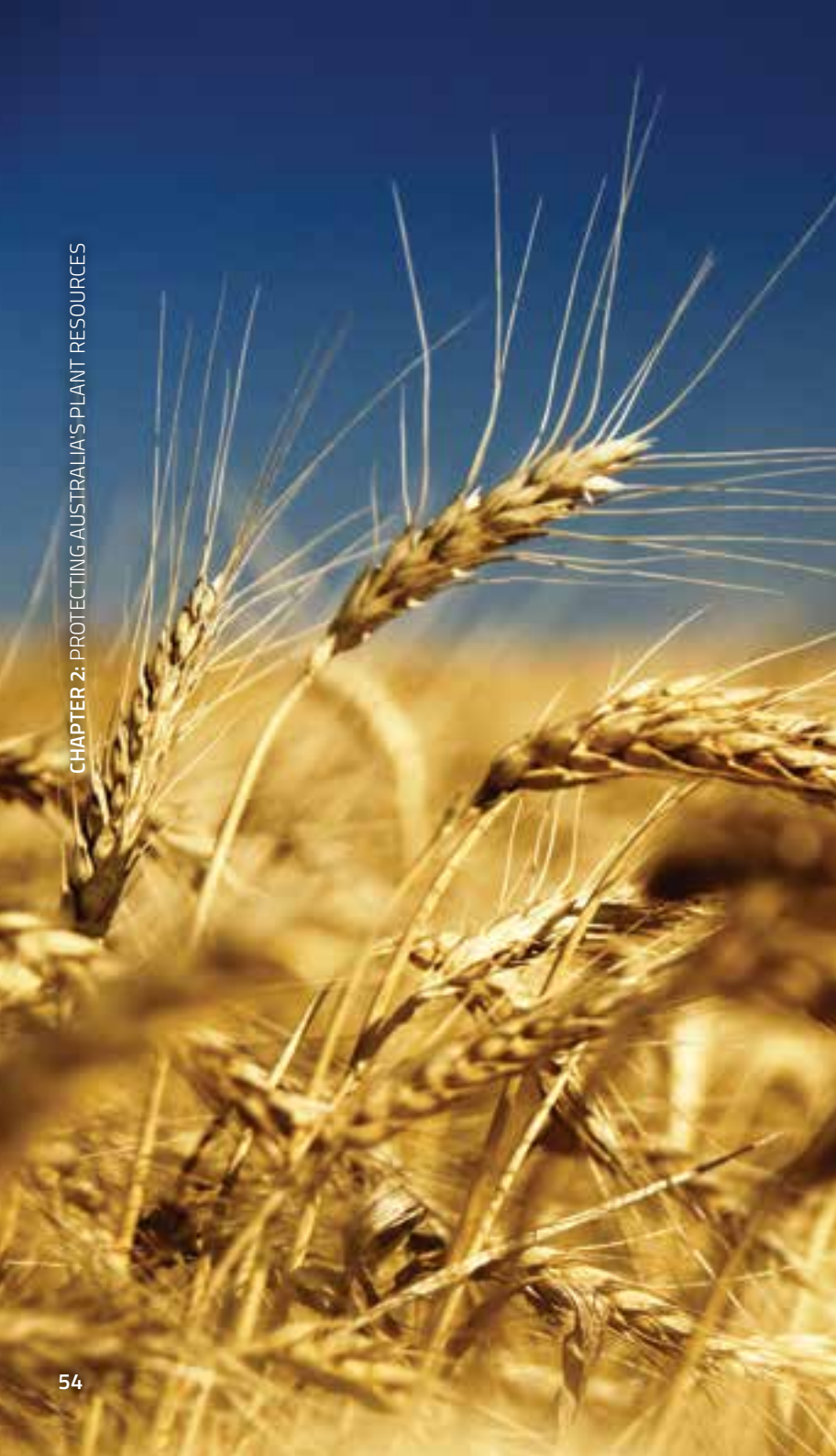
Table 6. High Priority Pest threats (continued)

