



DIY BIOSECURITY

**FARM BIOSECURITY ACTION PLAN
FOR OLIVE GROWERS**





BIOSECURITY: WHAT IS IT AND HOW CAN I BENEFIT?

Plant biosecurity is a series of measures that aid in protecting production areas from harmful insects, weeds, and various plant diseases. They are collectively referred to as 'plant pests,' that have the potential to adversely affect plant health.

On-farm biosecurity best practices play a pivotal role in maintaining Australia's reputation of producing high quality products. Growers maintaining a pest-free environment can capitalise on this reputation and use it as a trade asset to gain leverage into global and local markets. Additionally, biosecurity practices can act as security against farm quarantine measures.

Proper biosecurity signage; insect, weed and pest surveillance; and on-farm clean-down facilities are three commonly used, farm biosecurity measures.



Olive Fly (*Bactrocera oleae*)



Six easy ways to protect your property

You have an important role to play in protecting your property and the entire olive industry from biosecurity threats.

Here are six easy ways you can reduce the threat of new pests impacting on your livelihood. Each of these practices should be embedded in your orchard's everyday management as they make good business sense by reducing the risk of spreading pests. Don't put your livelihood at risk by neglecting orchard biosecurity.

1. Be aware of biosecurity threats

Make sure you and your orchard workers are familiar with the most important exotic olive pest threats. Conduct a biosecurity induction session to explain required hygiene practices for people, equipment and vehicles in your orchard.

2. Use pest-free propagation material

Ensure all propagation material is from trusted sources and orchard inputs are fully tested, pest-free and preferably certified. Keep good records of your orchard inputs.

3. Keep it clean

Practicing good sanitation and hygiene will help prevent the entry and movement of pests onto your property. Workers, visitors, vehicles and equipment can spread pests, so make sure they are clean before entering and leaving your property. Have a designated visitor's area and provide vehicle and personnel wash-down facilities.

4. Check your orchard

Monitor your trees frequently. Knowing the usual appearance of your orchard and trees will help you recognise new or unusual events and pests. Keep written and photographic records of all unusual observations. Constant vigilance is vital for early detection of any exotic plant pest threat.

5. Abide by the law

Respect and be aware of laws and regulations established to protect the olive industry, Australian agriculture, and your region.

6. Report anything unusual

If you suspect a new pest – report it immediately to the Exotic Plant Pest Hotline





BIOSECURITY SIGNAGE

Biosecurity signage informs visitors and guests that they are entering a bio secure farm and that individuals are expected to abide by the established procedures.

- Signs should direct visitors and guests to register their presence to the owner or farm manager prior to entering the property. Signs with bold and contrasting colours are recommended for the greatest effect.
- Install and maintain signage throughout the property. Effective signs should be clear, visible and well maintained in locations where visitors cannot help but notice. For this to occur, signs should be located at all entrances to the farm.
- Supplement signage with additional on-farm biosecurity practices. For example, signs should direct guests to specific visitor parking whereupon they can register their presence with the owner and undergo a farm induction. Signs should also clearly indicate where foot washes and vehicle or machinery clean-down facilities are located.



Download a farm biosecurity sign template from
www.farmbiosecurity.com.au/buy-a-gate-sigN



PEST SURVEILLANCE

Proper surveillance is essential for maintaining plant health and can provide security against quarantine measures. There are several important aspects to consider when implementing surveillance on your property.

Monitor

Routinely monitor for pests to maintain plant health and identify risks before they become endemic. It is important to be aware of the pests, diseases and weeds that are located in your region and, most importantly, those found in and around your property to accurately identify risks.

Identify

Proper identification can streamline spray applications or alternative treatment methods to rid plants of pests. Exotic pests should also be included in routine monitoring: consult your industry biosecurity plan for a list of priority exotic pests. It can also be helpful to consult with neighbouring properties on anything suspicious as the problem is unlikely to remain contained to one area.

Record

Record all observations of pests and disease, including a lack of observations. The date of any observation made, identity of any pest, growing areas affected, the level of infestation and the proposed treatment plan should be recorded. If no observations were made, this should also be noted. Proper surveillance and record keeping can be important for retaining market access.

Report

Report any significant findings to the relevant state or territory agriculture agency, on the Exotic Plant Pest Hotline 1800 084 881.





