Plan and Protect:

Steps to safeguard your farm against pests, diseases and weeds

Plant Protection Series *Volume 1*

Plant Health AUSTRALIA

Sugar Research Australia

Front and back cover images courtesy of CANEGROWERS.

Plant Health Australia is the national coordinator of the government-industry partnership for plant biosecurity in Australia. As a not-for-profit company, PHA services the needs of Members and independently advocates on behalf of the national plant biosecurity system.

PHA's efforts help minimise plant pest impacts, enhance Australia's plant health status, assist trade, safeguard the livelihood of producers, support the sustainability and profitability of plant industries and the communities that rely upon them, and preserve environmental health and amenity.

www.planthealthaustralia.com.au

CANEGROWERS is the peak body for Australian sugarcane growers. CANEGROWERS Australia represents around 80% of Australia's sugarcane growers. CANEGROWERS is a highly successful lobby, representation and services group, with 19 offices across Queensland and New South Wales. CANEGROWERS represents the Australian sugarcane industry as a member of PHA.

www.canegrowers.com.au

Sugar Research Australia (SRA) invests in and manages a portfolio of research, development and extension projects that drive productivity, profitability and sustainability for the Australian sugarcane industry. SRA is an industry-owned company, funded by a government matched statutory levy paid by growers and milling businesses.

sugarresearch.com.au

Australian Sugar Manufacturers, formerly known as the Australian Milling Council (ASMC), represents Australia's raw sugar manufacturers and exporters and is an advocate for a range of policy, regulatory and legislative topics that affect the sugar value chain.

sugarmanufacturers.org

This guide was developed by Plant Health Australia, CANEGROWERS, Sugar Research Australia, Australian Sugar Manufacturers, the Queensland Department of Primary Industries with financial support from Sugar Research Australia Limited.

This publication is designed for use by farmers and their staff, contractors, millers, researchers and consultants working in the sugarcane industry. It shows simple procedures that you can use to minimise the risk of introducing and spreading weeds, pests and diseases onto properties.

Contents

Introduction

Pests and diseases can severely affect your farm. It makes good business sense to reduce the risk by taking measures to improve biosecurity.

This guide contains:

- A checklist of recommended best-practice activities you can implement on your property to reduce the risk of spreading pests and diseases, increase your biosecurity preparedness and safeguard your business against biosecurity threats.
- Background information on each checklist activity grouped by key themes
- 'Quick Tips' for Setting up a washdown area and Mapping your property
- Templates including vehicle contamination cleaning, pest surveillance and visitor register

In Queensland, under the *Biosecurity Act 2014*, everyone has a general biosecurity obligation (GBO) to ensure they do not spread a pest, disease or a contaminant.

Likewise, in New South Wales, under the *Biosecurity Act 2015*, everyone has a general obligation to act to prevent the introduction and spread of pests, diseases, weeds and contaminants. The *Biosecurity Act 2015* relates to the prevention, elimination, minimisation and management of biosecurity risks.

As part of fulfilling your general obligation to prevent or minimise biosecurity risks, the Queensland government recommends to:

- 'Come clean, go clean' meaning you should ensure your shoes, clothing, vehicles and equipment are clean before you enter and leave agricultural properties, park or forests
- Check for and follow biosecurity zones and other movement restrictions and local requirements before moving certain plant material, soil and related equipment
- Additionally, you should also be aware of any biosecurity management activities or plans in place before entering a property
- Be informed about pests and diseases, including specific risks to your area

More information

Queensland *Biosecurity Act 2014*
Queensland Government
https://www.legislation.qld.gov.au/view/html/inforce/current/act-2014-007

New South Wales *Biosecurity Act 2015*
New South Wales Government
https://www.dpi.nsw.gov.au/dpi/biosecurity/managing-biosecurity/legislation/biosecurity-act-2015

General obligation (New South Wales)
New South Wales Government
https://www.dpi.nsw.gov.au/dpi/biosecurity/managing-biosecurity/general-biosecurity-duty

General biosecurity obligation (Queensland)
Queensland Government
https://www.dpi.qld.gov.au/business-priorities/biosecurity/policy-legislation-regulation/biosecurity-act-2014/general-biosecurity-obligation

Easy ways to protect your farm

Farm Inputs

	Source sugarcane planting material and seeds for alternative crops from reputable suppliers and ensure planting material is checked and found to be free from pests.
	Ensure approved seed or tissue culture plants are purchased when replanting.
	Where possible, ratoon cane no more than four times.
	Request and maintain records that state the source and testing history of planting material and maintain a register of propagation material.
	Only plant sugarcane varieties recommended by the local Regional Variety Committee (RVC)(See SRA Variety Guides).
	Use certified fertiliser.
	Record the source of organic fertilisers, delivery and application dates.
	When acquiring compost, soil conditioners and mulches, look for compliance with Australian Standards and maintain records when batches are used and where they are applied on your property.
	Monitor water sources on your property for anything unusual such as weeds.
	Protect water sources on your property from being accessed by wild and feral animals.

Production Practices

	Work with Production Services to monitor crop and fallow areas for pests, diseases and weeds.
	Report resistant varieties that become heavily infected.

People, Vehicles and Equipment

	Provide visitors access to appropriate hygiene supplies including handwashing facilities, hand sanitiser, gloves, overalls and disinfectant foot baths.
	Ensure anyone recently returned from overseas has clean footwear and clothing before entering the farm.
	Limit visitor access to production areas by providing a designated parking area for visitors, ensuring visitors stick to paths and designated roadways and where possible, use dedicated farm vehicles to transport visitors around your property and wash vehicles down.
	Ensure that machinery entering, leaving or being used on your property is clean.
	Disinfect equipment including harvesters, knives, cutters and planters.
	Put up biosecurity signs at entrances.

Feral Animals and Weeds

	If possible, consider installing fencing to keep out movements of animals, people and vehicles that can spread pests, diseases and weeds.
	Control volunteer plants that can harbour pests and diseases.