Scientific name	Common name	High priority pest of
Unknown (suspected phytoplasma)	Longan and lychee witches' broom disease	Lychee
<i>Urocerus gigas</i>	Giant wood wasp	Forestry
<i>Uromyces lineolatus</i>	Rust	Vegetable
<i>Varroa destructor</i>	Varroa mite	Apple and Pear, Honey bee, Nut
<i>Varroa jacobsoni</i>	Varroa mite	Honey bee
<i>Verticillium dahliae</i> (defoliating strain)	Verticillium wilt	Cotton, Nut, Olive
<i>Vespa</i> spp. (exotic species)	Hornets	Honey bee
<i>Watermelon bud necrosis virus</i> (Tospovirus)	Watermelon bud necrosis	Vegetable
<i>White leaf phytoplasma</i>	White leaf	Sugarcane
<i>Xanthomonas albilineans</i> (exotic strains, serological groups 2 or 3)	Leaf scald	Sugarcane
<i>Xanthomonas axonopodis</i> pv. <i>allii</i>	Xanthomonas leaf blight	Onion
<i>Xanthomonas axonopodis</i> pv. <i>passiflorae</i>	Bacterial blight	Passionfruit
<i>Xanthomonas campestris</i> (avocado strain)	Bacterial canker	Avocado
<i>Xanthomonas citri</i> subsp. <i>citri</i> (syn. <i>X. axonopodis</i> pv. <i>citri</i>)	Citrus canker	Citrus
<i>Xanthomonas citri</i> subsp. <i>malvacearum</i> (syn. <i>X. axonopodis</i> pv. <i>malvacearum</i>)	Bacterial blight, angular leaf spot	Cotton
<i>Xanthomonas fragariae</i>	Strawberry angular leaf spot	Strawberry
<i>Xylella fastidiosa</i> (subspecies not specified)	Pierce's disease, blueberry leaf scorch, olive leaf scorch, olive quick decline, phony peach	Blueberry, Cherry, Viticulture
<i>Xylella fastidiosa</i> subsp. <i>fastidiosa</i>	Pierce's disease, blueberry leaf scorch, olive leaf scorch	Coffee, Nut
<i>Xylella fastidiosa</i> subsp. <i>multiplex</i>	No common name	Nut, Olive
<i>Xylella fastidiosa</i> subsp. <i>pauca</i>	Pierce's disease, blueberry leaf scorch, olive quick decline	Citrus, Coffee, Olive decline

Scientific name	Common name	High priority pest of
<i>Xylella fastidiosa</i> subsp. <i>percei</i>	Almond leaf scorch, pecan bacterial leaf scorch	Nut
<i>Xylosandrus compactus</i>	Black twig borer	Mango
<i>Zea mosaic virus</i> (Potyvirus)	Zea mosaic virus	Grains
<i>Zeugodacus cucurbitae</i> (syn. <i>Bactrocera cucurbitae</i>)	Melon fruit fly	Avocado, Melon, Papaya, Passionfruit, Summerfruit, Tomato, Vegetable



Image courtesy of the Australian Melon Association



CONTINGENCY PLANNING

Contingency planning is a pre-emptive preparedness initiative that improves readiness for a particular exotic pest threat. Contingency plans are developed by PHA, industries and governments.

Before any incursion occurs, experts are brought together to collate information on a particular pest or pest group, its biology and available control measures. Each contingency plan provides guidelines and options for steps to be undertaken and considered when developing a Response Plan for this pest.

Table 7 provides a list of 124 contingency plans that have been developed to date. These plans make a considerable contribution to Australia's preparedness for serious exotic plant pest threats. Contingency plans are available on PHA's website, in the Pest Information Document Database.

Wheat rust outbreak could cost Australia up to \$1.4 billion

On 6 September 2018 the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) issued a report on the potential economic impacts of the wheat stem rust strain Ug 99 in Australia.

The Ug 99 strain is not present in Australia, but it poses a major risk to the \$6 billion wheat industry in terms of revenue losses and increased production costs, should it arrive in the country.

The report provides estimates of the economic impact over 10 years of three scenarios for disease spread, ranging from \$574 million for wheat-growing areas in the western region, to \$1.4 billion if all wheat growing areas in Australia were to become affected.