Fact Sheet

On-farm clean-down facilities

Vehicle and machinery surfaces often collect soil and plant debris. This represents a biosecurity risk because many plant pests, such as bacteria, fungi, viruses, viroids, nematodes, and insects (and insect eggs), can remain stable in soil and plant matter for long periods.

A **clean-down facility** is an area where growers, farm workers, extension officers and contractors can clean and disinfect all vehicles and machinery entering or leaving growing areas. Regular use of the facility will go a long way towards reducing the chance of introducing pests to a property and spreading pests to other regions.

Step 1 - Clean down

Clean all incoming and outgoing vehicles and machinery using a high pressure water hose or compressed air to remove any plant debris and soil. Focus on areas where soil or plant debris may be trapped, e.g. tyre treads and wheel arches.

Step 2 - Decontaminate

Apply a decontaminant solution to all vehicle surfaces where soil and plant material may stick. Decontaminant solutions include antibacterial, antifungal and antiviral agents and should be used according to product label recommendations.

Step 3 - Rinse the clean-down facility

Before moving the vehicle, use a high pressure water hose on the clean-down facility to make sure debris is captured in the sump area. Before moving the vehicle away from the clean-down facility, allow it to dry thoroughly – this will lessen the amount of dirt picked up by tyre treads.

Cleaning of vehicles and machinery is a big step towards minimising threats from plant pests and diseases. However, biosecurity measures do not end at the clean-down facility.



Carry a portable cleaning system on property

Keeping resident plant pests confined to parts of the property will have short and long term benefits for production yield and market access.

To stop pest spread between growing areas use a portable high pressure water hose or air compressor to clean vehicles, machinery and farm equipment before moving to a new area.

When developing a clean-down facility consider...

Location

Use an open area close to property entrances and located as far as possible from growing areas.

Drainage

Keep flow-off away from access to drainage lines to avoid contaminating water sources. A sump or waste water collection area is recommended for drainage of water, soil and plant debris.

Size

Ensure there is enough room for large machines and vehicles to enter and move around.

Cleaning equipment

Dedicated high pressure hoses or compressed air cleaners will make the cleaning process more effective.

Surface

Concrete or bitumen is ideal. A grassed surface is not recommended due to the potential for some pests to incubate in soil and on plant matter.

Signage

Clean-down areas should be sign-posted and directions provided from the property entrance to the clean-down facility. This will ensure that visitors are aware of the clean-down facility and can report to it on arrival.



FARM BIOSECURITY ACTION PLAN AND CHECKLIST: GUIDANCE MATERIAL

Developed as a part of the Invasive Biosecurity Program, this document is
intended as a guide for reducing the risk of plant pest transmission

TRANSMISSION PATHWAY	ACTIONS TO REDUCE TRANSMISSION
<p>VEHICLES AND EQUIPMENT</p> <p>Vehicles and equipment surfaces often collect soil and plant debris. In particular, organic material can collect in grilles, in tyre treads and on wheel rims. This represents a biosecurity risk because many plant pests, such as bacteria, fungi, viruses, viroids, nematodes, and insects (and insect eggs), can remain stable in soil for long periods. Some viruses can even remain viable on vehicle surfaces without the presence of organic matter.</p>	<ul style="list-style-type: none"> • Maintain vehicle and equipment clean-down facilities at dedicated facilities on site away from growing areas. • Ensure runoff from clean-down facilities lead into a sump that is away from growing areas. • Keep dedicated equipment and farm vehicles on the property. • Clean and disinfect vehicles and equipment between use in different growing areas. • Restrict visitor vehicle parking to designated areas. • Ensure on-site vehicles travel on designated pathways between growing areas. • Direct traffic with gate signs and inform visitors about property access points, and who to contact for queries.
<p>PACKAGING, BINS AND PALLETS</p> <p>Packaging and pallets are an important part of the supply chain and are commonly re-used. Often packaging, bins and pallets cross state borders, and are transferred between properties. It is therefore important that biosecurity practices recognise and account for the risks posed by these conveyances.</p>	<ul style="list-style-type: none"> • Do not recycle cardboard packaging materials. • Store unused boxes and bins on clean hard floors in a covered area. • Sanitise plastic bins before reuse in the supply chain. • Clean pallets of organic material and soil before use. • Store dirty pallets away from growing areas.
<p>STAFF AND FARM VISITORS</p> <p>Contractors, tourists, news reporters, service providers, family members, and school groups all visit the farm now and again. For many, a farm visit is a valuable and rare experience, however for growers such a visit can prove costly. Insects, nematodes, weed seeds, plant viruses – there are many organisms that can hitchhike on clothing, hands, footwear and vehicles, and they can seriously affect grower bottom lines.</p>	<ul style="list-style-type: none"> • Check visitor clothing, footwear and tools for organic matter and soil. If required, clean down before entering the farm. • Maintain cleaning facilities, including footbaths and brushes, making sure they are accessible for visitors and staff. • Induct staff in on-farm biosecurity practices. • Ensure visitors are aware of biosecurity expectations prior to moving around the farm. • Ensure all visitors report to management, sign a visitor register and report previous movements in other growing regions upon entering the property. • Use gate signs to direct traffic and inform visitors about property access points. • Ensure there is a clearly designated parking area for visitors to minimise interaction with growing areas and farm equipment • Maintain regular communication with neighbours regarding biosecurity procedures.

