

Home and community gardens: A guide to biosecurity



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What is a 'pest'?

Pests are insects that have a negative impact on plant health, including growth and production.

Some pests feed on leaves

There are pests that cause direct damage to plants by feeding on leaves, including caterpillars, snails and locusts. These pests can impact plants by:

- 1 Reducing the photosynthetic area of leaves.
- 2 Creating a wound that is now open for infection by pathogens (fungi, bacteria, virus).
- 3 Harming the quality and edibility of plants such as lettuce and spinach.



Fall armyworm larvae (caterpillar).*

Some pests are 'sap-suckers'

Sapsucking pests are one of the most common garden issues, and include aphids, scale and mealy bugs. They feed by sucking the sap out of plants, which can impact plants by:

- 1 Weakening plants by affecting their growth and/or hormones.
- 2 Transmitting plant viruses to healthy plants.
- 3 Increases chances of sooty mould developing.



Mealy bugs.*



A green peach aphid.**

Some pests eat from inside leaves

Leafminers are a type of pest where the eggs are laid inside a leaf and upon hatching, the juvenile pest eats its way through plant tissue causing 'mines' (see image). This can impact plants by:

- 1 Reducing the photosynthetic area of leaves.
- 2 Damage edible leaves of vegetables.



Leafminer mines.^

Some pests feed on root systems

Pests that live in the soil can eat or otherwise damage the root system of plants in your garden. This includes soil-dwelling pests like African black beetles and nematodes (microscopic worm-like insects). Damage to plants can include:

- 1 Direct damage to plant roots.
- 2 Transmitting plant viruses and bacterial diseases to healthy plants.
- 3 Creating a wound that is now open for infection by pathogens (fungi, bacteria, virus).



Microscopy image of root-knot nematode.^^



African black beetle grub eating a rotting potato.***

Image credits: *Canva; **Whitney Cranshaw, Colorado State University, Bugwood.org; ***DPIRD WA; ^Bahram Fayaz, HM Clause; ^^Jonathon D. Eisenback, Virginia Polytechnic Institute & State University, Bugwood.org.

What is a 'disease'?

A disease is when a plant is infected with a micro-organism or 'pathogen' that negatively impacts the plant's health, growth and development. Diseases are most commonly caused by virus, fungal and bacterial pathogens.

Viruses can be transmitted to plants by insects

Certain insects, like 'sapsuckers', can pick up plant viruses when feeding from an infected plant and they can carry the virus to healthy plants. Damage to plants includes:

- ① Reduced growth and development due to virus.
- ② Creates an entry point (or wound) for other pathogens like fungi and bacteria.



↑ Aphid sapsucking.**

Pathogens can be spread through wind

Fungi and bacteria produce spores, which are cells able to develop into new fungi and bacteria. These spores can be easily picked up and spread via wind, making them tricky to control. Only under specific environmental conditions (e.g. temperature) will these spores infect plants and become an issue in the garden.

If spores land on any part of a plant in the right conditions for infection, they can cause significant damage. This can include:

- ① Reduced photosynthetic area of leaves.
- ② Diminished quality and edibility of plants such as lettuce and spinach.
- ③ Plant stress.
- ④ Restricted ability of the plant to transport water and nutrients around the plant, causing wilting.



Pathogens can infect plants through their roots

Just like wind, fungal and bacterial spores can be moved around in water. This means they can infect plants if they come into contact with root systems. Damage to plants can include:

- ① Plant stress as pathogens infect plant cells and feed on their nutrients.
- ② Infection of the roots and stem can cause wilting.
- ③ Root rot, which affects plant growth and development.



What is 'biosecurity'?

Biosecurity is practices that prevent and manage plant pests and diseases from establishing in a certain region where they are not currently present. This could be your home or community garden.

What is a 'biosecurity threat'?

We refer to a '**biosecurity threat**' as a pest or disease that would harm Australia's plants (or animals) if it were to arrive in Australia from overseas, with potential to spread around the country.

What is the difference between an 'exotic' and 'endemic'?

An exotic pest or disease originates from overseas and is not yet present in Australia. An endemic pest or disease is established in Australia.

How does Australia's biosecurity system work?

Australia has specific measures in place at our borders, in addition to our natural separation from other countries, that protect us from 'exotic' plant pests and diseases. As international travel and trade increases, it is becoming much easier for biosecurity threats to enter Australia.

Why is biosecurity important?

In the last several years, a number of exotic pests and diseases have been found in urban areas (for example, cities such as Perth, Melbourne and Sydney). If they were to become widespread in Australia, the environment, economy and livelihoods would be significantly impacted.

Is it important to community gardens?

