



# Chapter 7

Post-border biosecurity –  
controlling pests and weeds



*Vegetable crops in Australia are vulnerable to weeds due to regular soil disturbance and fertiliser and irrigation use. However, timely weed control practices can successfully minimise the impact of weeds as in this example near Gatton, Queensland. Image courtesy of M. Coleman, University of New England*

## Post-border biosecurity – controlling pests and weeds

While many resources are invested in keeping new pests out of Australia and responding to pest detections, existing pests and weeds require biosecurity measures to prevent further spread. This chapter describes biosecurity measures that apply to pests found in certain parts of Australia, pests that are established and must be managed, and weeds.

There is a national system that coordinates domestic quarantine restrictions to prevent pest spread within Australia, but post-border control of pests and weeds is one part of the biosecurity system where agricultural industries and the Australian community have a major role to play.

Most farmers are aware that they have responsibility for controlling pests and weeds on their property and the use of on-farm biosecurity practices is on the rise. However, there is more that producers can do to prevent biosecurity incursions on their properties. This chapter details the communication initiatives to encourage on-farm biosecurity risk mitigation undertaken by PHA and Animal Health Australia, government and industries.

The chapter finishes with an overview of Australia's weed biosecurity system.



*PIRSA Biosecurity SA contractor conducting baiting operations during the eradication response to the outbreak of Queensland fruit fly at Loxton. Image courtesy of PIRSA*

## National and state oversight of domestic quarantine

Plant pests can be spread easily from one part of Australia to another through the movement of plants, plant products, people, soil and equipment. The main concerns are newly established and regionalised pests.

To address this risk, domestic quarantine restrictions imposed on the movement of high-risk items apply in each state and territory. Restrictions operate under state and territory legislation to complement and support the national quarantine legislation that governs the import and export of goods to and from Australia.

### SUBCOMMITTEE ON DOMESTIC QUARANTINE AND MARKET ACCESS

To assist with the coordination of domestic quarantine between the state and territory governments the Subcommittee on Domestic Quarantine and Market Access (SDQMA) has been established. This committee consists of senior plant health regulators from state and territory governments, representatives from the Australian Government Department of Agriculture and Water Resources, and an independent chair from PHA.

The objective of the committee is to develop, review and maintain domestic quarantine standards and conditions that allow movement of produce around the country while avoiding the risk of spreading regionalised plant pests. For example, produce from fruit fly affected regions can be moved to non-affected regions for sale, once it has met certain conditions such as in-field and post-harvest treatments.

The subcommittee is tasked with ensuring that conditions are:

- technically justified and least trade restrictive, to minimise regulatory burdens on industry
- coordinated and harmonised across the country and regions to the extent possible
- consistent with Australia's international obligations under the World Trade Organization's Agreement of the Application of Sanitary and Phytosanitary Measures.

It works closely with state and national plant quarantine agencies and industries to develop and implement new treatment arrangements, which not only provide for domestic trade, but also present a potential pathway to support international market access.

### RESTRICTIONS FOR INTERSTATE TRAVELLERS AND TRANSPORT OF PRODUCE

Anyone travelling within Australia, moving house across regional or state borders, or moving produce around the country is bound by restrictions on what they can and cannot carry set by state and territory governments.

Rules apply to high-risk material including plants and plant products, fruit and vegetables, honey and beekeeping equipment, soil, agricultural machinery and recreational equipment.

The website [interstatequarantine.org.au](http://interstatequarantine.org.au) provides information on domestic quarantine restrictions for travellers and producers. This information is also in a booklet – Australian Interstate Quarantine: A Traveller's Guide – which was updated in November 2018.

There are interstate quarantine bins at domestic airports, ferry terminals, and state or quarantine zone borders. Travellers must dispose of any restricted products at those points. Rules change as new pest incursions occur, so travellers are advised to check on the Australian Interstate Quarantine website for the latest information.

### Restrictions for interstate export

Commercial trade in products being moved around Australia is managed by the individual states and territories, who provide certificates for each consignment attesting that the goods meet the receiving state or territory's entry conditions. Consignments of produce that originate from a controlled region can be shipped into a region that does not have the pest of concern, if the produce is certified to have been treated in such a way that it no longer poses a biosecurity risk. It might be growing or packing produce in a particular way, such as under cover, or being treated after harvest.

There are three types of certificates that may be issued to certify that produce for interstate trade meets the receiver's requirements:

- **Plant Health Certificate** – which is issued by a government officer from the state or territory of origin.
- **Plant Health Assurance Certificate** – which is supplied by an approved business under an Interstate Certification Assurance scheme arrangement. To issue these certificates – known as an Interstate Certificate of Assurance (ICA) – a business must meet specific requirements and undergo regular audits by the state or territory government accreditation authority.
- **BioSecure HACCP Biosecurity Certificate** – where certificates are issued through a third party. In 2018, Nursery and Garden Industry Australia received approval to issue the first certificates of this type.

In 2018, states and territories updated several ICAs to mitigate the risks from Queensland and Mediterranean fruit fly, and green snail. Two new ICAs were issued for bananas from properties affected by Panama TR4, and for the treatment and inspection of cut flowers for tomato potato psyllid. The Australian Interstate Quarantine website lists all ICAs by state or territory and holds the Schedule of National Interstate Certification Assurance Documents, a complete list of ICAs.

## OFFICIAL CONTROL OF QUARANTINE PLANT PESTS TO PROTECT OVERSEAS TRADE

Since 2017, the Plant Quarantine Pest and Official Control National Policy – implemented by the Chief Plant Health Managers across Australia – has helped to contain and control new plant pests and diseases, while allowing the Australian Government to continue to regulate imports to prevent pest entry. The policy also facilitates exports, so growers can continue sending their products to overseas markets.

On occasions, an exotic plant pest or disease may enter Australia that cannot be eradicated. In these circumstances, responsibility for managing the pest or disease rests with industry and the government of the state or territory in which it occurs.

When ‘official control’ is applied, the state or territory government has put in place measures that aim to contain and control the pest or disease. These mandatory activities include:

- containment or suppression activities (mostly involving destruction, disposal and decontamination)
- surveillance in the area where the pest or disease could establish
- movement restrictions so the pest or disease does not spread to an area that is not affected.

Official control can be applied at a regional or national level. If it is applied nationally, it must be consistent across all states and territories.

When an exotic pest or disease enters and is officially confirmed to be in Australia, the Department of Agriculture and Water Resources has an obligation to notify the International Plant Protection Convention. When other countries become aware of the presence of the pest or disease in Australia, it can trigger trade bans or restrictions on our exports, as well as requests for Australia to review its current import conditions.

If Australia can provide trading partners with evidence that the pest or disease is under official control, the department can continue to justify regulating international imports to prevent exotic pest entry.

Official control may also underpin negotiations for export with concerned trading partners to accept plants or products that have been produced in areas of Australia that are not affected by the pest or disease, or are treated to importing country standards to manage the biosecurity risk. If an established pest is not under official control, the department cannot justify continuing to prevent the pest’s entry by regulating imported goods and conveyances for that pest.

While there are numerous benefits in implementing official control, there are also costs associated with containment, surveillance and movement restrictions. State and territory governments, in consultation with peak industry bodies, must determine whether official control is cost-beneficial or whether other management options are more appropriate for the plant pest.

## AUSTRALIA'S REGIONALISED PESTS

When pests that have the potential to damage the environment or agriculture are detected, eradication is the ideal goal. In some cases, however, a pest cannot be eradicated. Depending on the circumstances, domestic quarantine measures may be implemented to contain the pest, minimising negative impacts.

Regionalised pests can be contained at a local, regional or state level, depending on current distribution and the ability to implement cost-beneficial measures for containment.

In addition to introduced pests, some regionalised pests are native to parts of Australia, notably the Queensland fruit fly which is found on the east coast but not in SA, Tasmania or WA.