Disruptions to Australian wheat exports may also result if markets that are sensitive to Ug 99 contamination were to ban imports of Australian wheat.

Eradication of Ug 99 would likely only be technically feasible if the rust is detected while still contained within a very small area with a light spore load, so it is crucial Australia takes measures to keep Ug 99 from entering the country in the first place.

To help manage the risk posed by this significant wheat disease, work is being done in surveillance, monitoring pathogen populations to track the evolution of potential virulence, and pre-breeding of resistant varieties of wheat.

Potential economic impacts of the wheat stem rust strain Ug 99 in Australia is available at agriculture.gov.au/wheat-stem-rust-report

Table 7. Contingency plans

Scientific name	Common name	Year	Location of document	Scope
<i>Acarapis woodi</i>	Tracheal mite	2012	PHA	National – honey bee industry
<i>Agromyza ambigua</i> , <i>A. megalopsis</i> , <i>Cerodontha denticornis</i> , <i>Chromatomyia fuscata</i> and <i>C. nigra</i>	Cereal leafminers	2009	PHA	National – grains industry
<i>Agrotis segetum</i>	Turnip moth	2011	PHA	National – grains industry
<i>Alternaria humicola</i>	Leaf spot of field pea	2009	PHA	National – grains industry
<i>Alternaria triticina</i>	Leaf blight of wheat	2009	PHA	National – grains industry
<i>Anoplophora chinensis</i>	Citrus longicorn beetle	2009	PHA	National – production nurseries
<i>Aphis fabae</i> , <i>Haplothrips tritici</i> and <i>Schizaphis graminum</i>	Exotic sap-sucking pests	2015	PHA	National – grains industry
<i>Atherigona soccata</i>	Sorghum shoot fly	2008	PHA	National – grains industry
<i>Austropuccinia psidii</i> (syn. <i>Uredo rangelii</i>)	Myrtle rust	2012–13	DJPR	State
<i>Austropuccinia psidii</i> (syn. <i>Uredo rangelii</i>)	Myrtle rust	2015	PIRSA	State
<i>Bactericera cockerelli</i>	Tomato potato psyllid	2017–18	PIRSA	State
<i>Bactericera cockerelli</i> and <i>Candidatus Liberibacter solanacearum</i>	Zebra chip complex	2011	Hort Innovation, PHA	National – vegetable and potato industries
<i>Bactrocera dorsalis</i> , <i>B. tryoni</i> and <i>Ceratitis capitata</i>	Oriental fruit fly, Queensland fruit fly and Mediterranean fruit fly	Updated bi-annually	PIRSA	State
<i>Bactrocera tryoni</i> and <i>Ceratitis capitata</i>	Queensland fruit fly and Mediterranean fruit fly	2013	DPIPWE	State
<i>Bactrocera tryoni</i> , <i>Ceratitis capitata</i> and exotic fruit fly species	Fruit flies	Updated bi-annually	PIRSA	State
<i>Barley stripe mosaic virus</i> (Hordeivirus)	Barley stripe mosaic virus	2009	PHA	National – grains industry
<i>Beet pseudo-yellows virus</i> (Closterovirus), <i>Diodia vein chlorosis virus</i> (Crinivirus), <i>Lettuce infectious yellows virus</i> (Crinivirus) and <i>Tomato yellow leaf curl virus</i> (Begomovirus)	Whitefly transmitted viruses	2011	PHA	National – production nurseries
<i>Curvularia spicifera</i> (syn. <i>Bipolaris spicifera</i>)	Leaf blotch of cereals	2009	PHA	National – grains industry
<i>Braula coeca</i>	Braula fly	2012	PHA	National – honey bee industry
<i>Burkholderia glumae</i>	Panicle blight	2008	PHA	National – rice industry
<i>Candidatus Liberibacter africanus</i> , <i>Ca. L. americanus</i> , <i>Ca. L. asiaticus</i> , <i>Diaphorina citri</i> and <i>Trioza erytrae</i>	Huanglongbing and vectors	2013	QDAF, NGIA	National – production nurseries
<i>Candidatus Liberibacter africanus</i> , <i>Ca. L. americanus</i> , <i>Ca. L. asiaticus</i> , <i>Diaphorina citri</i> and <i>Trioza erytrae</i>	Huanglongbing and vectors	2009 (under review)	Hort Innovation	National – citrus and nursery industries
<i>Candidatus Liberibacter africanus</i> , <i>Ca. L. americanus</i> , <i>Ca. L. asiaticus</i> , <i>Diaphorina citri</i> and <i>Trioza erytrae</i>	Huanglongbing and vectors	2015	Hort Innovation, PHA	National – citrus and nursery industries
<i>Cantareus apertus</i>	Green snail	2012–13	DJPR	State