Train, Plan and Record

	Train staff and visitors on biosecurity requirements.
	Learn about exotic pest threats and teach your staff and contractors.
	Report any unusual pests and diseases and make sure your staff know how to as well.
	Undertake training in use of agricultural and veterinary chemicals and always follow label instructions.
	Maintain appropriate records for your property, for example, chemical treatments used.

Farm Inputs

Sugarcane farms use a variety of inputs including sugarcane seeds, planting material, fertiliser, compost, soil conditioners, mulches, water and machinery.

Almost anything moved onto your property can be a potential source of pests and diseases.

It is recommended to monitor all materials that enter your property including water to limit pests and disease entering your farm.

Seeds and Planting Material

Sugarcane planting material includes stalks, setts, billets and tissue culture plants. Ensure sugarcane planting material and seeds for alternative crops such as legumes are purchased from reputable sources and that they are free of pests and diseases.

Infected planting material presents a risk to your business. Often, you will not be able to assess the quality of planting material just by looking at it. Plants that appear to be clean and healthy may still contain pests and disease. It is essential to source planting material from accredited suppliers.

Figure 1. *Image by CANEGROWERS.*

Never use poor quality or diseased planting material as it can infect your entire crop.

Request and maintain records that show the source and testing history of planting material to allow the origin of diseases, pests or weeds to be traced if an outbreak occurs.

Sugarcane Productivity Services operate approved seed plots and coordinate the supply of tissue culture plants in all cane growing areas. Approved seed or tissue culture plants provide clean plant material that is multiplied on farm to supply commercial plantings. Productivity Services conduct inspections of seed sources as required.

Growers should purchase approved seed when replanting. It must be planted into fallow land to prevent contamination by pests and diseases that could spread from volunteer plants.

Where possible, ratoon cane no more than four times. Doing so will reduce pests and diseases and potential yield losses.

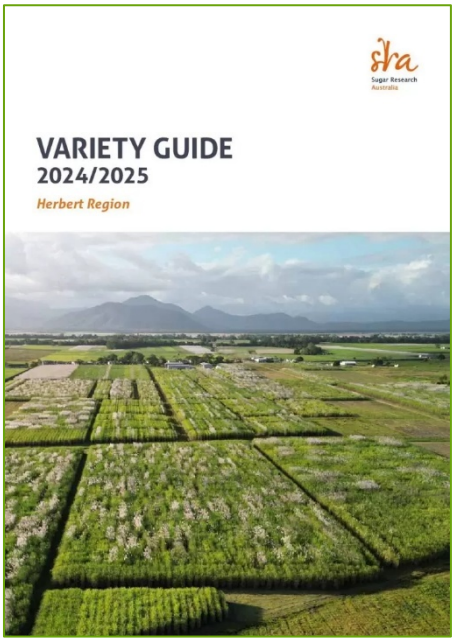
Recommendations

✓	Source sugarcane planting material and seeds for alternative crops from reputable suppliers and ensure planting material is checked and found to be free from pests.
✓	Ensure approved seed or tissue culture plants are purchased when replanting.
✓	Where possible, ratoon cane no more than four times.
✓	Request and maintain records that state the source and testing history of planting material and maintain a register of propagation material.

Varieties

The Australian sugar industry relies on using sugarcane varieties that are resistant to disease. It is vital that all producers adhere to this strategy to protect individual crops and the industry in the region.

Australian sugarcane growers are advised to choose sugarcane varieties recommended by Regional Variety Committees (RVCs) in their region, which are resistant to local diseases. Lists of currently recommended varieties are maintained by RVCs and can be found in the 'Regional Variety Guides' which are updated each year and are available on the SRA website.



Recommendations

- ✓ Only plant sugarcane varieties recommended by the local Regional Variety Committee (RVC)(See SRA Variety Guides).

Sugar Research Australia Regional Variety Guides
Sugar Research Australia
https://sugarresearch.com.au/growers/varieties/

Sugar Research Australia Variety Guides
Sugar Research Australia
https://youtu.be/yUrulG27jc8

Fertiliser

Fertilisers have the potential to introduce diseases, pests and weeds onto your property. It is recommended to monitor all fertiliser that enters your property.

Organic fertilisers such as manure and compost can be sources of weeds if they are not composted thoroughly.

Reduce the risk of purchasing contaminated or non-compliant fertiliser by ensuring that the supplier is following the Fertiliser Industry Federation of Australia Purchasing Code of Practice or has equivalent quality controls in place.

It is also recommended that producers record the source of organic fertilisers, delivery and application dates so that any problems that may occur they can be traced back to their point of origin.

Recommendations

- ✓ Use certified fertiliser from a supplier following the Fertiliser Industry Federation of Australia Purchasing Code of Practice.
- ✓ Record the source of organic fertilisers, delivery and application dates.

Fertiliser Australia
Fertiliser Australia
https://fertilizer.org.au/

Compost, Soil Conditioners and Mulches

Compost, soil conditioners and mulches also be a source of contamination onto your property. When acquiring these inputs, look for compliance with the Australian Standard AS4454 2012 that applies to compost, soil conditioners and mulches.

When buying compost from suppliers, ask for testing history or a quality assurance certificate. It is also a good idea to record when batches were used on your farm and where they were applied.

If you are making your own compost, do not include source material that you know comes from diseased plants or animals.

As general best practice, regularly check your property for signs of new pests, diseases or weeds.

Figure 2. *Image by CANEGROWERS.*

Recommendations

- ✓ When acquiring compost, soil conditioners and mulches, look for compliance with Australian Standards and maintain records when batches are used and where they are applied on your property.

Water Sources

Sources of water on a property may include dams, drains and/or creeks. It is important to protect water sources on your property from being accessed with wild and feral animals, which have the potential to introduce contamination including pests and diseases. Furthermore, it is also important to monitor water sources on your property for signs of contamination, pests, diseases, weeds and ferals, including areas that have been recently landscape such as new dams. For example, weed seeds such as those of *Mimosa diplotricha* (Giant Sensitive Plant) and *Rottboellia cochinchinensis* (Itch grass) can be transported by water. Flooding events can also provide an opportunity for pests and weeds to become established, and for animals to come onto your property, so keep an eye out for new weeds in areas where flood waters may have run across your land from neighbouring properties.

