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GRDC

GROUNDCOVER SUPPLEMENT

BIOSECURITY – A SHARED RESPONSIBILITY

STRONG BIOSECURITY UNDERPINS GRAIN INDUSTRY PROFITABILITY

Photo: GRDC

Callum Fletcher

By Callum Fletcher

GRDC manager biosecurity

GRDC deeply values the role that the national plant biosecurity systems play in ensuring the continued productivity, profitability and marketability of Australian grains.

In Australia, plant biosecurity is achieved through a coordinated network of government and industry organisations that work together to protect Australia at and beyond the border.

This system begins with the surveillance of emerging threats overseas, spanning all the way through to hygiene practices on individual farms. It includes contingency planning and the emergency responses needed to deal with an incursion.

This issue of the *GroundCover*™ *Supplement* is intended primarily as a snapshot of this crucial system, but it also provides an opportunity to meet the nation's key biosecurity players, both at the national and local level. Of special note are the state grains biosecurity officers (GBOs), who are highlighted on the back cover and whose work is the most directly relevant to on-farm biosecurity activities.

Importantly, this issue also stands as an invitation to all to renew our collective vigilance and awareness when it comes to reporting unusual pests, weeds and diseases.

As a major investor in research and development, GRDC plays a direct role in supporting the nation's plant biosecurity system.

We invest in the technological capabilities that boost incursion preparedness – especially regarding surveillance and the diagnostics needed during an emergency response.

Furthermore, research is conducted to help improve the control options available in the event of an incursion. This includes the deployment of chemical treatments – fungicides, pesticides or herbicides – or the pre-emptive development of genetic resistance.

These investments are already at work as industry faces off against three levels of threats:

- immediate threats from the likes of khapra beetle and fall armyworm that have arrived in some regions or are under eradication;
- looming threats, such as wheat blast as it encroaches ever closer to Australia; and
- the management of established threats, such as stripe and leaf rust.

At every level of threat, GRDC considers it vitally important that lessons are learned and shortfalls anticipated within a cycle of continuously improving biosecurity effectiveness. Well-targeted investment in research is essential to this process. So is communication and knowledge-sharing, which I intend to encourage strongly. As such, I look forward to the opportunities that GRDC extension activities offer to meet and talk with industry.

As a relative newcomer to GRDC, however, you might not yet have met me. I have taken over the role, which is exclusively focused on biosecurity matters, previously filled by Dr Jeevan Khurana. I bring to this position 20 years of experience in researching important pests and diseases of grains and horticultural crops, and extending this to industry. Most recently, that included working with government and research providers to improve biosecurity preparedness and responses for the vegetable industry.

I'm excited to start my tenure at GRDC with this *GroundCover*™ *Supplement* and I look forward to meeting growers in person to continue conversations started by the ensuing articles. □

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GRDC GRAINS RESEARCH & DEVELOPMENT CORPORATION

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COVER IMAGE: Biosecurity efforts to protect the grains industry include on-farm practices.

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Laying the foundations – a plan to guide grains biosecurity

The National Grains Biosecurity Plan is being reviewed to better protect grain growers from the increasing threat of exotic pest incursions

By Stuart Kearns

National manager for preparedness and RD&E, Plant Health Australia

Photo: Shutterstock

A healthy wheat field ready for harvest.

A new biosecurity plan for the Australian grains industry is under development to lay the foundation for a stronger biosecurity system and a more resilient industry. The plan is being prepared by Plant Health Australia (PHA) in partnership with Grain Producers Australia (GPA) and with GRDC investment. Valuable input is also coming from biosecurity and crop protection experts from state and Commonwealth departments of agriculture.

As Australia faces significant and evolving threats from exotic pests and diseases, PHA remains focused on strengthening partnerships. This entails government and industry working collaboratively to identify, prioritise and manage key risks and drive the development of a structured and practical biosecurity plan.

This plan will provide a framework to identify our priorities, increase preparedness and better defend against biosecurity incidents.

It also becomes a point of reference for industry to renew and coordinate activities that improve biosecurity.

Finally, the plan provides a platform for industry and government to outline their commitments with regard to coordinating:

- risk assessment;
- surveillance;
- diagnostics;
- emergency response preparedness;
- training needs; and
- awareness raising.

THE STAKES

Controlling plant pests, which includes invertebrate pests and diseases, costs the Australian grains industry more than $1.7 billion per year. This includes costs related to managing crop diseases ($1.4 billion a year) and the control of invertebrate pests, including associated crop losses to invertebrate pests ($360 million a year). When this is combined with the $3.3 billion cost of controlling weeds and managing herbicide resistance, the grains industry spends more than $5 billion per year on crop protection.

New incursions of pests and diseases can add to these costs by affecting yield, quality and market access.

GPA chair and Western Australian grain producer Barry Large says strengthening biosecurity protections for growers is a high priority for GPA. "The Australian grains industry needs tougher, preventive biosecurity measures," he says. "The last thing we want is a new exotic pest that puts everyone at risk of suffering serious economic and social devastation."

THE THREATS

More than 1400 exotic plant diseases and invertebrate pests have been identified as exotic threats to the grains industry's 25 leviable crops. PHA is working with industry to prioritise these threats and produce a list of the highest-priority exotic pests of most concern for production and market access.

At the top of the list will be those pests that have a high entry, establishment and spread potential as well as the highest economic impact. The plan will summarise the mitigation and surveillance activities being undertaken.

It will also compile a list of additional resources already developed for pests relevant to the grains industry, including:

- contingency plans;
- fact sheets; and
- diagnostic protocols.

This will enable industry to identify any gaps and help prioritise specific actions as part of its implementation.