Community and home gardens - with their abundance of fruit and vegetables - provide a preferred environment for pests and diseases.

If you look carefully, you can find all sorts of insects in the garden; however, knowing the difference between the good and the bad bugs is important.

Becoming familiar with the pests and diseases that are common to our gardens - like the cabbage white butterfly - helps us spot unusual pests or disease symptoms if they are to arrive in our garden from overseas and we can remove them before they cause lots of damage to our crops.



Signs help you communicate to garden visitors that there are measures in place to reduce the spread of pests and diseases to garden plants.*



Biosecurity officers screen imported mail, passengers and cargo for goods that pose a biosecurity risk, such as live plants and planting material.**

These two insects are 'exotic' pests that are not yet present in Australia, but have the potential to damage Australia's environment and plants grown in Australia.



Black bean aphid.^



Brown marmorated stink bug adult^[▲]



When you're in the garden, keep an eye out for any insects or plant disease symptoms that are different to normal.***

Key exotic pests and diseases

Sometimes it is very difficult to determine whether a bug is 'good' or 'bad'! Below are two examples of two exotic pests that are damaging to vegetable plants but have many native Australian insect look-a-likes.



Glossy shield bug.

NATIVE



Brown marmorated stink bug.
(Not found in Australia.)

EXOTIC



Spotted gum psyllid.

NATIVE



EXOTIC

Tomato potato psyllid.
(Only found in Western Australia.)

There are many exotic pests and diseases that are not yet present in Australia. Some exotic pests have managed to find their way into Australia but are only established in some states and/or territories. Here are a few key vegetable pests that are easy to keep an eye out for:

Giant African snail.
(Not found in Australia.)



EXOTIC

American serpentine leafminer.
(Only found in Northern Australia.)



EXOTIC

Colorado potato beetle.
(Not found in Australia.)



EXOTIC

These pests have the ability to significantly impact the variety of vegetables you grow in your home or community garden. It is important that we keep these pests out, or contained in their current established areas, so they do not impact Australia.

Integrated Pest Management



Integrated Pest Management (IPM) is an environmentally conscious way of managing pests in a garden or farm. IPM uses a combination of cultural, biological, physical and chemical techniques and measures. IPM is built on the principles of planned thinking and regular monitoring of plants. Below, we discuss the key components of IPM programs.

Chemical control

Substances are used to kill or repel pests, selecting the least toxic options first and applying them only when needed (i.e. pest levels are above economic thresholds, etc.)

Biological control

The use of predators, parasitoids or pathogens to suppress pests. This can be by the introduction and release of natural enemies or creating an environment favourable to beneficial insects/natural enemies so their numbers increase in a garden (planting flowers).

Physical control

Prevents pests from entering an area using physical barriers and traps or the physical removal of pests.

Cultural control

The conditions of the garden are altered to make the environment less favourable/suitable for pests and diseases. This includes planting location, timing, crop rotation as well as cultivation techniques that expose pests to predation, destroy their food, shelter or breeding habitats.

How can pests and diseases get into your garden?



There are five main pathways through which plant pests and diseases (and weeds!) can spread to your home or community garden. They include:

- 1 Equipment.
- 2 Volunteers, staff and visitors.
- 3 Plant waste and weeds.
- 4 Fertiliser, seeds & seedlings.
- 5 Wind.



Green peach aphid adult.*

1. Equipment

Garden equipment, like shovels and secateurs, can collect soil and plant material during use. Harmful bacteria, fungi, viruses, nematodes, insects and even insect eggs can remain alive without host plants for long periods of time in soil and can be spread by dirty equipment.

How can I minimise the risks?

Make sure you clean any equipment before using it, and before taking it home or to a different area of the garden. This reduces the chances of you spreading pests and diseases around your garden via dirty equipment.



2. Volunteers, staff, and visitors

There is often a lot of foot traffic through community gardens from volunteers to visitors and staff. It is important to ensure that everyone coming into the garden is not bringing any harmful pests and diseases with them as many can hitchhike on clothes, shoes, and hands.

How can I minimise the risks?

Ensure those coming into your garden are aware they need to enter with clean shoes and clothes (or have designated garden wear like gumboots). This reduces the spread of pests and diseases. It's also a good idea to leave the garden with clean shoes so you don't take anything from your community garden back to your garden at home.



Fall armyworm larvae (caterpillar).**



Ensure all volunteers, staff, and visitors enter the garden with clean shoes and clothes.

3. Plant waste and weeds



Any plant material can transport harmful pests and diseases. Plant waste from harvested crops and unpicked produce can attract, conceal and provide a protected environment for pests and diseases to live, which can lead to high infestations. Also, weeds can negatively impact vegetable crops by acting as an alternative host for pests and diseases.