TRANSMISSION PATHWAY	ACTIONS TO REDUCE TRANSMISSION
<p>WASTE AND WEEDS</p> <p>Plant waste and weeds can be effective incubators of plant pests. Argentine thrips and western flower thrips are examples of pests that commonly feed on understory tree flowers in the grove or in nearby fields leading to olive dieback in spring and autumn.</p>	<ul style="list-style-type: none"> • Store waste away from growing areas and water sources. • Dispose of waste as soon as possible. This can be done by burial, burning or composting. • Maintain weed-free buffer zones around growing areas. • Control weed populations in order to prevent incubation and transmission of plant pests, diseases and weeds.
<p>PLANTING MATERIALS</p> <p>Fertiliser, compost, plastic mulch, nursery trees as well as other planting materials can incubate plant pests and diseases.</p>	<ul style="list-style-type: none"> • Source planting material from reputable suppliers. • Treat for pests as required. • Keep any tests for plant pests (diagnostics) on record.
<p>WIND</p> <p>Routine checking of crops is an important aspect of maintaining crop health and gives you the best chance of identifying a new pest before it becomes established.</p>	<ul style="list-style-type: none"> • Carry out regular pest surveillance in crops and surrounding vegetation. • Train staff to be aware of common and exotic plant pests. • Make posters, information pages and fact sheets available on property to help staff identify symptoms. • Use traps to survey for insects. • Record the date of all observations, such as pests identified, growing area affected, the level of infestation and proposed treatment plans. • In the interests of aiding market access, pest surveillance should also include documenting <u>lack of observation</u> for trade sensitive pests (eg. fruit flies).

For further detail please refer to the Farm Biosecurity Action Planner:
www.farmbiosecurity.com.au/wp-content/uploads/Farm-Biosecurity-Action-Planner.pdf



FARM BIOSECURITY ACTION PLAN FOR MANAGEMENT OF OLIVE PESTS

This Action Plan is a template with which you can address the pest transmission pathways listed in this booklet. It is designed so that you can put your individual management action in the blank column. It is recommended that the Action Plan is completed before the Farm Biosecurity Checklist to demonstrate that actions are being implemented. Prioritise biosecurity actions for each growing area on your property. Update your biosecurity plan as goals are achieved and integrate biosecurity actions into your overall Farm Management Plan.

WHAT IS THE RISK?	ESTIMATED RISK RATING* 0 = no risk, 10 = high risk	CURRENT MEASURES IN PLACE	ADDITIONAL MEASURES
<p>VEHICLE MOVEMENT</p> <p>With multiple entry sites, vehicle access cannot be controlled, making it difficult to stop visitors moving into growing regions. These risks are increased when the vehicles have been exposed to different growing areas.</p>			
<p>VEHICLE AND EQUIPMENT HYGIENE</p> <p>Areas where organic matter can become lodged, such as tyre treads and grilles, can incubate plant pests.</p>			
<p>STAFF AND FARM VISITORS</p> <p>Visitors and staff can carry plant pests between production areas. Staff that are untrained in good biosecurity practices can spread diseases, pests and degrade biosecurity protocols that are in place. It can be difficult to trace the source of a pest outbreak without knowledge of who has visited the farm.</p>			
<p>WASTE</p> <p>Farm waste can become a breeding ground and incubation source for plant pests eg anthracnose on prunings.</p>			