Table 56 lists the 92 regionalised pests recognised by formal legislation and their current area of distribution within Australia. These are the pests that domestic quarantine measures aim to contain.

**Table 56. Australia’s regionalised pests**

Scientific name	Common name	Area of regionalisation
<b>New South Wales</b>		
<i>Bactrocera tryoni</i>	Queensland fruit fly	Endemic within all of NSW excluding the Queensland Fruit Fly Control Zone on the Victorian border as defined in <i>Biosecurity (Queensland Fruit Fly) Control Order 2017</i> under the <i>Biosecurity Act 2015</i>
<i>Banana bunchy top virus</i> (Babuvirus)	Banana bunchy top virus	Present within the Banana Bunchy Top Virus Control Zone on the far north coast as defined in the <i>Biosecurity (Banana Bunchy Top Virus) Control Order 2017</i> under the <i>Biosecurity Act 2015</i>
<i>Daktulosphaira vitifoliae</i>	Grapevine phylloxera	Present within the Grapevine Phylloxera Infested Areas, comprising the Sydney and the Albury-Corowa regions as defined in the <i>Biosecurity Regulation 2017</i> under the <i>Biosecurity Act 2015</i>
<i>Panonychus citri</i>	Citrus red mite	Present within the Citrus Red Mite Biosecurity Zone, comprising the Cumberland and Northumberland counties as defined in the <i>Biosecurity Regulation 2017</i> under the <i>Biosecurity Act 2015</i>
<i>Ralstonia solanacearum</i>	Bacterial wilt of potatoes	Endemic in NSW excluding the Seed Protected Area, comprising specific areas within the Central Tablelands and Northern Tablelands as defined in the <i>Biosecurity Regulation 2017</i> under the <i>Biosecurity Act 2015</i>
<i>Spongospora subterranea</i>	Powdery scab of potatoes	Endemic in NSW excluding the Seed Protected Area, comprising specific areas within the Central Tablelands and Northern Tablelands as defined in the <i>Biosecurity Regulation 2017</i> under the <i>Biosecurity Act 2015</i>

Table 56. Australia's regionalised pests (continued)

Scientific name	Common name	Area of regionalisation
Northern Territory		
<i>Aleurodicus dispersus</i>	Spiraling whitefly	Darwin, Palmerston, Darwin rural area, Katherine
<i>Bactrocera tryoni</i>	Queensland fruit fly	Darwin, Palmerston, Darwin rural area, Katherine, Tennant Creek, Alice Springs
<i>Bemisia tabaci</i>	Silver leaf whitefly	Darwin, Palmerston, Darwin rural area, Katherine
<i>Brontispa longissima</i>	Palm leaf beetle	Darwin, Palmerston, Darwin rural area
<i>Citripestis eutrapera</i>	Mango fruit borer	Darwin, Darwin rural area, Katherine
<i>Cryptosporiopsis citri</i>	Cryptosporiopsis leaf spot	Darwin, Darwin rural area, Batchelor, Daly River, Litchfield region
<i>Cucumber green mottle mosaic virus</i>	Cucumber green mottle mosaic virus	Darwin rural area, Katherine, Alice Springs (Ti Tree)
<i>Fusarium oxysporum</i> f. sp. <i>cubense</i> (tropical race 4)	Panama disease	Darwin rural area
<i>Fusarium oxysporum</i> f. sp. <i>niveum</i>	Fusarium wilt of watermelon	Darwin, Darwin rural area, Katherine
<i>Idioscopus clypealis</i>	Mango leaf hopper	Tiwi Islands, Darwin rural area
<i>Idioscopus nitidulus</i>	Mango leaf hopper	Darwin, Palmerston, Darwin rural area, Adelaide River, Pine Creek, Katherine
<i>Monomorium dichroum</i>	Monomorium dichroum	Darwin
<i>Parlatoria blanchardi</i>	Date palm scale	Alice Springs
<i>Phakopsora cherimoliae</i>	Phakopsora rust	Darwin rural area
<i>Pineapple mealy bug wilt associated virus</i> (PMWaV-1, PMWaV-3)	No common name	One property only (Darwin Correctional Facility Shoal Bay)



Bunched flowers are a symptom of mango malformation disease. Image courtesy of Barry Conde, NT DPIR



Table 56. Australia's regionalised pests (continued)

Scientific name	Common name	Area of regionalisation
<b>Northern Territory (continued)</b>		
<i>Pseudocercospora purpurea</i>	Cercospora spot	Darwin rural area
<i>Selenothrips rubrocinctus</i>	Red banded thrips	Darwin, Palmerston, Darwin rural area, Adelaide River, Pine Creek, Katherine
<i>Sternochetus mangiferae</i>	Mango seed weevil	Darwin, Palmerston, Darwin rural area, Batchelor, Adelaide River
<i>Tetranychus gloveri</i>	Glovers' mite	Darwin rural area
<i>Thrips palmi</i>	Melon thrips	Darwin rural area
<i>Uredo morifolia</i>	Mulberry rust	Dundee Downs, Palmerston, Noonamah, Darwin rural area
<b>Queensland</b>		
<i>Aleurodicus dispersus</i>	Spiraling whitefly	Torres Strait Islands, Cape York Peninsula, Mareeba, Charters Towers, coastal towns south to Bundaberg
<i>Anoplolepis gracilipes</i>	Yellow crazy ant	Populations dotted in various locations spanning Cairns to the Gold Coast
<i>Apis cerana</i> , Java genotype	Asian honey bee	Surrounding Cairns region, north to Twyford (near Mossman), west of Dimbula and south to Feluga
<i>Banana bunchy top virus</i> (Babuvirus)	Bunchy top	Noosa south to the NSW border
<i>Chilo terrenellus</i> (Pagenstecher)	Sugarcane stem borer	Detected on a number of occasions in sugarcane on two of the three Torres Strait islands closest to PNG (Saibai and Dauan)
<i>Cucumber green mottle mosaic virus</i>	Cucumber green mottle mosaic virus	Confined to three quarantined properties in central and south-east Queensland
<i>Cryptotermes brevis</i>	West Indian drywood termite	Greater Brisbane, Wide Bay–Burnett, Rockhampton, Bowen, Townsville
<i>Deanolis sublimbalis</i>	Red banded mango caterpillar	Far northern Cape York Peninsula
<i>Eumetopina flavipes</i> (Muir)	Island sugarcane planthopper	Torres Strait island archipelago and the northern peninsula area of Cape York
<i>Fiji disease virus</i>	Fiji disease virus	Sugarcane biosecurity zones 4, 5 and 6

Table 56. Australia's regionalised pests (continued)

Scientific name	Common name	Area of regionalisation
<b>Queensland (continued)</b>		
<i>Fusarium oxysporum</i> f. sp. <i>Cubense</i> (race 1, race 2, subtropical race 4 and tropical race 4)	Panama disease	Race 1 endemic throughout banana growing regions Race 2 south Johnstone and Cairns Race 4 (subtropical) south-east Queensland as far north as Rosedale (north of Bundaberg) Races 1, 2 and subtropical race 4 are no longer in regulation, although the General Biosecurity Obligation (GBO) applies Race 4 (tropical) detected in 2015 and 2017 on two separate properties. A containment program remains in place
<i>Idioscopus clypealis</i>	Mango leaf hopper	Cape York Peninsula and Mareeba area, south to Atherton, and along the coast from Wangetti to Gordonvale. Managed under the GBO
<i>Idioscopus nitidulus</i>	Mango leaf hopper	Cape York Peninsula. Managed under the GBO
<i>Liriomyza sativae</i>	Vegetable leafminer	Northern Peninsula area of Cape York Peninsula
<i>Mycosphaerella fijiensis</i>	Black sigatoka	Some northern and eastern Torres Strait Islands
<i>Papaya ringspot virus</i> (Potyvirus)	Papaya ringspot virus	South-east Queensland as far north as Bundaberg area
<i>Planococcus lilacinus</i>	Coffee mealybug	Boigu Island, Torres Strait Islands
<i>Procontarinia</i> spp.	Mango leaf gall midge	Torres Strait and northern tip of Cape York Peninsula
<i>Pseudococcus cryptus</i>	Cryptic mealybug	Islands in the Torres Strait and isolated places in North Queensland, including Cairns, not widely distributed
<i>Pseudococcus jackbeardsleyi</i>	Jack Beardsley mealybug	Torres Strait Islands and the Cape York Peninsula
<i>Pseudocercospora purpurea</i>	Cercospora leaf spot	Mareeba Shire Council and Tablelands Regional Council
<i>Sugarcane mosaic virus</i> (strain A) (Potyvirus)	Sugarcane mosaic virus	Sugarcane biosecurity zones 4, 5 and 6