Recommendations

- ✓ Monitor water sources on your property for anything unusual such as weeds.
- ✓ Protect water sources on your property from being accessed by wild and feral animals.

Production Practices

You can reduce the risk of spreading pests and diseases by using simple biosecurity measures as part of your everyday farm management practice.

Monitoring crops and fallow areas for pests, diseases and weeds

Monitoring your crops and fallow areas provides the best protection against new pests, diseases and weeds. Any unusual pests or symptoms should be reported. Your Productivity Services is a good place to start.

Monitoring the health of your crop is a fundamental part of farm management and gives the best chance of spotting a new pest soon after it arrives. The earlier you or your staff report or respond to an issue the better chance you have of limiting its impact.

Pay particular attention to high-risk areas where pests are most likely to enter and establish on your property such as cane loading areas (sidings or pads), near wash-down areas, and along public roads, creeks, drainage lines and railways.

Fallow areas should also be monitored for signs of new weeds, or volunteer plants that can shelter pests between cane growing periods.

Finding a new pest or disease on your property early gives you and the whole industry the best chance of controlling it.

Figure 3. *Image by CANEGROWERS.*

Recommendations

- ✓ Work with your local Productivity Service to monitor crop and fallow areas for pests, diseases and weeds.

Monitoring disease symptoms in resistant varieties

Sugarcane varieties that are rated as 'resistant' to specific pathogens can become sensitive to that pathogen over time. It might be that the pathogen has evolved to overcome plant resistance, or a new strain of the disease has entered Australia. An example of this was the outbreak of orange rust in variety Q124.

Varieties that are rated as resistant may include a few infected plants, however, if a resistant variety becomes widely infected with a disease, you should report it immediately.

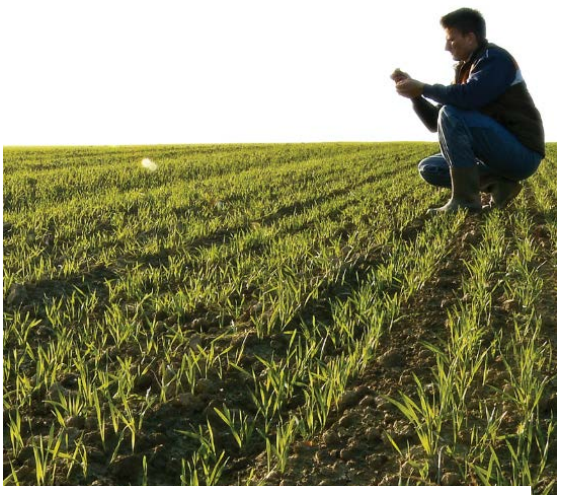


Figure 4*. Image by Plant Health Australia.*

Recommendations

- ✓ Report resistant varieties that become heavily infected.

People, Vehicles and Equipment

Pests and weeds can spread in soil and plant material on vehicles, equipment, footwear and clothing. For this reason, anyone visiting your farm and any vehicles, equipment or machinery coming on to the property can introduce pests and weeds onto your farm.

People

Make sure that staff, contractors and visitors are aware of your biosecurity requirements and follow your guidelines. Provide visitors access to appropriate hygiene supplies including handwashing facilities, hand sanitiser, gloves, overalls and disinfectant foot baths.

To ensure your property does not become a source of pests for others, you also have a responsibility to inform visitors of any declared or notifiable pests present on your farm, such as Fiji leaf gall to prevent their spread.

Figure 5. *Image by Farm Biosecurity.*

Recommendations

- ✓ Provide visitors access to appropriate hygiene supplies including handwashing facilities, hand sanitiser, gloves, overalls and disinfectant foot baths.
- ✓ Ensure anyone recently returned from overseas has clean footwear and clothing before entering the farm.

Biosecurity and people movement on farms
Farm Biosecurity
https://youtu.be/vijE9bszf64

Vehicles

While it is impractical to stop all vehicle movement on and around your property, there are steps you can take to limit the risks that they pose on your crop. For example, it is best practice to ensure that all visitors' vehicles are restricted to a designated parking area or are cleaned before entering production areas. Vehicles and equipment that need to enter production areas can be cleaned using high pressure water or compressed air.

To minimise the risk of spreading weeds, pests and diseases, limit visitor's vehicle access to production areas or use dedicated farm vehicles to move through production areas. Those vehicles should not leave the farm. Otherwise, provide a wash-down facility to clean vehicles before allowing access to production areas.

Figure 6. *Image by Farm Biosecurity.*

Recommendations

- ✓ Where possible, use dedicated farm vehicles to transport visitors around your property.
- ✓ Limit visitor access to production areas by providing a designated parking area for visitors, or ensure visitors stick to designated roadways and wash down their vehicles when needed.

Machinery

Any machinery coming onto your property poses a risk of spreading pests, diseases and weed seeds. This includes contractors involved in harvesting, planting or fertilising sugarcane or other crops.

Billets left in a billet planter or harvester could be infected with diseases like ratoon stunting disease, leaf scald or Fiji leaf gall. If these billets are planted on your farm, they could introduce or spread diseases around your property.

Figure 7. *Image by CANEGROWERS.*

Providing a suitable wash-down facility away from production areas is a good way of helping contractors to only use clean machinery on your property. **This is especially important to reduce the risk of spreading serious sugarcane diseases such as Ratoon Stunting Disease (RSD).**

You have the right to ask contractors to clean machinery before entering and leaving your farm.

Recommendations

- ✓ Ensure that machinery entering, leaving or being used on your property is clean.