<p>PLANTING AND PACKAGING MATERIALS</p> <p>Nursery seedlings, packaging materials, soil, compost and fertiliser can be a source of plant pests.</p>			
<p>PEST SURVEILLANCE</p> <p>Lack of surveillance can lead to pest infestation symptoms going unnoticed, allowing the pest to go unmanaged, during which time they may establish in growing regions and spread to other properties.</p>			
<p>GROWING AREA REGULATION</p> <p>Unnecessary people, vehicles and equipment movement in growing areas can increase the risk of plant pest transmission. Neighbouring properties could harbour plant pests. Weeds can be an incubation source for pests. Feral animals have the potential to spread pests.</p>			
<p>BIOSECURITY PLANNING</p> <p>Not implementing biosecurity strategies and increasing biosecurity can increase the risk of plant pest infestation, lead to higher long-term costs for managing plant pests, and place market access at risk.</p>			
<p>EXTRA RISK</p>			
<p>EXTRA RISK</p>			

*The risk rating is a qualitative estimate that aims to indicate high priority areas of farm biosecurity. It is important to note that individual properties may face different levels of risk for each aspect of biosecurity. For this reason farm biosecurity plans should be tailored accordingly to be most effective. Attributing a value to the risk rating should be based on current knowledge of farm traffic, farm management practices, and professional advice.

Grove biosecurity checklist

Property name:

Date of biosecurity check:

RECOMMENDED PRACTICES	YES	NO	Comments
Pests			
Commercial trees and neighbouring vegetation regularly inspected for pests			
Grove staff know how and where to report pests			
Grove staff are familiar with the high priority pest threats for the olive industry			
Active pest surveillance is regularly conducted			
Survey activities and results are recorded, even when nothing is found			
Numbers of mummies left after harvest are minimised and those remaining are inspected			
Product management			
Propagation material is free from pests – visually and by documented testing			
Planting or propagation material is 'certified' or has defined an occurrence health status			
Records of planting material and its source maintained			
Planting material without complete documentation not accepted on property			
Staff have specific knowledge of symptoms of olive pests spread in propagation material			
Effective monitoring/pest management program maintained			
No soil, plant material or insects left on equipment or in bins			
Olive fruit loaded and unloaded on paved or sealed pad away from production areas			
Fallen or waste olive fruit and packing shed waste disposed of away from production areas and irrigation sources			

RECOMMENDED PRACTICES	YES	NO	Comments
People movement			
Biosecurity signs are located at main entrances			
Visitors sign a Visitor Register on arrival			
Visitors, clothing, footwear and tools are free of loose soil or plant matter before entering or leaving the grove			
All people recently returned from overseas have clean footwear and clothes before entering the grove			
Footbaths and scrubbing brushes provided for visitors and staff moving from contaminated to clean areas of the grove			
Grove vehicles used to transport visitors around the property			
Grove staff aware of biosecurity procedures in place			
Equipment and vehicles			
Designated parking area for non-grove vehicles			
Cleaning and wash-down facilities, preferably on a concrete pad, provided for people, machinery and equipment			
High pressure water or air available for use to remove plant material and soil from equipment and machinery			
Sump installed in wash-down facility to catch unwanted weeds and stop run-off			
Grove vehicles kept clean by regularly clearing the vehicle floor of soil, weed seeds and insects			
Vehicle movement kept to a minimum in production areas			
Borrowed and second-hand machinery and equipment is cleaned of all plant material and soil before use			
Secateurs and grafting knives are disinfected using a bleach solution between trees			
Machinery cleaned before being moved off property			