Scientific name	Common name	Area of regionalisation
<b>Queensland (continued)</b>		
<i>Sugarcane striate mosaic-associated virus</i> (Carlavirus)	Sugarcane striate mosaic virus	Sugarcane biosecurity zone 2 and 6
<i>Tetranychus piercei</i>	Spider mite	Weipa, Cape York Peninsula
<i>Thrips palmi</i>	Melon thrips	South-east Queensland as far north as Bundaberg area. North Queensland coastal areas from Ayr to Mossman and Atherton Tablelands
<i>Wasmannia auropunctata</i>	Electric ant	Far north Queensland, Cairns hinterland and Bingle Bay
<b>South Australia</b>		
<i>Achroia grisella</i>	Lesser wax moth	Endemic across all of SA
<i>Galleria mellonella</i>	Greater wax moth	Endemic across all of SA
<i>Ascospaera apis</i>	Chalkbrood	Endemic across all of SA
<i>Aethina tumida</i>	Small hive beetle	Limited known distribution within all of SA not known to occur on Kangaroo Island
<i>Paenibacillus larvae</i>	American foulbrood	Endemic across most of SA not known to occur on Kangaroo Island
<i>Melissococcus pluten</i>	European foulbrood	Endemic across most of SA not known to occur on Kangaroo Island
<i>Nosema apis</i>	Nosema	Endemic across all of SA
<i>Nosema ceranae</i>	Nosema	Endemic across most of SA not known to occur on Kangaroo Island
<i>Grapevine pinot gris virus</i>	Grapevine pinot gris virus	Limited distribution – further surveillance required to define spread
<i>Diuraphis noxia</i>	Russian wheat aphid	Endemic within SA's cereal growing regions
<i>Cucumber green mottle mosaic virus</i>	Cucumber green mottle mosaic virus	Known to be present on three properties on the Northern Adelaide Plains. Under active eradication
<i>Chortoicetes terminifera</i>	Australian plague locust	Endemic within all of SA

Table 56. Australia's regionalised pests (continued)

Scientific name	Common name	Area of regionalisation
<b>Victoria</b>		
<i>Bactrocera tryoni</i>	Queensland fruit fly	Permanent fruit fly zones (refer to specific gazetted orders)
<i>Cornu apertus</i> (syn. <i>Cantareus apertus</i> )	Green snail	Management of green snail linked and infested lands (refer to specific gazetted orders)
<i>Daktulosphaira vitifoliae</i>	Grapevine phylloxera	Phylloxera Infested Zone and Phylloxera Free Zone (refer to specific gazetted orders)
<i>Globodera rostochiensis</i>	Potato cyst nematode	Management of potato cyst nematode linked and infested lands, and Plant Protection District (refer to specific gazetted orders)
<b>Western Australia</b>		
<i>Achroia grisella</i>	Lesser wax moth	Regulations or controls for movement and control in specified areas
<i>Aethina tumida</i>	Small hive beetle	Kimberley Region. Host material restricted from movement to rest of state
<i>Bemisia tabaci</i> (B biotype)	Silverleaf whitefly	Perth and Carnarvon. Host material restricted from movement to Kununurra
<i>Brontispa longissima</i>	Palm leaf beetle	Broome. Host material restricted from movement to rest of state
<i>Cornu apertus</i> (syn. <i>Cantareus apertus</i> )	Green snail	Regulations or controls for movement and control in specified areas
<i>Ceratitis capitata</i>	Mediterranean fruit fly	Absent from east Kimberley region (Ord River Irrigation Area). Regulations or controls for movement and control in specified areas
<i>Chortoicetes terminifera</i>	Australian plague locust	Regulations for control in specified areas
<i>Cosmopolites sordidus</i>	Banana weevil borer	Kununurra and Carnarvon. Host material restricted from movement to rest of state
<i>Cryptolestes ferrugineus</i>	Flat grain beetle	Regulations or controls for movement and control in specified areas
<i>Cryptolestes pusillus</i>	Flat grain beetle	Regulations or controls for movement and control in specified areas
<i>Ephestia elutella</i>	Tobacco moth	Regulations or controls for insecticide resistant strains

Scientific name	Common name	Area of regionalisation
<b>Western Australia (continued)</b>		
<i>Ephestia kuehniella</i>	Mediterranean flour moth	Regulations or controls for insecticide resistant strains
<i>Fusarium oxysporum</i> f. sp. <i>cubense</i> (race 1)	Panama disease	Carnarvon. Host material restricted from movement to rest of the state
<i>Galleria mellonella</i>	Larger wax moth	Regulations or controls for movement and control in specified areas
<i>Hylotrupes bajulus</i>	European house borer	Regulations or controls for movement and control in specified areas
<i>Oryzaephilus surinamensis</i>	Sawtooth grain beetle	Regulations or controls for insecticide resistant strains
<i>Pentalonia nigronervosa</i>	Banana aphid	Carnarvon. Host material restricted from movement to rest of the state
<i>Plodia interpunctella</i>	Indian meal moth	Regulations or controls for insecticide resistant strains
<i>Potato spindle tuber viroid</i>	Potato spindle tuber viroid (PSTVd)	Carnarvon
<i>Rhyzopertha dominica</i>	Lesser grain borer	Regulations or controls for insecticide resistant strains
<i>Sitophilus granarius</i>	Granary weevil	Regulations or controls for insecticide resistant strains
<i>Sitophilus oryzae</i>	Rice weevil	Regulations or controls for insecticide resistant strains
<i>Sitotroga cerealella</i>	Angoumois grain moth	Regulations or controls for insecticide resistant strains
<i>Thrips palmi</i>	Melon thrips	Kimberley (low pest prevalence area)
<i>Tribolium castaneum</i>	Rust red flour	Regulations or controls for insecticide resistant strains
<i>Tribolium confusum</i>	Confused flour beetle	Regulations or controls for insecticide resistant strains
<i>Trogoderma variabile</i>	Warehouse beetle	Regulations or controls for movement and control in specified areas

## PREVENTING THE SPREAD OF FRUIT FLIES

Australia is fortunate to be free of some of the most damaging fruit fly species that occur overseas. Some of these – like the Oriental fruit fly, Natal fruit fly, melon fly and peach fruit fly – would cause considerable damage to crop production in Australia should they establish here. To ensure we remain free of these devastating pests Australia has an extensive system of surveillance and an ongoing response in the Torres Strait.

Two fruit fly species in Australia are significant pests economically – Queensland fruit fly and the Mediterranean fruit fly. They are the focus of pest management programs and quarantine restrictions to prevent Queensland fruit fly from spreading into Tasmania, WA and SA and Mediterranean fruit fly spreading from WA.

Given the widespread ramifications of fruit flies, it is in everyone's interest to prevent exotic fruit flies from reaching or becoming established in Australia and to tackle fruit fly management collectively.