Table 7. Contingency plans (continued)

Scientific name	Common name	Year	Location of document	Scope
<i>Cephus cinctus</i> and <i>Thaumatotibia leucotreta</i>	Wheat stem sawfly and false codling moth	2015	PHA	National – grains industry
<i>Cephus pygmeus</i>	European wheat stem sawfly	2008	PHA	National – grains industry
<i>Ceratocystis ulmi</i>	Dutch elm disease	2001	DJPR	State
<i>Ceutorhynchus assimilis</i> and <i>Dasineura brassicae</i>	Cabbage seedpod weevil and brassica pod midge	2011	PHA	National – grains industry
<i>Chilo partellus</i>	Spotted stem borers	2009	PHA	National – grains industry
<i>Chilo</i> spp.	Sugarcane stem borer	2008	SRA	National – sugarcane industry
<i>Chortoicetes terminifera</i>	Plague locust	2010	PIRSA	State
<i>Chromatomyia horticola</i> , <i>Liriomyza bryoniae</i> , <i>L. cicerina</i> , <i>L. huidobrensis</i> , <i>L. sativae</i> and <i>L. trifolii</i>	Agromyzid leafminers	2008	PHA	National – grains industry
<i>Chrysanthemum stem necrosis virus</i> (Tospovirus), <i>Impatiens necrotic ringspot virus</i> (Tospovirus), <i>Pelargonium flower break virus</i> (Carmovirus) and <i>Tomato spotted wilt virus</i> (Tospovirus)	Thrips-transmitted viruses	2011	PHA	National – production nurseries
<i>Colletotrichum truncatum</i> (lentil strain)	Lentil anthracnose	2008	PHA	National – grains industry
<i>Conopomorpha cramerella</i>	Cocoa pod borer	2012–14	QDAF	State
<i>Cryphonectria parasitica</i>	Chestnut blight	2010	DJPR	State – chestnut industry
<i>Cucumber green mottle mosaic virus</i>	CGMMV	2015	QDAF	State – containment by melon, vegetable and nursery industries
<i>Daktulosphaira vitifoliae</i>	Grape phylloxera	Updated bi-annually	PIRSA	State – viticulture industry
<i>Deanolis sublimbalis</i>	Red banded mango caterpillar	2008	PHA	State
<i>Diatraea</i> spp.	Sugarcane borer	2008	SRA	National – sugarcane industry
<i>Diuraphis noxia</i>	Russian wheat aphid	2012	PHA	National – grains industry
<i>Dorysthenes buqueti</i>	Sugarcane longhorn stemborer	2009	SRA	National – sugarcane industry
<i>Echinothrips americanus</i>	Poinsettia thrips	2010	PHA	National – production nurseries
<i>Eldana saccharina</i>	African sugarcane moth borer	2008	SRA	National – sugarcane industry
<i>Eoreuma loftini</i>	Mexican rice borer	2008	SRA	National – sugarcane industry
<i>Erwinia amylovora</i>	Fire blight	2002	DJPR	State
<i>Erwinia amylovora</i>	Fire blight	2007	Hort Innovation, PHA	National – apple and pear industry
<i>Erwinia amylovora</i> (and its impact on honey bees)	Fire blight	2004	DPIPWE	State – honey bee industry
<i>Erwinia papayae</i>	Bacterial crown rot	2011	PHA	National – papaya industry
<i>Eumetopina flavipes</i>	Island sugarcane planthopper	2009	SRA	National – sugarcane industry
<i>Eurogaster integriceps</i>	Sunn pest	2008	PHA	National – grains industry

Table 7. Contingency plans (continued)