Cleaning down your harvester
Sugar Research Australia
https://youtu.be/yjXCfbFnEJg

Effective farm wash down facilities
Plant Health Australia
https://www.planthealthaustralia.com.au/wp-content/uploads/2024/01/Effective-farm-wash-down-facilities.pdf

Equipment

Wash and disinfect all planting equipment including harvesters, cane knives, whole-stalk cane cutters and planters.

Always cut and plant the cane with machinery that has been thoroughly cleaned and disinfected. Cleaning equipment such as cane knives and harvesters between uses reduces the risk of spreading serious sugarcane diseases such as Ratoon Stunting Disease (RSD).

Figure 8*. Image by CANEGROWERS.*

Recommendations

- ✓ Disinfect equipment including harvesters, knives, cutters and planters

Vehicle and equipment biosecurity on farms
Farm Biosecurity
https://youtu.be/yjXCfbFnEJg

Biosecurity Signage

***Figure 9**. Ensure signs are visible at entrances advising of biosecurity and quarantine areas.*

Biosecurity signs help to control movement onto and around your property.

Signs at the main entrance to your property alert visitors to the need to comply with the measures you have in place. Other signs can show visitors where to park and where to clean down their vehicles or equipment, if needed.

Signs should contain simple messages, for example, 'Do not enter the farm without prior approval' or 'Use wash down facilities for cleaning vehicles and machinery'. They should also provide your contact details including your mobile phone number or UHF channel.

Signs should also be clear, visible and well maintained and be supported by additional biosecurity measures such as restricted access points.

Biosecurity signs are a good way to alert visitors of potential risks that their visit poses to your business and inform them of your requirements while on your property.

Recommendations

- ✓ Put up biosecurity signs at entrances.

Biosecurity Gate Sign Template

Farm Biosecurity

https://www.farmbiosecurity.com.au/wp-content/uploads/2019/03/Farm-Biosecurity-sign-900x600-V2.pdf

https://www.farmbiosecurity.com.au/toolkit/gate-signs/

Farm Biosecurity Aluminium Signs

https://www.k2ksigns.com.au/products/visitors-please-respect-farm-biosecurity-sign?variant=31215373516843

Feral Animals and Weeds

Wild and Feral Animals

Wild and feral animals pose a risk to your property through direct impact on production and their potential to carry diseases, pests and weed seeds onto and around your property.

Vermin like rats can damage crops, spread diseases and contaminate water sources. Rat management therefore reduces yield losses and the risk of cane quality. Similarly, feral pigs are among Queensland's most widespread and damaging pest animals. They degrade soil and water, damage crops and livestock, and carry diseases. Feral pigs cause losses of an estimated 20,000 tonnes of sugarcane each year. Fences will limit access by wild or feral animals that can carry pests and weed seeds.

Volunteer Plants and Weeds

Volunteer plants and weeds in production areas can also harbour pests and diseases, providing a source of inoculum to reinfect the next crop.

Ensure that crop destruction and follow-up controls remove all volunteers in paddocks. Where possible control volunteers and weeds along roadways and head ditches.

It is also a good idea to establish a weed management plan for your property, including plans to eradicate, contain or manage current weeds on your property and to prevent the introduction of new ones. You are likely to need a combination of practices to manage existing weeds, including herbicides and cultural practices like trash blanketing, strategic tillage and farm hygiene.

Fires, floods and storms can often provide an opportunity for pests and weeds to become established, and for animals to come onto your property.

***Figure 10**. Itch grass poses a significant challenge to cane growers. Image by Sugar Research Australia.*

To ensure this does not become an issue, regularly inspect your property for the presence of diseases, pests, weeds and ferals, particularly areas such as new roads or dams, or areas damaged in storms such as fences. Keep an eye out for new weeds in the areas where flood waters may have run across your property.

Recommendations

- ✓ If possible, consider installing fencing to keep out movements of animals, people and vehicles that can spread pests, diseases and weeds.
- ✓ Control volunteer plants that can harbour pests and diseases.

Pl@ntNet Weed Identification App

Sugar Research Australia

https://sugarresearch.com.au/growers/weeds/plantnet/

Train, Plan and Record

An important part of limiting pests and diseases on your farm and surrounding farms is ensuring staff are well trained, that you can trace where farm inputs including planting material came from, and that you have records of purchases, sales and machinery movement.

Training Staff

Anyone working on your property, including friends, family and contractors, may not know how easily diseases, pests and weeds can spread and how to prevent them from impacting your business. Inform staff of the biosecurity standards required on site and provide training if necessary. Display signs to remind staff and visitors of the importance of biosecurity.

Make sure your staff keep a lookout for unusual pests. Make sure that they can recognise **established** and **exotic** species, and that they know how to report them. Refer to **Plant Protection Series Volume 2 Pests, Diseases and Weeds of Sugarcane** for more information. If you don't know what the identity of a pest is, talk to your Productivity Services.

Training is also an important aspect to ensure the safety of yourself and others on your property. For example, training in the use of agricultural and veterinary chemicals and always following label instructions is best practice to ensure chemical safety on your property.

Recommendations

✓	Train staff and visitors on biosecurity requirements.
✓	Learn about exotic pest threats and teach your staff and contractors.
✓	Report any unusual pests and diseases and make sure your staff know how to as well.
✓	Undertake training in the use of agricultural and veterinary chemicals and always follow label instructions.

Recordkeeping

Recordkeeping is an important step in protecting your property, crop, staff and visitors. A variety of records should be kept for your property for different purposes sources of inputs, pesticide use and having a visitor's log (hardcopy, electronic or via an app).

For example, it is best practice to maintain records for purposes including:

- Chemical treatments used on your property.
- The source of organic fertilisers, delivery and application dates so that any problems can be traced back to the origin.
- When batches of compost were used on your farm and where they were applied.
- Propagation material.

Recommendations

✓	Maintain appropriate records for your property, for example, chemical treatments used.

Quick Tips: Setting Up a Washdown Area

Why do I need a washdown area?

Vehicles and machinery have the potential to spread soil borne pests and diseases such as Ratoon Stunting Disease (RSD) as well as invasive plants which can harm your property and the environment.