The National Fruit Fly Strategy is a collaborative approach to managing pest species developed by PHA in 2008. A cost-benefit analysis undertaken in 2012 by the Australian Bureau of Agricultural and Resource Economics and Sciences estimated that, if fully implemented, the national strategy could generate benefits of between \$29 and \$38 million per year.

The National Fruit Fly Council oversees and monitors implementation of the strategy, continuing the work begun by the National Fruit Fly Strategy Advisory Committee which performed this role from May 2014 to September 2015. The Council includes representatives from governments, industry and Hort Innovation. It has an independent chair and is supported by a National Manager and a secretariat from PHA.

The Council aims to help drive the delivery of a national system that prevents fruit flies being a constraint to sustainable production or a barrier to trade and market access. It focuses its efforts across four areas:

- systems for the prevention, detection, eradication and management of fruit flies
- maximising market access, including activities that assist in securing entry conditions for horticultural produce into markets
- legislation and regulation that supports fruit fly management, is harmonised across Australia and is consistent with international standards
- research and development to ensure that innovative solutions and technically justifiable approaches are available to meet the requirements of the three areas above.

Regular meetings of the Council provide an important opportunity to identify priority areas for action and to promote coordination of activities between its members. It is also working to improve the general awareness of fruit fly as important pests, of how they can be managed, and of the Council's role in a nationally coordinated system.

The website [preventfruitfly.com.au](http://preventfruitfly.com.au) provides information for backyard growers and commercial producers. It is supported by an e-newsletter and Twitter to keep stakeholders informed.



*Mediterranean fruit fly. Image courtesy of Scott Bauer, USDA Agricultural Research Service, Bugwood.org*



## Community involvement in domestic quarantine

### THE BIOSECURITY OBLIGATIONS OF ALL AUSTRALIANS

Abiding by international and domestic border restrictions is one role that all Australians must play in maintaining Australia's biosecurity status. In addition, everyone has an obligation to do what they can to avoid spreading plant pests and weeds, to keep a lookout for anything unusual and report unfamiliar pests. In two states, NSW and Queensland, governments have included these obligations in legislation.

The introduction of a general biosecurity obligation or duty makes explicit the role that everyday Australians have to play in the biosecurity system. A biosecurity risk exists when dealing with any pest, disease or contaminant. This includes moving an animal, plant, turf, soil, machinery and equipment that could carry a pest, disease or contaminant.

People in the two eastern states are now required by law to take all reasonable and practical steps to prevent or minimise the risk of causing a biosecurity 'event' and limit the consequences of such an event. A biosecurity event is caused by a pest, disease or contaminant that is, or is likely to become, a significant problem for human health, social amenity, the economy or the environment.

Australians are not expected to know about all biosecurity risks but are expected to know about those associated with their day-to-day work and hobbies. For example:

- Those who live or work in a biosecurity zone (for example a builder or developer in a fire ant biosecurity zone) are expected to know what can and cannot move in to and out of the zone, and any other precautions required.
- Residential gardeners are expected to know the basics about reducing the risks of spreading a pest or disease, and the problem pests in their local area. They will not be expected to know about all of the biosecurity risks to plants.
- Farmers are expected to stay informed about and appropriately manage the pests and diseases that could affect or be carried by their crops and livestock, as well as weeds and pest animals that could be on their property.
- Land owners are expected to stay informed about and appropriately manage the weeds and pest animals (such as wild dogs) that could be on their property.
- Transporters of agricultural produce are expected to check whether the transportation of goods could spread diseases or pests and, if so, to manage the risks appropriately.

To learn more about the new laws, go to the Queensland and NSW government websites.

## THE ROLE OF LOCAL GOVERNMENT

As the community's closest tier of government, local government is a key stakeholder in biosecurity management. Local government's involvement in biosecurity varies from state to state and even from region to region, but generally includes:

- management of pest species on land owned by local governments
- on-going support for local community groups in the area of natural resource management including the management of post-border invasive species
- developing and enforcing pest management local laws under the *Local Government Act 1995*
- providing tools, management plans, staff support and training on post-border biosecurity issues
- delivering environmental education programs and other information relating to biosecurity in the community
- regional collaboration between local governments to deal with regional biosecurity issues
- providing field trial sites for biological control of certain weeds.

## CONTROLLING PESTS THROUGH AREA WIDE MANAGEMENT

Area wide management is an approach to pest management that operates in a geographic area. It can be applied to many pests but is currently a widespread technique for managing pest species of fruit flies. Area wide management often requires cooperation from Australian communities to be effective.

Recent years have seen the southward spread of Queensland fruit fly into southern NSW and northern Victoria. Areas previously free from this pest or experiencing only very low numbers are now having to manage the pest. Given the deregistration of several agricultural chemicals previously used for fruit fly control, in some regions area wide management is a necessary management strategy.

As a result, regional groups are taking a proactive approach to managing fruit flies in local areas. Area wide management can involve a range of techniques such as trapping, protein baiting, orchard hygiene (particularly picking up fallen fruit), sterile insect release, cover spraying and scouting.

Area wide management is only effective if all stakeholders take steps to reduce fly populations. This includes efforts by residents of urban areas and regional towns who need to reduce fruit flies in their gardens.

## National Fruit Fly Symposium helps set direction

On 14–15 August 2018, the National Fruit Fly Symposium was held in Melbourne and was attended by around 90 people including representatives from Australia's horticultural industries, researchers, pest control advisers and government agencies.

Attendees considered current progress and future priorities for managing fruit flies, in the lead up to a review of the National Fruit Fly Strategy. They were also updated on:

- current fruit fly research, development, management and extension activities
- future opportunities and market access aspirations for Australian horticulture
- recent activities to improve community engagement in fruit fly control and to get better extension of R&D outcomes
- priority areas for future investment and effort, including research, market access, pest management and policy.

Participants were confident that a suitable range of tools was available to manage fruit flies, and supported ongoing efforts to protect Australia from exotic fruit flies. They also recognised the importance of Australia's favourable pest status and minimising the spread and impact of fruit flies across the country.



Around 90 people representing horticultural industries, researchers, pest control advisers and government agencies attended the National Fruit Fly Symposium

## On-farm biosecurity

On-farm biosecurity is a set of measures producers can use to protect a property from the entry and spread of pests, diseases and weeds. On-farm risk mitigation establishes another layer of protection for a farm, allowing producers to mitigate new pest problems as well as boosting biosecurity for their region, their industry and supporting market access for produce.

On-farm biosecurity measures are most effective when integrated into everyday activities. Often measures are procedural, such as changing vehicles between zones on a property, providing footwear for visits to production areas, disinfecting pruning shears and ensuring that farm inputs are clean and disease free. These measures and information about the pests of their crop are included in biosecurity manuals (see page 61).

Increasingly, growers are appreciating the benefits of on-farm biosecurity. The rate of uptake of on-farm biosecurity risk mitigation varies between and within industries. Increasing this uptake is the remit of a number of programs, described in the following pages.

### THE FARM BIOSECURITY PROGRAM

Recognising the increasing number of mixed farming enterprises in Australia, PHA and Animal Health Australia (AHA) work together in a joint communication and awareness program, Farm Biosecurity, which provides biosecurity advice for both crop and livestock producers.

The program aims to help producers identify and reduce the risks to their enterprises posed by diseases, pests and weeds. The program website [farmbiosecurity.com.au](http://farmbiosecurity.com.au) provides an array of information and tools, including biosecurity manuals, templates for record keeping, farm biosecurity gate signs to download or order, industry specific information, videos outlining best practice, a personal profile builder, a biosecurity planner and a planning app.

Resources produced by Farm Biosecurity are structured around the six biosecurity essentials:

- farm inputs
- production practices
- farm outputs
- people, vehicles and equipment
- feral animals and weeds
- train, plan and record.

By considering how these principles apply to their properties, producers can go a long way towards protecting their farms and their future from the impact of new or established diseases, pests and weeds.