Scientific name	Common name	Year	Location of document	Scope
<i>Fulmekiola serrata</i>	Oriental sugarcane thrips	2009	SRA	National – sugarcane industry
<i>Fusarium oxysporum</i> f. sp. <i>ciceris</i> , <i>F. oxysporum</i> f. sp. <i>lentis</i> and <i>F. oxysporum</i> f. sp. <i>lupini</i>	Fusarium wilt of chickpea, lentil and lupin	2009	PHA	National – grains industry
<i>Fusarium oxysporum</i> f. sp. <i>conglutinans</i>	Fusarium wilt of canola	2007	PHA	National – grains industry
<i>Gibberella fujikuroi</i>	Bakanae	2005	NSW DPI	National – rice industry
<i>Gibberella fujikuroi</i>	Bakanae	2008	PHA	National – rice industry
<i>Globodera pallida</i>	Potato cyst nematode	2001	DPIPWE	State
<i>Globodera rostochiensis</i>	Potato cyst nematode	2002	DJPR	National
<i>Halyomorpha halys</i>	Brown marmorated stink bug	2016	PHA	Not specific to a particular industry
<i>Harpophora maydis</i> and <i>Plasmopara halstedii</i>	Exotic soil-borne pathogens of grains	2013	PHA	National – grains industry
<i>Helicoverpa zea</i>	Corn earworm	2009	PHA	National – grains industry
<i>Heterodera avenae</i> , <i>H. filipjevi</i> and <i>H. latipons</i>	Cereal cyst nematodes	2012	PHA	National – grains industry
<i>Heterodera carotae</i>	Carrot cyst nematode	2008	DPIRD, Hort Innovation	National – vegetable industry
<i>Heterodera ciceri</i> , <i>H. glycines</i> and <i>H. zea</i>	Exotic nematodes of grains	2013	PHA	National – grains industry
<i>Homalodisca vitripennis</i>	Glassy winged sharpshooter	2009	PHA	National – production nurseries
<i>Homalodisca vitripennis</i>	Glassy winged sharpshooter	2018	PHA, NGIA	National – production nurseries
<i>Hylotrupes bajulus</i>	European house borer	2011	QDAF	State
<i>Hypothenemus hampei</i>	Coffee berry borer	2012–13	QDAF	State
Invasive exotic ants	Various	2018 draft	QDAF	National – production nurseries
<i>Liriomyza bryoniae</i> , <i>L. huidobrensis</i> , <i>L. sativa</i> , <i>L. trifolii</i> and <i>Chromatomyia horticola</i>	Agromyzid leafminers	2008	QDAF, Hort Innovation	National
<i>Liriomyza huidobrensis</i>	Serpentine leafminer	2009	PHA	National – production nurseries
<i>Lissachatina fulica</i> (syn. <i>Achatina fulica</i>)	Giant African land snail	2015	NGIA	National – ornamentals, vegetables, legumes
<i>Lissorhoptrus oryzophilus</i>	Rice water weevil	2005	NSW DPI	National – rice industry
<i>Lissorhoptrus oryzophilus</i>	Rice water weevil	2008	PHA	National – rice industry
<i>Lygus lineolaris</i>	Tarnished plant bug	2011	PHA	National – production nurseries
<i>Lymantria dispar</i>	Asian gypsy moth, gypsy moth complex	2002	NSW DPI	National
<i>Lymantria dispar dispar</i>	Gypsy moth (Asian and European strains)	2009	PHA	National – production nurseries
<i>Magnaporthe grisea</i>	Rice blast	2005	NSW DPI	National – rice industry
<i>Magnaporthe grisea</i>	Rice blast	2008	PHA	National – rice industry

Table 7. Contingency plans (continued)