One of the best ways to manage the risk posed by vehicles and machinery is to set up a washdown area and clean them when they enter and leave your property.

Figure 11. *Ideally, the surface of a washdown facility should be sealed and constructed from a material such as concrete or bitumen. Image by Chris Anderson.*

How do I set up a washdown area?

Select your location

Position your washdown area near the entry/exit points of your property away from any production areas and at least 30 metres away from any watercourse or waterbody. This reduces the risk of introducing contaminated material such as plant debris, which may harbour pests and diseases, as well as runoff water, from entering and contaminating production areas.

If possible, select a location that has access to power and high-pressure water. Alternatively, at non-powered sites, ensure a supply of petrol is available to enable use of alternative cleaning equipment such as a petrol-powered cleaning pressure washer.

Define the dimensions of your washdown bay

Your washdown area should be large enough to accommodate various sizes of vehicles and machinery. As a guide, ensure the washdown bay pad is approximately 2 metres bigger in length and width than the largest vehicle or machine for which it is to be used. This is to reduce the likelihood that water used for cleaning will splash and spread beyond the washdown area. Remember to clean down the wash pad between uses so it is ready for the next vehicle.

Figure 12. *Soil and plant material can adhere to machinery, trucks and vehicles, therefore posing a risk of spreading pests and diseases.*

Select your surface

Ideally, the surface of a washdown area should be sealed and constructed from a material such as concrete or bitumen. Alternatively, gravel or blue metal can be used, however use of compacted gravel or blue metal should be avoided if runoff water is likely to drain elsewhere away from the washdown area.

Ensure your washdown facility is well signed

Ensure your washdown area is clearly signed and displays instructions to visitors about how to use it.

Manage runoff responsibly

Ensure that runoff water is directed away from production areas and will not drain into waterways, watercourses or waterbodies, including into ditches that lead to production areas. This is important not only for reducing the risk of spreading pests and diseases, but also for safeguarding the environment from pollution by chemicals such as detergents and oils, which may be present in wastewater from your washdown bay.

Develop a Biosecurity Vehicle Kit

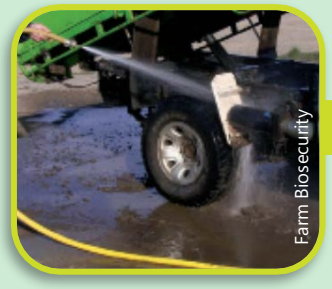
Keeping essentials stocked in a 'Biosecurity Vehicle Kit' ensures appropriate equipment is on hand to decontaminate vehicles, machinery and equipment entering and leaving your property as well as hands and shoes of personnel. It is suggested to keep a plastic tub handy to store these items, so they are kept together and accessible when needed.

Some suggestions of things to include are:

- ✓ Hard brush and pan to dislodge soil and plant matter and clean vehicle floors and surfaces as well as shoes, clothes and equipment
- ✓ Disposable gloves
- ✓ Handwash or hand sanitiser
- ✓ Spray bottle containing a cleaning agent such as a detergent, dilute bleach solution of 70% methylated spirits in 30% water
- ✓ Paper towel
- ✓ Hessian bag/mat (to place on the ground if setting up a foot bath near a field)
- ✓ Plastic bags for storing dirty clothes, shoes or equipment

Using a washdown area

Wash down → Decontaminate → Rinse



Wash all vehicles and machinery* entering and exiting the washdown bay with high pressure water, such as delivered by an electrical-powered or petrol-powered high-pressure washer.

Apply a decontaminant solution to all surfaces that have come into contact with mud and dirt such as tools, footwear, floor mats and foot pedals.

Use high pressure water to rinse off the decontaminant. Move the vehicle off the wash pad to a dry surface. Clean the wash pad down so it is ready for its next use.

*Do not use water on machinery with sensitive electronic equipment.

Quick Tips

Quick Tips: Mapping Your Property

A property map is an important tool as it provides a visual representation of production areas and entry points on your property. Your property map can also be given to visitors so they can adhere to your requirements.

When creating a map of your property, consider including the features below:

Where entry can be gained to your property
Parking areas on your property
House and office areas
Where roadways are situated
Sheds, dams, silos, machinery parking areas and any other significant structure
Where production areas are
Any old or existing hazards (e.g. old or existing dumps)
Any significant weed or pest infestations
Water ways
Location of designated clean down/wash down facilities
Location of power poles and other utility fixtures

If property is mixed farming with stock:

Stockyards
Stock quarantine area
Drought or fodder feeding points
Watering points

A property map also allows you to identify zones on your property that might require different levels of activity.

Zoning is the division of the property into separate areas and the management of movement between and within these zones. A three-zone system helps to manage movement, create separation between different areas of farming activities and restrict movement onto and off your farm.

Cool zone (e.g. House)	Minimum to no contact with crop or animals on property. Low requirement to restrict access.
Warm zone (e.g. Sheds, silos, roadways, stockyards)	Some contact with crops or animals but can be managed by having gravelled areas or extra surveillance.
Hot zone (e.g. the production areas of the property)	Significant restricted access. Only people and vehicles that need to enter these areas should have access.

It is also important to consider access for utility and service providers. It is a good idea to have a specific property map to give to utility providers and their contractors, which outlines the location of power poles and suggested routes for the works to take to gain access. You should consider where the poles/utility fixtures are location and associated risks. For example, poles located within a cropped paddock may be more prone to associated vehicle and machinery biosecurity risks, as opposed to poles near the sheds. Have copies of this specific map printed off and draw with a market the route you wish the worker to take. You may also be able to scan this and email it to the provider prior to their visit, along with your biosecurity expectations.

Recommendations

✓ Design a property map and provide copies for visitors, including utility and service providers
✓ For utility and service providers, provide a specific map that outlines the route you wish them to take to access key infrastructure such as power poles located on your property

Property Map **Date:**

Quick Tips

Smartcane Best Management Practice (BMP)

CANEGROWERS delivers the Smartcane BMP project with funding from the Queensland Government's Reef Water Quality Program and CANEGROWERS. The aim of the program is to recognise best management practices carried out by Australian cane growers. All cane growing businesses, regardless of size and location are eligible to register for the Smartcane BMP program.