The Farm Biosecurity Producer of the Year Award was established by PHA, AHA and the Department of Agriculture and Water Resources to recognise the contribution of producers who demonstrate outstanding, proactive on-farm biosecurity practices.

### Banana growers recognised in biosecurity awards

In March 2018 the Australian Biosecurity Awards were presented at the ABARES Outlook Conference in Canberra. The winners of the inaugural Farm Biosecurity Producer of the Year Award were Mackay Farming Group from Tully, Queensland, and Rum Jungle Organics, from Batchelor in the NT.

**Mackay Farming Group** owns Bolinda Estate, a banana farming business located in Tully struck by Panama disease tropical race 4 (TR4) in July 2017. Because of their sound biosecurity practices on farm they were well positioned to deal with this non-eradicable fungal disease which can spread in soil, water and infected plant material.

When Bolinda Estate was placed under quarantine following a positive test result for TR4, the existing biosecurity measures they had in place allowed them to keep the business going with only a few hours down-time by isolating sections of the property.

**Rum Jungle Organics** principally grew bananas, but after the discovery of banana freckle in 2013, all banana trees on their property had to be destroyed and disposed of as part of the National Banana Freckle Eradication Program.

This resulted in owners Alan Peterson and Julie-Ann Murphy having virtually no farm income for four years. They undertook a complete review of their biosecurity practices and after being allowed to re-plant a new crop of bananas, the plants are now producing fruit and they can once again sell top quality fruit at the local markets.



(L to R) Biosecurity award winners Gavin and Cameron Mackay from Mackay Farming Group; Alan Peterson from Rum Jungle Organics; Greg Fraser from PHA; Julie Anne Murphy from Rum Jungle Organics; Jim Pekin from Australian Banana Growers' Council.

## BIOSECURITY EXTENSION AND ENGAGEMENT PROGRAMS

Through the leadership of their peak bodies, plant industries are becoming increasingly involved in biosecurity communication and engagement. Biosecurity extension and engagement programs are funded by PHA member industries to improve the management of, and preparedness for, biosecurity risks at the farm level. Biosecurity officers associated with some of these programs are often funded by grower levies and so tend to work with producers of particular crops.

Some state governments have additional outreach programs with officers who work with groups of producers and others along the supply chain to strengthen the state's biosecurity system. For example, the NSW Local Land Services brings together agricultural production advice including biosecurity, natural resource management and emergency management for farmers, landholders and the community.

### Grains Farm Biosecurity Program

The Grains Farm Biosecurity Program is funded by grain producers and managed by PHA and Grain Producers Australia, in partnership with the governments of five grain-producing states. Grains Biosecurity Officers are responsible for raising awareness of biosecurity management practices among grain growers and others along the supply chain. The officers engage growers at field days and conferences, giving presentations and demonstrations and running training sessions on biosecurity management practices that growers can use to protect their farms.

Since it began in 2007, thousands of in-crop and stored grain pest and disease surveys have been undertaken with industry, improving on-farm biosecurity as well as raising awareness in grain growing regions. Data from these surveys has and continues to be captured within the national reporting tool *AUSPestCheck*<sup>TM</sup>. Media, newsletter and *Ground Cover* articles are distributed year round to raise awareness of seasonal biosecurity risks for grain growers. Biosecurity officers also undertake surveillance for exotic pests of grains and have assisted in various recent incursion responses such as Russian wheat aphid, Khapra beetle and lupin anthracnose.

## Recognition for grains farm biosecurity efforts

In March 2018, the Grains Farm Biosecurity Program (GFBP) won an Australian Biosecurity Award, recognising their significant ongoing contribution to Australia's biosecurity integrity.

The biosecurity frontline personnel are the grains biosecurity officers, located in NSW, Queensland, SA, Victoria and WA. Each officer is responsible for raising awareness of biosecurity among grain growers and others along the supply chain in their region, and helping the industry during emergency responses and pest incursions. The faces have changed over the years but, collectively, grains biosecurity officers have attended more than a thousand events and handed out many thousands of farm biosecurity signs, pest fact sheets, manuals and other biosecurity material.

Since 2007 when it began, the grains biosecurity officers have delivered hundreds of training sessions in clubs and halls all over the country to raise awareness of the importance of biosecurity and provide growers with information to protect their properties. They have written articles for *Ground Cover* magazine and other publications, and worked with individual growers to develop farm biosecurity plans to assist in managing the risk of diseases, pests and weeds.

More information about the program is available from [planthealthaustralia.com.au/gfbp](http://planthealthaustralia.com.au/gfbp)



(L to R) Victoria's grains biosecurity officer Jim Moran, PHA's Executive Director and CEO Greg Fraser, and GPA's Barry Large at the Australian Biosecurity Awards. Image courtesy of Steve Keough Photography

### National Citrus Biosecurity Program

As part of a partnership program funded by Hort Innovation and the Department of Agriculture and Water Resources (through the Agricultural Competitiveness White Paper), a National Citrus Biosecurity Program was initiated in 2017 to improve biosecurity planning, preparedness and awareness in the citrus industry.

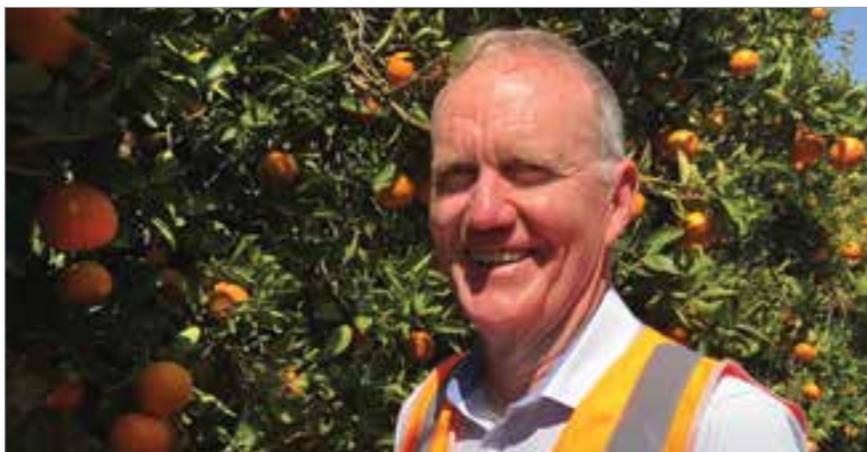
During 2018, a National Citrus Biosecurity Coordinator was appointed to work with government and industry to improve surveillance for exotic pests and raise awareness of pest threats among citrus growers and others along the supply chain.

The program has re-established the First Detectors Network, a group of growers and crop scouts who monitor their crops regularly for any sign of exotic pests. The coordinator is also investigating ways to improve awareness and surveillance in peri-urban and urban communities.

Should an exotic pest enter Australia, early detection of incursions helps to limit their spread and minimise the costs of eradication. Improved surveillance also helps to provide ongoing evidence to demonstrate area freedom from pests, to support new market access requests and the maintenance of existing markets.

The Huanglongbing Taskforce was also established in 2018 to identify and coordinate research and extension needed to manage huanglongbing, the most serious High Priority Pest for the citrus industry.

The program is guided by the framework provided by the National Citrus Biosecurity Surveillance Strategy 2018–28, developed by PHA in consultation with Citrus Australia and the Department of Agriculture and Water Resources in 2017. The strategy is aligned with the National Plant Biosecurity Strategy and National Plant Biosecurity Surveillance Strategy, as described in **Chapter 1**.



National Citrus Biosecurity Coordinator Jeff Milne. Image courtesy of Citrus Australia

### National Forest Biosecurity Surveillance Program

In 2018, activities to initiate a National Forest Biosecurity Program commenced with the appointment of the National Forest Biosecurity Coordinator co-funded by the Department of Agriculture and Water Resources (through the Agricultural Competitiveness White Paper) and the Australian Forest Products Association. The coordinator is to oversee the establishment of the program which aims to enhance national forest pest surveillance.