How can I minimise the risks?

Plant waste should be kept away from growing areas where possible and cleaned up and disposed of regularly (e.g. deep burial, burning, etc.). Control weeds in the garden. Monitor weeds for pests and diseases as well as crop plants.



Clean up and dispose of waste appropriately.^

4. Fertiliser, seeds and seedlings

Anything that is moved into your garden, like fertiliser, seeds and seedlings, can be a potential source of plant pests/diseases. This is often how pests/diseases spread to new regions over large distances.

Organic fertilisers like manure and compost can be sources of plant pests and diseases too. If you're propagating plants or planting shared seeds, make sure they're not showing disease symptoms as this can cause greater spread of the disease. It is important to remember that pests/diseases can be spread easily to new areas through seeds or seedlings.

How can I minimise the risks?

Ensure any material is composted thoroughly to destroy its ability to conceal pests and diseases.

Be mindful when purchasing seeds online or sharing seeds with friends. Interested in hearing more about these 'seedy' biosecurity risks? Read this magazine article via the QR code or this link (<https://bit.ly/32cPwYt>) on how we as gardeners can safeguard Australia.



5. Wind

Many pests and diseases can be spread via assistance from wind. This means that new bugs could arrive in your garden overnight!

How can I minimise the risks?

Routine checking of vegetables and other garden plants gives you the best chance of detecting a new pest or disease before it becomes established in your garden. It gives you the best chance of preventing anything establishing on your property and the ongoing damage and expenses for their control.

Sticky traps and other trap types can assist crop monitoring. They're a cheap and effective tool to measure what beneficial insects and pests have recently arrived in the garden.

It is important to monitor for pests and diseases in the garden.

Regularly check your vegetable (and other plants) for pests and diseases. This can help you keep track of pest or disease levels throughout the year, but also help you detect anything new that has arrived in the garden.

Sharing your pest and disease knowledge is key! Let your staff, volunteers, visitors and friends know what pests and diseases you're keeping an eye out for, or have seen in high numbers in the garden lately. Biosecurity is a shared responsibility.



Seeds and seedlings should be sourced from reputable or certified suppliers and guaranteed a high health status.*



Seeds can harbour pests and diseases. Be mindful when purchasing seeds online or sharing seeds with friends.



Sticky traps can help you monitor for pests that are present in the garden. Most insects are attracted to the bright yellow colour.*



Biosecurity is a shared responsibility.**

So, what do I do if I find an unusual pest or disease in the garden?

Despite Australia having strict restrictions in place to reduce the risks of any imported material carrying harmful pests and diseases, there have been occasions where some have slipped through and been detected in urban environments surrounding the air and seaports.



Keep your eye out for unusual pest and disease symptoms in the garden.*

How do I know whether to report something or not?



- 1 Are you seeing pest/disease symptoms on a different plant to usual?
- 2 Is it something you haven't seen in the garden before?
- 3 Is it weird, strange, or unusual?
- 4 Are your normal pest/disease control methods not working like they have in the past?

If you answered **yes** to any of the above, it is a good idea to report what you're seeing and find out whether it is something new to Australia.

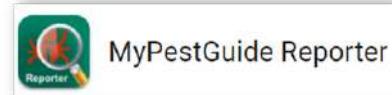
So how do I report?

(1) Use the MyPestGuide Reporter app on your phone or computer.



The **MyPestGuide Reporter** app is a free communication tool for everyone, from growers to home gardeners, to report pests and diseases. It also has in-built pest identification field guides.

The app can be used to upload details of the unusual pest or disease that you have found in your garden. This includes, where you saw the pest, what you saw and images. Once you have sent in your report, insect experts will verify the report, identify the pest, map it and provide the reporter with feedback and advice.



Read more here <https://bit.ly/3EnWN4D> and <https://bit.ly/3LQjgYf> or via the QR codes.



Information page

How to report (video)



(2) Ring the Exotic Plant Pest Hotline.



1800 084 881

When you ring the EPP Hotline, it will connect to your state or territory's agricultural agency (based on your location). The phone will be answered by an insect expert, who will ask you a few questions to understand the situation, such as:

- 1 What have you seen? (Describe or send a photo)
- 2 When did you first notice it?
- 3 Where was it found?
- 4 What plant was it on?
- 5 How many pests did you see?

If you don't have time to ring, some states and territories offer an online reporting form - check whether this is possible via this link (<https://bit.ly/3qmMTeg>) or the QR code.



If you would like further information regarding urban biosecurity or this resource, please contact the AUSVEG Extension and Engagement Team on (03) 9882 0277 or email science@ausveg.com.au.