The program comprises of eight modules in total: three core modules (Modules 1, 2 and 3) and five optional modules (Modules 4, 5, 6, 7 and 8):

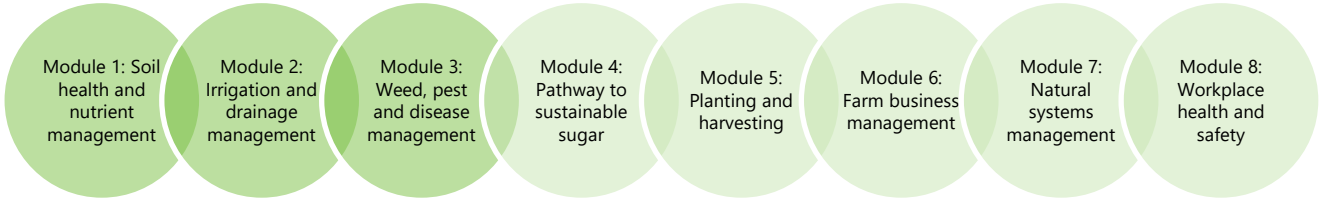


***Figure 13**. Modules in the Smartcane Best Management Practice program. Modules 1,2 and 3 are core whilst the remainder are optional.*

Smartcane Best Management Practice (BMP)
SmartCane
https://smartcane.com.au/

farmbiosecurity

Vehicle Contamination Cleaning Record

www.farmbiosecurity.com.au

Date	Time	Vehicle Identification	Vehicle was previously used for	Intended use post cleaning

If you see anything unusual on your property call the Emergency Animal Disease Watch Hotline on **1800 675 888** or the Exotic Plant Pest Hotline on **1800 084 881**

Visitor register

Please enter your details to assist us with our farm biosecurity records

Date	Time on property		Name	Reason for visit	Vehicle registration and mobile phone	Blocks visited on this property	Location/date of last contact with crops
	Arrival	Departure					

If you see anything unusual, call the Exotic Plant Pest Hotline

EXOTIC PLANT PEST HOTLINE
1800 084 881

Pest surveillance data sheet

Farm: _____

Scout: _____

Date: _____

		Established pests				Exotic pests			
Paddock	**No. sites**	Pest 1	Pest 2	Pest 3	Pest 4	Pest 1	Pest 2	**Other pests found**	**Comments**

If you see anything unusual, call the Exotic Plant Pest Hotline

NB Estimated infestation level of endemic and exotic pest presence/absence to be scored (e.g. zero/low/med/high or % plants/blocks affected)
Pests targeted by surveillance must be named before surveillance initiated (for both endemic and exotic pests)

EXOTIC PLANT PEST HOTLINE
1800 084 881

References

1. Australian Bureau of Statistics (ABS)(20223). Australian Agriculture: Broadacre Crops. Available online at: https://www.abs.gov.au/statistics/industry/agriculture/australian-agriculture-broadacre crops/latest-release. Accessed 24th October 2024.
2. Australian Government (2017). The Biology of *Sorghum bicolor* (L.) Moench subsp. *bicolor* (Sorghum), Australian Government Department of Health Office of the Gene Technology Regulator, Version 1.1 July 2017. Available online at: https://www.ogtr.gov.au/sites/default/files/files/2021-07/the_biology_of_sorghum.pdf, Accessed 14th May 2025.
3. Australian Sugar Milling Council (ASMC)(2023). Sugar Industry Summary Statistics. Available online at: https://asmc.com.au/sugar-industry-overview/statistics/. Accessed 24th October 2024.
4. Bhuiyan, S.A., Croft, B.J., Wong, E., Ogden-Brown, J., Turner, M., Parfitt, R., Magarey, R., Dull, J. & Cox, M. (2016). Effects of *Pachymetra* root rot and nematodes on some elite sugarcane clones in Australia, *Proc. Aust. Soc. Sugar Cane Technol.*, Volume 38. Available online at: https://elibrary.sugarresearch.com.au/server/api/core/bitstreams/91b96cd8-f3bb-4429-ab93-6d5316b6d841/content.
5. Briar, S. S., Wichman, D., & Reddy, G. V. (2016). Plant-parasitic nematode problems in organic agriculture. *Organic farming for sustainable agriculture*, 107-122. Available online at: https://agresearch.montana.edu/carc/Articles/Plant-Parasitic%20Nematode%20Problems-2016.pdf.
6. Business Queensland (2021). Hymenachne. Available online at: https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/invasive/restricted/hymenachne, Accessed 14th May 2025.
7. Business Queensland (2021b). Red witchweed. Available online at: https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/invasive/prohibited/red-witchweed, Accessed 14th May 2025.
8. Business Queensland (2021c). Siam weed. Available online at: https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/invasive/restricted/siam-weed, Accessed 14th May 2025.
9. Business Queensland (2022). Navua sedge. Available online at: https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/invasive/other/navua-sedge, Accessed 14th May 2025.
10. CANEGROWERS (2025). Homepage. Available online at: https://www.canegrowers.com.au/. Accessed 1st April 2025.
11. Centre for Invasive Species Solutions (2019 – Updated in 2024). Giant Sensitive Plant, *Weeds Australia*. Available online at: https://weeds.org.au/profiles/giant-sensitive-plant/#prosection3, Accessed 14th May 2025.
12. Centre for Invasive Species Solutions (2019b – Updated in 2024). Java Bean, Sicklepod, Foetid Senna, Sicklepod Senna, Sickle Senna, Chinese Senna, Coffee Weed, Habucha, Arsenic Weed, Foetid Cassia, Wild Senna, Stinking Cassia, Peanut Weed, Low Senna, *Senna obtusifolia (L.) H.S.Irwin & Barneby*, *Weeds Australia*. Available online at: https://weeds.org.au/profiles/java-bean-sicklepod/#prosection5, Accessed 14th May 2025.
13. Centre for Invasive Species Solutions (2020). *Chromolaena odorata* (L.) R.M.King & H.Rob., *Weeds Australia*. Available online at: https://profiles.ala.org.au/opus/weeds-australia/profile/Chromolaena%20odorata, Accessed 14th May 2025.
14. Chand, H., Kumar, A., Paswan, S. & Dwivedi, G.P. (2014). Estimation of damage intensity of *Chilo tumidicostalis* Hampson in Sugarcane during primary and secondary infestation, *Ann. Pl. Protec. Sci.*, 22(2), 253-256.
15. City of Darwin (n.d.) Greening Darwin Strategy 2030. Available online at: https://citiespowerpartnership.org.au/wp-content/uploads/2021/08/GreeningDarwinStrategy_Darwin.pdf, Accessed 14th May 2025.
16. Cullen, J., Julien, M., & McFadyen, R. (2012). Biological Control of Weeds in Australia, CSIRO Publishing.
17. Daugrois, J.H., Dumont, V., Champoiseau, P., Costet, L., Boisne-Noc, R. & Rott, P. (2003). Aerial contamination of sugarcane in Guadeloupe by two strains of *Xanthomonas albilineans*, *European Journal of Plant Pathology*, 109, 445-458.
18. Dara, S. K. (2019). The new integrated pest management paradigm for the modern age. *Journal of Integrated Pest Management*, *10*(1), 12.
19. Das, A. & Lala, A. (2024). Chapter 4: Insect Pests of Sugarcane, Indian Agricultural Research Institute, New Delhi.
20. Ekhator, F., Uyi, O.O., Ikuenobe, C.E. & Okeke, C.O. (2013). The Distribution and Problems of the Invasive Alien Plant, *Mimosa diplotricha* C. Wright ex Sauvalle (Mimosaceae) in Nigeria, *American Journal of Plant Sciences*, 4, 866-877.
21. Elliott, N. C., Farrell, J. A., Gutierrez, A. P., van Lenteren, J. C., Walton, M. P., & Wratten, S. (1995). *Integrated pest management*. Springer Science & Business Media.
22. Gaugler, R. (1997). Know your nematodes, Golf Course Management, Pages 64-68. Available online at: https://www.researchgate.net/profile/Randy-Gaugler/publication/263445935_Know_your_nematode/links/00b7d53ad962db7220000000/Know-your-nematode.pdf, Accessed 29th May 2025.
23. Grimshaw, J.F. & Donaldson, J.F. (2007). Records of two sugarcane pests *Eumetopina flavipes* Muir (Hemiptera: Delphacidae) and *Chilo terrenellus* Pagenstecher (Lepidoptera: Pyralidae) from Torres Strait and far north Queensland, *Australian Journal of Entomology*, 46, 35-39.