The need for a nationally coordinated program comprising stakeholders from industry and government is crucial due to the ever increasing volumes of trade and movement of people and commodities into and within Australia. Climate change is also causing pest pressures and distribution to change worldwide. Improved surveillance will help to provide ongoing evidence to demonstrate freedom from pests and to support early detection of pests.

The National Forest Biosecurity Surveillance Strategy 2018–23 and its Implementation Plan guide the program, in consultation with industry, government and the R&D sector.

The forest surveillance strategy is aligned with the National Plant Biosecurity Strategy and National Plant Biosecurity Surveillance Strategy, as described in **Chapter 1**.

The program started with an assessment of the high-risk pathways for entry of forest pests into Australia and a pilot of High-Risk Site Surveillance in Queensland, NSW and Victoria. The National Forest Biosecurity Surveillance Program is overseen by a National Forest Biosecurity Surveillance Group, with the coordinator working directly with industry, state governments, environmental groups and other forest industry stakeholders.



Vegetable and potato officer Callum Fletcher speaking to growers in Carnarvon, WA, while Vegetables WA Vietnamese industry extension officer, Truyen Vo, translates. Image courtesy of AUSVEG

### Vegetable and Potato Farm Biosecurity Program

The Vegetable and Potato Farm Biosecurity Program is an extension and engagement program funded by vegetable growers and managed by PHA and AUSVEG to enhance biosecurity management practices of producers and others along the supply chain in that industry.

It focuses on increasing the awareness and adoption of farm biosecurity among vegetable and potato growers and is increasingly being used as a platform for driving strategically important biosecurity initiatives.

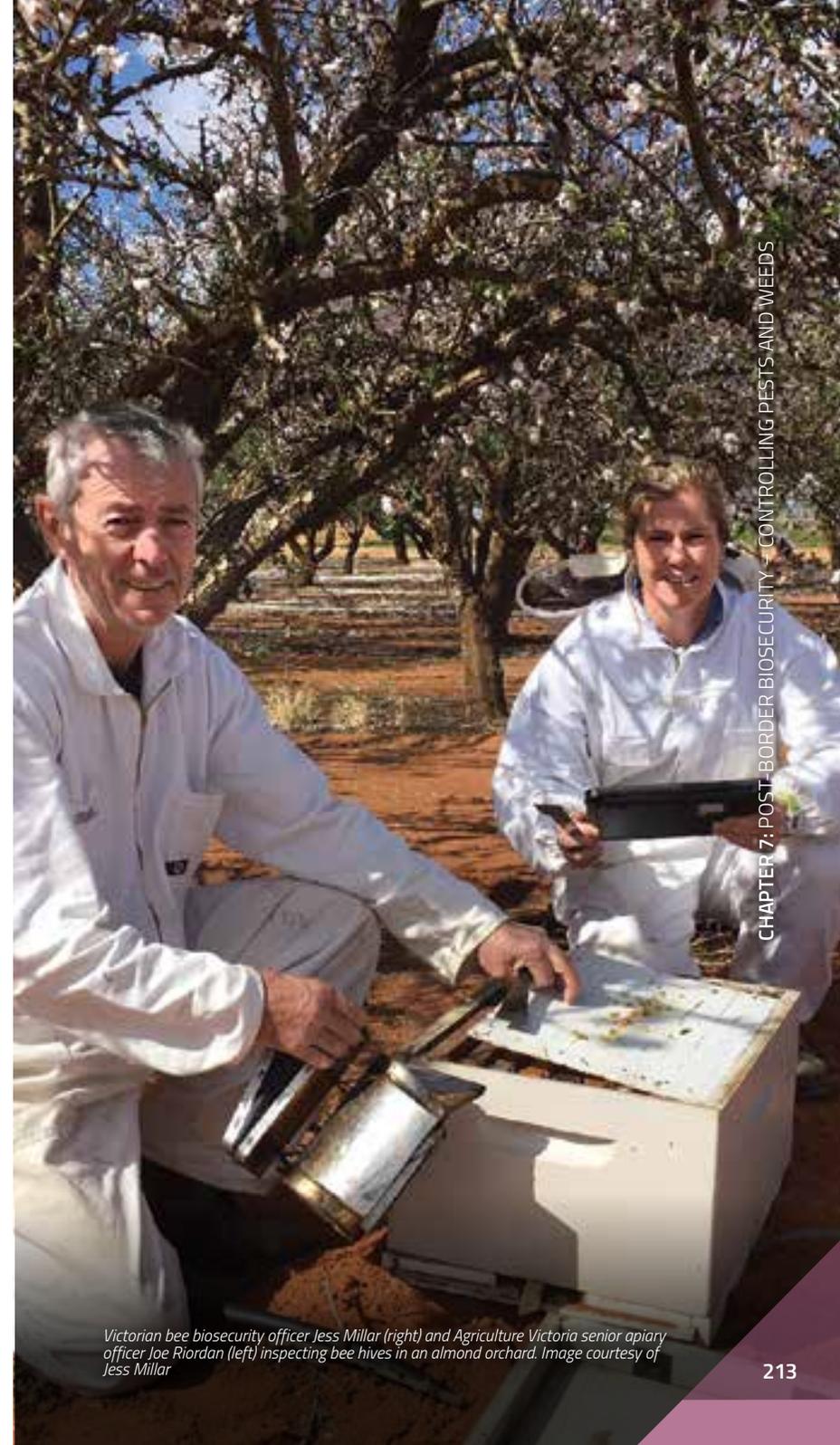
Two dedicated biosecurity officers develop extension and training material, write articles on biosecurity themes for industry magazines, engage with producers at field days, and liaise with growers during pest incursions. In 2018 the officers undertook an urban biosecurity pilot program after many of the recent exotic pest incursions were located at seaports, airports and other urban hotspots across Australian cities.

Throughout 2018, the officers took part in a variety of forums, biosecurity meetings and working groups. Their involvement also precipitated a number of initiatives with industry and researchers to extend surveillance capabilities and improve general surveillance reporting outcomes.

### National Bee Biosecurity Program

The National Bee Biosecurity Program is funded by the Australian Honey Bee Industry Council, with support from the state governments, and managed by PHA. It aims to help beekeepers to manage pests that are already in Australia, and to prepare for incursions by exotic pests, through training and education. If there is an exotic pest incursion, the biosecurity officers are available to provide expert support to industry, and to help design and implement response measures.

Bee biosecurity officers are employed in five states, and actively promote adoption of the Australian Honey Bee Industry Biosecurity Code of Practice. The aim of the Code of Practice is to improve the management of established pests and diseases, as well as increase the preparedness and surveillance for exotic pest threats to the honey bee industry.



Victorian bee biosecurity officer Jess Millar (right) and Agriculture Victoria senior apiary officer Joe Riordan (left) inspecting bee hives in an almond orchard. Image courtesy of Jess Millar

## MANAGING PESTS ON-FARM

Australian farmers manage pests with a variety of methods tailored to the type of pest, the crop and agroecological conditions. Most growers use an integrated pest management approach, which means that they combine chemical, cultural, mechanical and biological controls in a flexible way that can change over time.

### Chemical control

For the management of many plant pests, pesticides are the fastest and easiest option for control and most growers use at least one type of chemical to maintain productive agriculture. Pesticide availability in Australia is regulated by the **Australian Pesticides and Veterinary Medicines Authority (APVMA)**, an independent statutory authority. As the national regulator of agricultural and veterinary chemicals, the APVMA regulates pesticides in line with responsibilities described in the *Agricultural and Veterinary Chemicals (Administration) Act 1992* and the *Agricultural and Veterinary Chemicals Code Act 1994*.