CHEMICAL TREATMENTS FOR DISINFECTION ON SURFACES AND EQUIPMENT

ACTIVE INGREDIENTS*	EFFECTIVE AGAINST	RECOMMENDED PREPARATION*
Chlorine e.g. Sodium hypochlorite	Bacteria, viruses and fungi	Sodium hypochlorite – 10 ml (1%) Potable water – 1 litre Contact time – 10 minutes
Pentapotassium bis (peroxymonosulphate) 40-50%, Sodium C10-13-alkylbenzenesulfonate 10-12% Malic Acid 7-10% Sulphamidic acid 4-6% e.g. Virkon S	Bacteria, viruses and fungi	Virkon – 10 g Water – 1 litre Contact time – 10 minutes
Benzalkonium chloride 54g/L, Polyhexamethylene Biguanide Hydrochloride 4g/L e.g. F10SC	Bacteria, viruses and fungi	F10SC – 4 ml Water – 1 litre Contact time – 10 minutes

* Handle with care according to chemical safety data sheet.

** When disinfecting equipment or machinery surfaces please allow 10 minutes of contact to ensure that surfaces are disinfected properly. For footbaths, be sure that chemicals cover the entire tread of the shoe for 5-10 seconds.





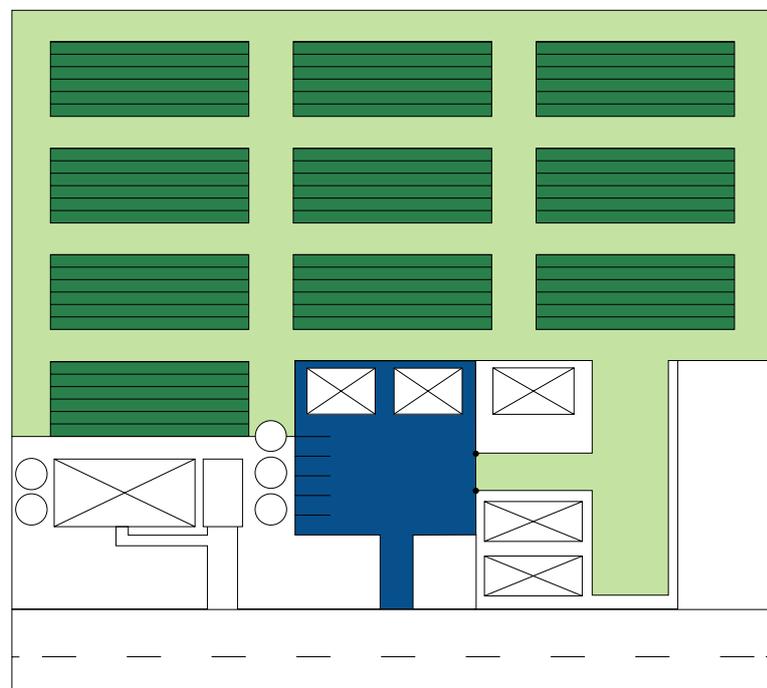
ZONING: KEEP YOUR DIRT ON YOUR FARM

Zoning of property is a cost-effective way to minimise the risk of spreading pests and disease on-farm. Furthermore, when quarantine measures are instituted there is potential to claim partial property freedom whereby, zoned properties will only have infected areas shut down while pest-free zones are allowed to maintain normal operation. Implementing zoning procedures can lead to major benefits to farmers and reduce the financial impact of quarantine.

Zoning divides farms into distinct areas: exclusion, separation, and farming. The exclusion zone restricts non-essential visitor and staff vehicles to specified car parking at the farm entrance. Separation includes the roadways and pathways for essential vehicles to access different areas on-farm. Lastly, farming areas are where farm vehicles, machinery and equipment operate on the property. Zones should be marked by physical barriers such as fencing and signage indicating locations of footbaths, clean-down facilities, drainage, roads and access points for delivery and collection. Movement should be restricted between zones where possible.

LEGEND

-  Exclusion
-  Separation
-  Grove





HIGH PRIORITY OLIVE PESTS

OLIVE MOTH, (olive kernel borer)

Prays oleae

Hosts: olive, almond, jasmine, anemone

Symptoms: Affects flowers, fruit and leaves. In the leaf-feeding generation, *P. oleae* presence is most easily detected by examining the leaves for mines. In the flower-feeding generation, florets are spun together with silk containing grains of frass. In the fruit-feeding generation, early fruit drop is likely to be caused by this pest.