24. Gupta, M.K. & Sarma, A.K. (2007). Plassey borer, *Chilo tumidicostalis* Hampson damage in sugarcane, *Annals of Plant Protection Sciences*, Volume 15, Issue 1, 12-14. Abstract available online at: https://www.indianjournals.com/ijor.aspx?target=ijor:apps&volume=15&issue=1&article=004.
25. Jordan, D., Butler, D., Henzell, b., Drenth, J. & McIntyre, L. (2004). Diversification of Australian sorghum using wild relatives, Posters: Genetics: Monocots, Proceedings of the Australian Society of Agronomy. Available online at: https://www.agronomyaustraliaproceedings.org/images/sampledata/2004/poster/3/3/1/986_jordand.pdf, Accessed 14th May 2025.
26. Li, W.F., Zhang, R.Y., Huang, Y.K., Pu, C.H., Yin, J., Cang, X.Y., Shan, H.L., Wang, X.Y. & Luo, Z.M. (2018). Loss of cane and sugar yield resulting from *Ceratovacuna lanigera* Zehntner damage in cane-growing regions in China, Bull Entomol Res., 108(1):125-129. doi: 10.1017/S0007485317000608.
27. Magarey, R. (2019). Field Guide: Diseases of Australian Sugarcane, Sugar Research Australia, ISBN: 978-0-949678-43-0.
28. Martins, D. A., Jakelaitis, A., Cardoso, I. S., Costa, A. C., & De Fátima Sales, J. (2016). Growth and physiological characteristics of the weed false johnsongrass (*Sorghum arundinaceum* (Desv.) Stapf). *Revista CERES*, *63*(1), 16–24. https://doi.org/10.1590/0034-737x201663010003.
29. Maryono, T., Widiastuti, A., Murti, R.H. et al. (2020). Identification and Characterization of the Causal Agent of Sugarcane Root and Basal Stem Rot in South Sumatra, Indonesia. *Sugar Tech* 22, 105–111. https://doi.org/10.1007/s12355-019-00749-2.
30. Naidu, M., Prakash, S.N. & Padayachi, B.V. (2016). Management of an isopteran pest, *Coptotermes gestroi*, in the Fiji sugar industry, *Proceedings of the International Society of Sugar Cane Technologists,* Volume 29, 1278-1282. Available online at: https://srif.net.fj/assets/files/MNaiduManagementofanisopteranpest-Coptotermesgestroi-intheFijisugarindustry.pdf.
31. O'Sullivan, D. (2013). Pasture management for South East Queensland, SEQ Catchments and Queensland Government Department of Agriculture, Fisheries and Forestry.
32. Queensland Government (2021). General biosecurity obligation, Available online at: https://www.dpi.qld.gov.au/business-priorities/biosecurity/policy-legislation-regulation/biosecurity-act-2014/general-biosecurity-obligation, Accessed 10th October 2025.
33. Rao, G.P., Madhupriya, Thorat, V., Manimekalai, R., Tiwari, A.K. & Yadav, A. (2017). A century progress of research on phytoplasma diseases in India, *Phytopathogenic Mollicutes*, Volume 7(1), 1-38, doi: 10.5958/2249-4677.2017.00001.9.
34. Roddee, J, Wangkeeree, J. & Hanboonsong, Y. (2024). Identification and Evaluation of Sugarcane Cultivars for Antixenosis Resistance to the Leafhopper *Yamatotettix flavovittatus* Matsumura (Hemiptera: Cicadellidae). *Plants*, 13(16):2299. https://doi.org/10.3390/plants13162299.
35. Rowe, R.C, & Powelson, M.L. (2002). Potato Early Dying: Management Challenges in a Changing Production Environment, *Plant Disease*, 86(11), 1184-1193. https://doi.org/10.1094/pdis.2002.86.11.1184.
36. Sampson, M.A. & Kumar, R. (1985). Life history, development and behaviour of *Eldana saccharina* Walker on sugarcane in Southern Ghana, *Insect Sci. Applic.*, Volume 6, No. 2, 135-143. doi:10.1017/S1742758400006512.
37. Simon, B.K. (2010). *Sorghum arundinaceum*, *AusGrass2*: *Grasses of Australia*. Available online at: https://ausgrass2.myspecies.info/content/sorghum-arundinaceum, Accessed 14th May 2025.
38. South African Sugarcane Research Institute (2005). Guidelines and Recommendations for Eldana Control in the South African Sugar Industry, South African Sugarcane Research Institute. Available online at: https://sasri.org.za/wp-content/uploads/Sugarcane-Farming/Publications/eldana-manual.pdf, Accessed 13th May 2025.
39. Srikanth, J., Jayanthi, R., & Salin, K. (2014). Sugarcane root borer *Polyocha depressella* swinhoe: An overview. *Journal of Sugarcane Research*, *4*(2), 1–20. https://www.researchgate.net/profile/Srikanth_J/publication/280806026_SUGARCANE_ROOT_BORER_POLYOCHA_DEPRESSELLA_SWINHOE_AN_OVERVIEW/links/55c7f04b08aeb9756746e66d.pdf.
40. SRA (n.d.). *Pachymetra* and Nematodes sampling procedure, Sugar Research Australia, Page 1.
41. SRA (2014). Managing nematodes in sugarcane production: Burdekin, Information Sheet: IS14027, Available online at: https://sugarresearch.com.au/wp-content/uploads/2017/02/Managing-Nematodes-in-Sugarcane-Production-Burdekin-IS14027.pdf, Accessed 29th May 2025.
42. SRA (2021). Ratoon Stunting Disease. Available online at: https://sugarresearch.com.au/wp-content/uploads/2025/04/RSD-Info-Sheet_2021_May-2021.pdf, Accessed 29th May 2025.
43. SRA (2022). Sugarcane Mosaic. Available online at: https://sugarresearch.com.au/wp-content/uploads/2025/04/Mosaic_2022.pdf, Accessed 12th May 2025.
44. SRA (2022b). Nematodes in Sugarcane, Sugar Research Australia. Available online at: https://sugarresearch.com.au/wp-content/uploads/2025/04/Nematodes-in-sugarcane.pdf, Accessed 29th May 2025.
45. SRA (2024). Xylem Extract Collection Protocol 2024, SRA RSD Diagnostic Laboratory, Pages 1-4.
46. SRA (2025a). About SRA. Available online at: https://sugarresearch.com.au/about-sra/, Accessed 7th March 2025.
47. SRA (2025b). Varieties. Available online at: https://sugarresearch.com.au/growers/varieties/, Accessed 7th March 2025.