The APVMA exists to ensure that Australia has access to safe and effective agricultural and veterinary chemicals to control pests and diseases on animals and plants. It also monitors and enforces compliance with the Agvet Code and other legislation and keeps a record and register of approved agricultural and veterinary constituents, registered products and approved labels. More information is available from [apvma.gov.au](http://apvma.gov.au)

All agricultural chemicals sold or used in Australia must be registered with the APVMA. National registration ensures that all agricultural chemical products, when used as directed on the product label, will be effective and have no harmful or unintended effects on people, animals, crops, the environment or international trade. The actual use of chemicals is regulated by state and territory governments.

A recent report<sup>20</sup> estimated that up to 68 per cent (\$17.6 billion) of Australia's total value of crop production is attributable to the use of crop protection products. Table 57 illustrates the amount and type of agricultural chemicals used for controlling plant pests in Australia. This total expenditure on pesticides for plants represents over seven per cent of the gross value of production for all crops in Australia<sup>21</sup>. Although many pesticide products are formulated and packaged in Australia, almost all the active constituent chemicals are manufactured overseas. In the event of an exotic pest incursion, the required chemicals might not be immediately available. PHA facilitates a program to help ensure the availability of pesticides in the event of an incursion, through its emergency permits initiative.

### Cultural and mechanical control

Cultural and mechanical control refers to the practice of modifying the growing environment of production crops to reduce the prevalence of unwanted pests. Examples include tillage methods and changing soil pH levels, irrigation practices and fallow periods, which make the environment less favourable for the survival, growth and reproduction of pest species. These practices can provide significant relief from some pests when used effectively.

### Biological control

Biological control is a method of controlling pests using natural enemies. Natural enemies of pests are known as biological control agents and include predators, parasitoids and pathogens. Biological control has been highly successful in many instances, with a number of pest problems permanently solved by importation and successful establishment of biological control agents. Successes tend to be confined to particular ecosystems or pest situations, and when they are effective, can provide long-term and even permanent results.

20. Australian Bureau of Agricultural and Resource Economics and Sciences, Agricultural commodities and trade data, Agricultural Commodities Statistics March 2017. Accessed online 22 July 2019 [agriculture.gov.au/SiteCollectionDocuments/abares/data/agricultural-commodities-statistics.xlsx](http://agriculture.gov.au/SiteCollectionDocuments/abares/data/agricultural-commodities-statistics.xlsx)
21. Australian Pesticide and Veterinary Medicines Authority, Gazette No 6 March 2018. Accessed online 22 July 2019 [apvma.gov.au/node/29176](http://apvma.gov.au/node/29176)

Table 57. Sales of plant chemicals in Australia, 2016–18

		Herbicide	Insecticide	Fungicide	Mixed function pesticide	Miticide	Molluscicide	Nematicide	Total
2016	No. of products	3,301	1,445	939	149	131	54	18	<b>6,037</b>
	Value of product sales (\$ million)	1,717	337	254	32	19	12	4	<b>2,375</b>
2017	No. of products	3,363	1,482	967	148	131	54	15	<b>6,160</b>
	Value of product sales (\$ million)	1,683	484	343	39	36	16	2	<b>2,603</b>
2018	No. of products	3517	1515	1021	145	131	52	16	<b>6,397</b>
	Value of product sales (\$ million)	1,714	413	269	37	20	14	2	<b>2,469</b>



## Australia's weed biosecurity system

The scope of Australia's biosecurity system covers more than just invertebrates and pathogens, with a range of activities also in place to address the threats posed by weeds.

A weed is a plant that requires some form of action to reduce its negative effects on the economy, the environment and human health or amenity.

Weeds displace native species, contribute to land degradation and reduce productivity in addition to the considerable costs of control.

It has been estimated that the cost to the Australian economy from the agricultural impacts of weeds is over \$4 billion annually<sup>22</sup>. An estimated 2,300 species currently impact the natural environment nationally, and a further 1,000 species have a direct impact on plant production.

There are far more potential weed species that have not yet entered the country or become established in Australia. In addition, many weeds display a 'lag phase' in which impacts do not become apparent, potentially for decades. As such, many future problem weeds may already be here.

Australia's weed biosecurity system aims to:

- prevent entry of high-risk plant species
- eradicate or contain those in the early stages of invasion
- mitigate the impacts of established weeds.

As with plant pest biosecurity, responsibility for weeds is shared between all levels of government, industry and the community. Legislation across the country sets out the various roles of governments in managing weeds across Australia.

Within Australia, state and territory government departments of primary industries and environment, along with Natural Resource Management authorities, have responsibility for weed biosecurity policy and management.

At the local level, weed surveillance is undertaken by most local councils, which report new weed incursions in their areas. Weed management is a component of on-farm biosecurity activities. Producers of both crops and livestock manage weeds on individual properties to reduce their impacts and play an integral part in the weed detection and reporting network.

Community based weed spotter programs are active in many states and local areas. Volunteers in these groups report new weed detections in their areas and are generally supported in their activities by government agencies.

## COORDINATION OF WEED MANAGEMENT

The Environment and Invasives Committee (EIC) provides an intergovernmental mechanism for identifying and resolving weed issues at a national level. It comprises members from the Australian Government and all state and territory governments, plus observers from CSIRO, PHA and the New Zealand Government.

EIC oversees the administration of the Australian Weeds Strategy 2017–27, which is the overarching policy for weed management in Australia. It outlines goals and actions required to keep Australia's economic, environmental and social assets secure from the impacts of weeds. The strategy is reviewed every 10 years to ensure it remains relevant to Australia's needs.



The strategy provides information on where improvements can be made at the national level that will result in benefits across Australia. It draws attention to areas that require national collaboration and will drive the development of consistent and coordinated national approaches by providing clarity around priorities, roles and responsibilities.

The strategy is available at [agriculture.gov.au/SiteCollectionDocuments/pests-diseases-weeds/consultation/aws-final.pdf](http://agriculture.gov.au/SiteCollectionDocuments/pests-diseases-weeds/consultation/aws-final.pdf)

## PREVENTING THE ENTRY OF NEW WEEDS

A large percentage of weed species (at least 50 per cent and possibly up to 70 per cent) were originally imported for use as garden ornamentals. However, many of these species were imported a long time ago and modern improvements to biosecurity arrangements have significantly reduced this risk.

The Department of Agriculture and Water Resources develops and implements quarantine policies for plant imports and for the past decade plant imports have been subject to a Weed Risk Assessment. A Permitted Seeds List has also been developed, so that all species not currently in Australia or on the Permitted Seeds List are subject to a risk assessment prior to importation. Australia's Weed Risk Assessment system has been adapted for use in other parts around the world.

Weeds are also an integral part of the Northern Australia Quarantine Strategy, which involves surveillance activities in Australia's north and neighbouring countries.

22. Sinden JA et al, 2004. The economic impact of weeds in Australia: Report to the CRC for Australian Weed Management, Technical Series No. 8, Adelaide

## ERADICATION AND CONTAINMENT OF NEWLY ESTABLISHED WEEDS

Eradication and containment of weeds is only possible if weed incursions are detected early, and a response is mounted before the weeds have a chance to spread too far.

The Australian, state and territory governments manage and coordinate nationally cost-shared invasive weed eradication programs through the Consultative Committee on Exotic Plant Incursions.

The Caring for our Country program coordinates national surveillance, containment and eradication of weed incursions that threaten production or the environment, or impact on trade or communities. Phase two of this program, from July 2013–18, integrates the Natural Heritage Trust, the National Landcare Program, the Environment Stewardship Program and the Working on Country Indigenous ranger programs.

### National Tropical Weeds Eradication Program

The National Tropical Weeds Eradication Program commenced in 2003 and targets weed species native to tropical America that are in north Queensland (and one in northern NSW). The program is managed by Biosecurity Queensland and is cost-shared by the Australian, Queensland, NSW, NT and WA governments.