Scientific name	Common name	Year	Location of document	Scope
<i>Maize dwarf mosaic virus</i> (Potyvirus)	Maize dwarf mosaic virus	2011	PHA	National – grains industry
<i>Mayetiola destructor</i>	Hessian fly	2005	PHA	National – grains industry
<i>Mayetiola hordei</i>	Barley stem gall midge	2008	PHA	National – grains industry
<i>Meromyza americana</i> and <i>M. saltatrix</i>	Wheat stem maggots	2009	PHA	National – grains industry
<i>Nysius huttoni</i>	Wheat bug	2008	PHA	National – grains industry
<i>Paracoccus marginatus</i>	Papaya mealy bug	2011	PHA	National – papaya industry
<i>Peronosclerospora philippinensis</i> and <i>P. sorghi</i>	Downy mildew of maize and sorghum	2009	PHA	National – grains industry
<i>Phakopsora euvitis</i>	Grapevine leaf rust	2006	QDAF	National
<i>Phyllophaga</i> spp.	May beetle	2008	PHA	National – grains industry
<i>Phytophthora ramorum</i>	Sudden oak death	2010	PHA	National – production nurseries
<i>Phytophthora ramorum</i>	Sudden oak death	2018	PHA, NGIA	National – production nurseries
<i>Plum pox virus</i> (Potyvirus) and <i>Tobacco etch virus</i> (Potyvirus)	Aphid-transmitted viruses	2011	PHA	National – production nurseries
<i>Pomacea canaliculata</i>	Golden apple snail	2008	PHA	National – rice industry
<i>Potato spindle tuber viroid</i>	Potato spindle tuber viroid (PSTVd)	2012–13	DJPR	State
<i>Psila rosae</i>	Carrot rust fly	2009	DPIRD, Hort Innovation	National – vegetable industry
<i>Puccinia graminis</i> f. sp. <i>tritici</i> (pathotype Ug99)	Stem rust of wheat	2009	PHA	National – grains industry
<i>Puccinia psidii</i>	Myrtle rust	2015	DPIRD	State
<i>Puccinia psidii</i> sensu lato	Eucalyptus rust	2009	PHA	National – production nurseries
<i>Puccinia striiformis</i> f. sp. <i>hordei</i>	Barley stripe rust	2010	NSW DPI, PHA	National – grains industry
<i>Pyrenophora teres</i> f. sp. <i>teres</i>	Net form of net blotch	2009	PHA	National – grains industry
<i>Red clover vein mosaic virus</i> (Carlavirus)	Red clover vein mosaic virus	2008	PHA	National – grains industry
<i>Scirpophaga</i> spp.	Top borers	2008	SRA	National – sugarcane industry
<i>Sesamia</i> spp.	Sugarcane and maize borers	2008	SRA	National – sugarcane industry
<i>Sitobion avenae</i>	Wheat aphid	2009	PHA	National – grains industry
<i>Sitona</i> spp. complex, especially <i>S. lineatus</i>	Pea leaf weevils	2005	DPIRD, PHA	National – grains industry
<i>Solenopsis invicta</i>	Red imported fire ant	2013	QDAF, NBC	National
<i>Solenopsis invicta</i>	Red imported fire ant	2013	QDAF, TACC	State
<i>Thekopsora minima</i>	Blueberry rust	2014	DJPR	State
<i>Tilletia barclayana</i>	Kernel smut of rice	2008	PHA	National – rice industry

Table 7. Contingency plans (continued)

Scientific name	Common name	Year	Location of document	Scope
<i>Tilletia contraversa</i>	Dwarf bunt of wheat	2007	PHA	National – grains industry
<i>Tilletia indica</i>	Karnal bunt	2005	PHA	National – grains industry
<i>Tilletia indica</i>	Karnal bunt	2006	NSW DPI	National – grains industry
<i>Tilletia indica</i>	Karnal bunt	2017	PIRSA	State
<i>Trogoderma granarium</i>	Khapra beetle	2005	PHA	National – grains industry
<i>Tropilaelaps clareae</i> and <i>T. mercedesae</i>	Tropilaelaps mites	2012	PHA	National – honey bee industry
<i>Uromyces pisi</i> and <i>U. viciae-fabae</i>	Field pea and lentil rust	2009	PHA	National – grains industry
<i>Ustilago scitaminea</i>	Sugarcane smut	1997	SRA	National – sugarcane industry
Various	Tramp ant	2015 draft	DJPR	National – production nurseries
<i>Varroa destructor</i> and <i>V. jacobsoni</i>	Varroa mites	2015	DJPR	National – honey bee industry
<i>Verticillium longisporum</i>	Verticillium wilt of canola	2011	PHA	National – grains industry
<i>Wasmannia auropunctata</i>	Electric ant	2013	QDAF, TACC	State
<i>Xanthomonas citri</i> subsp. <i>citri</i>	Citrus canker	2006	QDAF	State – citrus industry
<i>Xanthomonas translucens</i> pv. <i>translucens</i> and <i>X. translucens</i> pv. <i>undulosa</i>	Bacterial leaf streak	2011	PHA	National – grains industry
<i>Xylella fastidiosa</i>	Pierce's disease	2002, 2011, 2016	DJPR, PHA, QDAF, NGIA	National – viticulture and production nurseries