48. SRA (2025c). *Pachymetra* Root Rot. Available online at: https://sugarresearch.com.au/diseases/pachymetra-root-rot/, Accessed 12th May 2025.
49. SRA (2025d). *Pachmetra* Root Rot, Information Sheet, IS13005, Available online at: https://sugarresearch.com.au/wp-content/uploads/2025/04/Pachymetra-root-rot-IS13005.pdf, Accessed 12th May 2025.
50. SRA (2025e). Leaf Sheath Biopsy (LSB) Collection Protocol 2025, SRA RSD Diagnostic Laboratory, Pages 1-5.
51. SRA (2025f). Ratoon Stunting Disease. Available online at: https://sugarresearch.com.au/diseases/ratoon-stunting-disease/, Accessed 29th May 2025.
52. State of Queensland (2024). Biosecurity Act 2014 (Current as at 26 April 2024). Available online at: https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2014-007, Accessed 12th May 2025.
53. Thein, M.M., Jamjanya, T., Kobori, Y. et al. (2012). Dispersal of the leafhoppers *Matsumuratettix hiroglyphicus* and *Yamatotettix flavovittatus* (Homoptera: Cicadellidae), vectors of sugarcane white leaf disease. *Appl Entomol Zool* 47, 255–262. https://doi.org/10.1007/s13355-012-0117-7.
54. Thompson, N. & Randles, J.W. (2001). The genome organisation and taxonomy of *Sugarcane striate mosaic associated virus*, *Archives of Virology*, 146: 1441-1451.
55. Tran, N.T., Teo, A.C., Thomas, J.E., Crew, K.S. & Geering, A.D.W. (2020). Sugarcane mosaic virus infects *Stenotaphrum secundatum* in Australia, *Australasian Plant Disease Notes*. https://doi.org/10.1007/s13314-020-00410-y.
56. University of Delaware, Planthoppers of North America. Available online at: https://sites.udel.edu/planthoppers/north-america/north-american-delphacidae/genus-perkinsiella-kirkaldy-1903/, Accessed 28th April 2025.
57. Uyi, O. (2020). *Mimosa diplotricha*: a review and synthesis of its problem and control options, CAB Reviews, 15, 014. doi: 10/1079/PAVSNNR202015014. Available online at: http://www.cabi.org/cabreviews.
58. Yadav, S., Patil, J. & Kanwar, R.S. (2018). The Role of Free-Living Nematode Population in the Organic Matter Recycling, *International Journal of Current Microbiology and Applied Sciences*, 7(6). https://doi.org/10.20546/ijcmas.2018.706.321.