In 2018 the program targeted eradication of:

- limnocharis (*Limnocharis flava*), a wetland plant
- miconia (*Miconia calvescens*, *M. nervosa*, *M. racemosa*), rainforest tree and shrubs
- mikania vine (*Mikania micrantha*).



Tropical weed eradication field staff pulling a small miconia tree out of a riparian area in north Queensland. Image courtesy of Brenton Congoo, QDAF

Limnocharis, miconia and mikania vine are all considered serious weeds in other countries, while *Miconia nervosa* and *M. racemosa* have exhibited invasive characteristics in north Queensland. The combined impacts of these weeds on agriculture and the environment in tropical and subtropical areas of Australia would be significant if allowed to spread unchecked. The national eradication program involves targeted weed surveys and weed control, extensive community engagement to identify infested areas and research components. Regular reviews are undertaken to track the progress of the program towards eradication milestones and targets.

During 2018, field teams traversed over 7,000 hectares of rainforest, wetland and riparian areas in north Queensland to search out and remove all seedlings of these species before they were able to mature and produce seed. By removing 99.5 per cent of plants before they become reproductive, in combination with soil seed bank depletion over the past 16 years, all of the target species are on track for complete eradication from the Australian mainland.

Over 80 per cent of the eradication program resources are directed at *Miconia calvescens*, a highly invasive rainforest tree which has been spread by birds from gardens into the nearby Wet Tropics World Heritage Area. Known as the 'purple plague' in Tahiti and Hawaii, the seed of this plant can survive for up to 20 years in undisturbed rainforest, and quickly germinates after cyclones to turn patches of rainforest into monocultures of miconia. Only seven mature plants were detected by teams during 6,000 hectares of surveillance in dense tropical rainforest in 2018.

### Eradication of red witchweed

In July 2013, red witchweed (*Striga asiatica*) was detected in sugarcane on six properties in Queensland. Reaching agreement on a national approach to the eradication response was complex, since weeds are not covered under the existing industry and government response agreements, and both plant and livestock industries were considered likely to be affected. Nonetheless, the response to red witchweed has been undertaken according to the principles and arrangements set out in the national eradication agreements.

In April 2016, the Agriculture Ministers' Forum endorsed a 10-year response plan of up to \$5.8 million to eradicate red witchweed. The eradication response is led by the Queensland Government and is being funded by Meat and Livestock Australia, Grain Producers Australia and CANEGROWERS.

## MANAGING ESTABLISHED WEEDS

Combating weeds is an integral part of most farming systems. Problem weeds and their management differ greatly among industries and regions, but most production systems use a mixture of chemical and non-chemical control methods.

Some plant production industry peak bodies produce integrated weed management manuals, and the larger industry organisations conduct weed surveillance and research.

In Australian broadacre plant production industries, weeds are most commonly managed through competition with other plants, herbicide sprays, tillage, slashing, grazing, burning, or a combination of these measures.

In horticultural production systems, weed control focuses on mechanical cultivation and herbicide applications. No-till production systems, which use herbicides to control weeds, are now common in Australia.

Local councils are responsible for weed management on land that they own, control or manage, and some jurisdictions also conduct weed inspections on private land.

Local community groups support the activities of industry and governments in weed management. Formal organisations such as Landcare Australia, Conservation Volunteers and Greening Australia, together with smaller informal groups, organise volunteers to restore and maintain local bushland.

### Weeds of National Significance

Thirty two Weeds of National Significance (WoNS, see Table 58) have been agreed by the Australian Government, state and territory governments based on assessments of their invasiveness, potential for spread and environmental, social and economic impacts. Consideration was also given to their ability to be successfully managed. A list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012.

Weeds designated to be of national significance are those that require coordination among all levels of government, as well as organisations and individuals with weed management responsibilities.

A national focus on WoNS continues through the work of the Environment and Invasives Committee and government agencies report to this committee on progress against any remaining actions under the strategic plans.

Table 58. Weeds of National Significance

Scientific name	Common name
<i>Acacia nilotica</i> subsp. <i>indica</i>	Prickly acacia
<i>Alternanthera philoxeroides</i>	Alligator weed
<i>Andropogon gayanus</i>	Gamba grass
<i>Annona glabra</i>	Pond apple
<i>Anredera cordifolia</i>	Madeira vine
<i>Asparagus aethiopicus</i> , <i>A. africanus</i> , <i>A. asparagoides</i> (Western Cape form), <i>A. declinatus</i> , <i>A. plumosus</i> and <i>A. scandens</i> . Excludes <i>A. officinalis</i> and <i>A. racemosus</i>	Asparagus weeds
<i>Asparagus asparagoides</i>	Bridal creeper
<i>Cabomba caroliniana</i>	Cabomba
<i>Chrysanthemoides monilifera</i>	Bitou bush, boneseed
<i>Cryptostegia grandiflora</i>	Rubber vine
<i>Cytisus scoparius</i> , <i>Genista monspessulana</i> , <i>G. linifolia</i>	Brooms (scotch, montpellier, flaxleaf)
<i>Dolichandra unguis-cati</i>	Cat's claw creeper
<i>Eichhornia crassipes</i>	Water hyacinth
<i>Hymenachne amplexicaulis</i>	Hymenachne
<i>Jatropha gossypifolia</i>	Bellyache bush
<i>Lantana camara</i>	Lantana
<i>Lycium ferocissimum</i>	African boxthorn
<i>Mimosa pigra</i>	Mimosa
<i>Nassella neesiana</i>	Chilean needle grass
<i>Nassella trichotama</i>	Serrated tussock
<i>Opuntia</i> spp. (except <i>O. ficus-indica</i> ), <i>Cylindropuntia</i> spp., <i>Austrocylindropuntia</i> spp.	Opuntoid cacti
<i>Parkinsonia aculeata</i>	Parkinsonia
<i>Parthenium hysterophorus</i>	Parthenium weed

Table 58. Weeds of National Significance (continued)

Scientific name	Common name
<i>Prosopis</i> spp.	Mesquite
<i>Rubus fruticosus aggregate</i>	Blackberry
<i>Sagittaria platyphylla</i>	Sagittaria
<i>Salix</i> spp., except <i>S. babylonica</i> , <i>S. x calendron</i> and <i>S. x reichardtii</i>	Willows
<i>Salvinia molesta</i>	Salvinia
<i>Senecio madagas cariensis</i>	Fireweed
<i>Solanum elaeagnifolium</i>	Silverleaf nightshade
<i>Tamarix aphylla</i>	Athel pine
<i>Ulex europaeus</i>	Gorse



Common water hyacinth (*Eichhornia crassipes*). Image courtesy of Ted D. Center, USDA Agricultural Research Service, Bugwood.org

## Plant Sure scheme to weed out invaders

A pilot project in NSW is testing a voluntary accreditation scheme that will allow the ornamental plant industry to promote environmentally safe plants and help consumers to avoid buying plants that pose a weed risk.

The Plant Sure project has received seed funding from the NSW Environmental Trust to design and develop a scheme in collaboration with the nursery, gardening and horticulture sectors, as well as government agencies and peak environmental community groups.

The project, led by the Nursery and Garden Industry NSW and ACT, involves people working together to reduce the supply and trade of 'high-risk' ornamental plants that may become invasive.

Plant Sure will be a voluntary scheme, with education and engagement strategies that use branding and marketing to discourage the use of 'weedy' ornamental plants in the trade.

Partners will work with the entire supply chain, from breeders and growers to sellers and installers of ornamental plants, and the people that influence plant choice.

Phase 1 of the project, now complete, reviewed 18 different voluntary schemes in Australia and overseas to determine which model might be most suitable. From this, a purpose-built set of tools were developed to assess the risk of invasiveness of ornamental plant species and cultivars. These will be trialed with NSW partners initially, then refined and expanded for use nationally.



Image courtesy of NSW Office of Environment and Heritage