There are more than 130,000 hectares of vineyards in Australia, tended by 6,200 wine grape growers. Image courtesy of Australian Vignerons



BIOSECURITY MANUALS FOR PRODUCERS

To help guide improved farm biosecurity for specific crops, PHA in partnership with plant production industries and governments, has released 21 crop-specific biosecurity manuals, listed in Table 8. In 2018 two biosecurity manuals were produced: one for potato producers and another for onion producers.

These booklets are designed with growers and consultants in mind, explaining effective measures that can be incorporated into day-to-day operations to improve biosecurity and help protect farms from both new and established pests. Each booklet also raises awareness of the High Priority Pests of that industry, increasing the likelihood of detecting an exotic pest incursion early.

The information from biosecurity manuals is also provided in the crops section of the Farm Biosecurity website farmbiosecurity.com.au and complete manuals are available for download.

Table 8. Biosecurity manuals for producers

Manual	Version	Manual	Version
Biosecurity Induction Manual for Bundaberg Horticultural Farms	1.0	Farm Biosecurity Manual for the Northern Adelaide Plains Vegetable Growers	1.0
Biosecurity Manual for Beekeepers	1.1	Farm Biosecurity Manual for the Organic Grains Industry	1.0
Biosecurity Manual for Citrus Producers	2.0	Onion Growers' Biosecurity Manual	1.0
Biosecurity Manual for Grain Producers	4.0	Orchard Biosecurity Manual for the Almond Industry	1.0
Biosecurity Manual for Sugarcane Producers	1.0	Orchard Biosecurity Manual for the Apple and Pear Industry	2.0
Biosecurity Manual for the Nursery Production Industry	1.0	Orchard Biosecurity Manual for the Avocado Industry	1.0
Biosecurity Manual for the Papaya Industry	1.0	Orchard Biosecurity Manual for the Cherry Industry	1.0
Biosecurity Manual for the Plantation Timber Industry	1.0	Orchard Biosecurity Manual for the Mango Industry	1.0
Biosecurity Manual for the Viticulture Industry	1.0	Orchard Biosecurity Manual for the Summerfruit Industry	1.0
Farm Biosecurity Manual for the Banana Industry	1.0	Potato Growers' Biosecurity Manual	1.0
Farm Biosecurity Manual for the Cotton Industry	1.1		

New biosecurity manuals for potato and onion growers



In June 2018 the Potato Growers' Biosecurity Manual was released as a guide to farm biosecurity measures to reduce the risk posed by weeds, pests and diseases. It was developed by PHA in consultation with AUSVEG and potato growers across NSW, Victoria and South Australia.

The manual is designed to be used by potato growers and their staff, as well as contractors, processors, researchers and consultants working in the potato industry. It gives specific advice on what potato producers need to be aware of, and what measures they should be taking on their farm to reduce biosecurity risks.

Onion growers also have tailored advice on recommended farm biosecurity practices to minimise the risk of introducing and spreading pests, diseases and weeds and help protect farms, regions and the onion industry.



The Onion Grower's Biosecurity Manual, launched in April 2018, is for onion growers and staff, as well as contractors, researchers and consultants working in the industry. The manual includes simple procedures that can be used in day-to-day operations to improve farm biosecurity.

The manual focuses on how onion growers can address biosecurity risks related to pests and diseases already in Australia that are restricted to particular growing regions, and exotic pests and diseases that could potentially impact onion growers if they were to enter and become established in Australia.