OLIVE FLY

Bactrocera oleae

Host: Olive

Symptoms: The larvae (maggots) of the olive fruit fly feed inside the fruit, destroying the pulp and allowing the entry of secondary bacteria and fungi that rot the fruit and degrade the quality of the oil. Feeding damage can cause premature fruit drop and reduce fruit quality for both table olive and olive oil production. Olive fruit flies may be distinguished from related fruit flies by the presence of black spots on the wing tips and the lack of banding across the wings that occurs in most other related fruit fly species



OLIVE QUICK DECLINE

Xylella fastidiosa subsp. pauca (with vectors)

Host: wide host range including olive

Symptoms: Affects whole tree. See attached fact sheet. The first sign of OQDS is scattered leaf scorching and twig death throughout the upper part of the canopy. Leaf scorching begins as a browning at the tip of the leaf, spreading towards the base until the whole leaf is covered. Dead leaves remain attached to the branches until dislodged by rain. Browning and branch death spreads throughout the canopy giving the tree a burned appearance. These leaf scorch and dieback symptoms can be easily confused with several other olive tree diseases and environmental disorders.



VERTICILLIUM WILT (defoliating strains)

Verticillium dahliae

Host: wide host range with cotton and olive most severely affected

Symptoms: Affects whole tree including roots. Symptoms appear when leaves on one or more branches of the tree suddenly wilt early in the growing season; this process intensifies as the season progresses. Death of mature trees infected with *Verticillium* is possible. Darkening of xylem tissue, a key symptom for distinguishing *Verticillium* wilt in many crops is frequently not apparent in olives.





XYLELLA FASTIDIOSA

Olive Quick Decline in Italy is associated with unique strain of *Xylella fastidiosa*

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Figure 1. Symptoms of olive quick decline syndrome in Italy include canopy dieback (A), leaf scorch (B), and branch dieback (C). Photos: R. Krugner, USDA-ARS.



XYLELLA FASTIDIOSA

Olive quick decline syndrome (OQDS) is a destructive new disease currently affecting approximately 20,000 acres of olive in southern Italy—an area approximately the size of table olive production in California. Symptoms of OQDS include extensive branch and twig dieback, yellow and brown lesions on leaf tips and margins, vascular discoloration, and subsequent tree mortality (Figure 1).

Similar symptoms have been observed in olives in California, but disease incidence appears to be low when compared to Italy. A number of organisms, including fungi and a bacterium, have been isolated from sick trees in Italy and California. The bacterium *Xylella fastidiosa* has been found to infect olive trees in both locations.

To date, only strains belonging to *X. fastidiosa* subspecies *multiplex* have been isolated from olives in California. These California strains have limited association with the disease and experimental infections did not cause disease in olive varieties commonly cultivated in California.

In Italy, recent publications indicate that strains of the bacterium isolated from the outbreak area are closely related to *X. fastidiosa* subspecies *pauca*, a subspecies group not known to occur in the United States. The OQDS outbreak in Italy marks the first report of the bacterium in the European Union. Research is underway in Italy to evaluate the role of the bacterium in OQDS.

What are the *pauca*, *fastidiosa*, and *multiplex* subspecies?

Strains of the *pauca* subspecies are known to cause citrus variegated chlorosis, a serious disease of citrus reported in Brazil and Argentina. In California, *X. fastidiosa* subspecies *fastidiosa* causes Pierce's Disease on grapevine as well as scorch on almond, whereas *X. fastidiosa* subspecies *multiplex* infects almond but not grapevine. Strains of *fastidiosa* and *multiplex* subspecies do not affect citrus in the United States. Knowledge of the subspecies present in different cropping systems is important because the relative risk to other crops in the landscape depends on the host range of the *X. fastidiosa* subspecies present.



XYLELLA FASTIDIOSA

What are the implications of OQDS for California olives?

Olives can be a host for *X. fastidiosa* strains belonging to three subspecies groups: *pauca* in Italy and *multiplex* and *fastidiosa* in California. In addition, species of fungi associated with OQDS are not currently known to occur in California. Therefore, olive growers and landscape managers should report new incidences of extensive dieback or scorch on olives to farm advisors to facilitate early detection of potential pathogen introductions. International movement of plants and plant materials assures a constant flux of organisms across borders, necessitating constant awareness of global trends in pathogen and vector establishment.

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