Once completed, the revised plan will provide government regulators and industry leaders with a systematic way to identify and prioritise exotic grain pests and diseases of most concern. The aim is to help protect Australia's multibillion-dollar grains industry today, tomorrow and into the future. ☐

More information: Stuart Kearns, skearns@phau.com.au

Find out more about implementing biosecurity measures on your property by visiting grainsbiosecurity.com.au

What happens in a pest incursion?

The detection of emergency plant pests triggers a well-defined response

By Jeff Russell

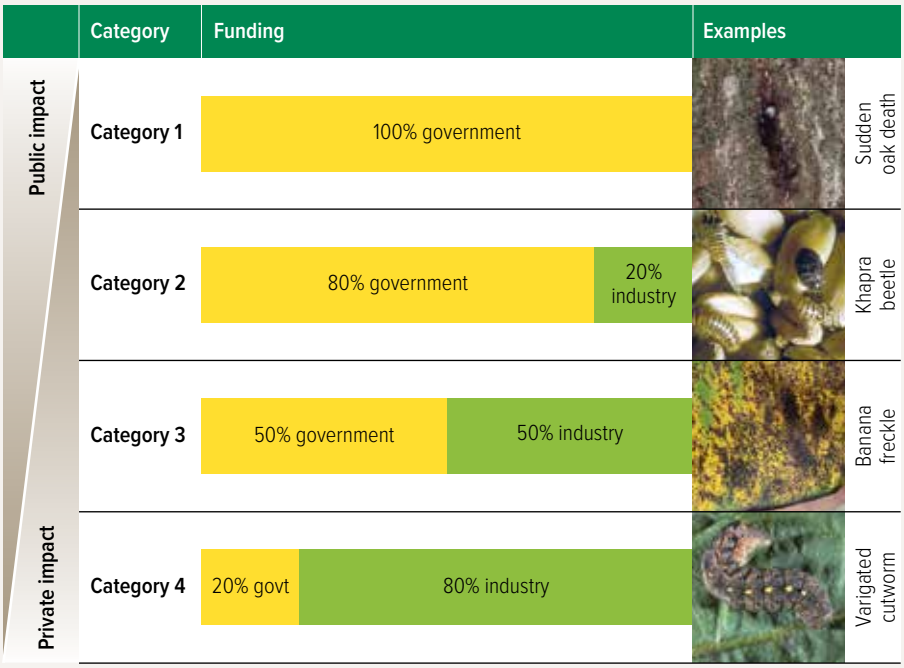
WA grains biosecurity officer

Have you ever wondered what goes on behind the scenes of biosecurity when a new pest is found in Australia?

Plant pests yet to appear in Australia are called exotic plant pests, also known as emergency plant pests or EPPs for short. These come knocking on Australia's door from time to time and, occasionally, one may gain entry. A recent example would be fall armyworm, which was detected in Australia in February 2020.

In anticipation of plant pest incursions, an Emergency Plant Pest Response Deed (EPPRD) – commonly known as the 'Deed' – was negotiated by Australian governments, plant industry organisations and Plant Health Australia (PHA) over several years, coming into effect in 2005. PHA is the custodian of the Deed and collaborates with signatories to keep it contemporary and support its implementation.

Figure 1: Pest categories of the Emergency Plant Pest Response Deed (EPPRD).



Source: Plant Health Australia

CATEGORISING THE THREAT

Under the Deed, EPPs are classified into four categories (see Figure 1) and these are captured in Schedule 13 of the Deed. Currently, there are no EPPs in Category 1 that affect the grains industry.

Classification is based on the public/private benefit of eradication of the EPP, with the distinction used to decide how costs are shared between the governments (federal, state and territory) and the affected plant industries.

Should there be a funded response to an uncategorised plant pest believed to be an EPP, then the 'default' category is applied pending categorisation. Category 1 EPPs have high environmental or human health impacts, so governments share the costs among themselves, while for Category 4 pests, industry as the primary beneficiary picks up the majority of the costs.

The system is intended to act as an insurance policy for the plant industries. It provides funds through a predetermined cost-sharing arrangement, makes resources available with minimal delay, provides the necessary support structures within governments and an agreed plan of action with industry.

A STAGED RESPONSE

Time is of the essence when a suspected EPP is discovered. The sooner a suspected EPP is reported, the faster it can be identified and, hopefully, successfully eradicated. The key steps taken to manage an incursion are shown in Figure 2. The Exotic Plant Pest hotline (1800 084 881) should be used to report suspect plant pests.

The hotline will alert specialist diagnosticians in the relevant state or territory to inspect samples and identify the pest and determine if this is an EPP. If it is an EPP, the expert will inform the state/territory chief plant health officer, who will inform the Australian chief plant protection officer (ACPPO).

Once a suspected EPP is reported to the ACPPO, the affected parties from government and industry, who are signatories to the Deed, and PHA will be notified. The ACCPO will convene a meeting of the Consultative Committee on Emergency Plant Pests (CCEPP).

If both the potential spread and impact of the pest are considered potentially serious, then the relevant state or territory agriculture department may adopt precautionary measures where the pest was found. Depending on the pest, these might include interim control or containment measures such as:

- restriction of operations in the area;
- removing people, vehicles and machinery from the area to conduct disinfection; and
- restricted access to the area.

The lead agency will develop a response plan and present it to the CCEPP. The CCEPP will make a recommendation to the National Management Group (NMG) based on the EPP status and feasibility of eradication. The NMP may approve a response plan and national cost-sharing

ACRONYMS

ACCPO – Australian chief plant protection officer

CCEPP – Consultative Committee on Emergency Plant Pests

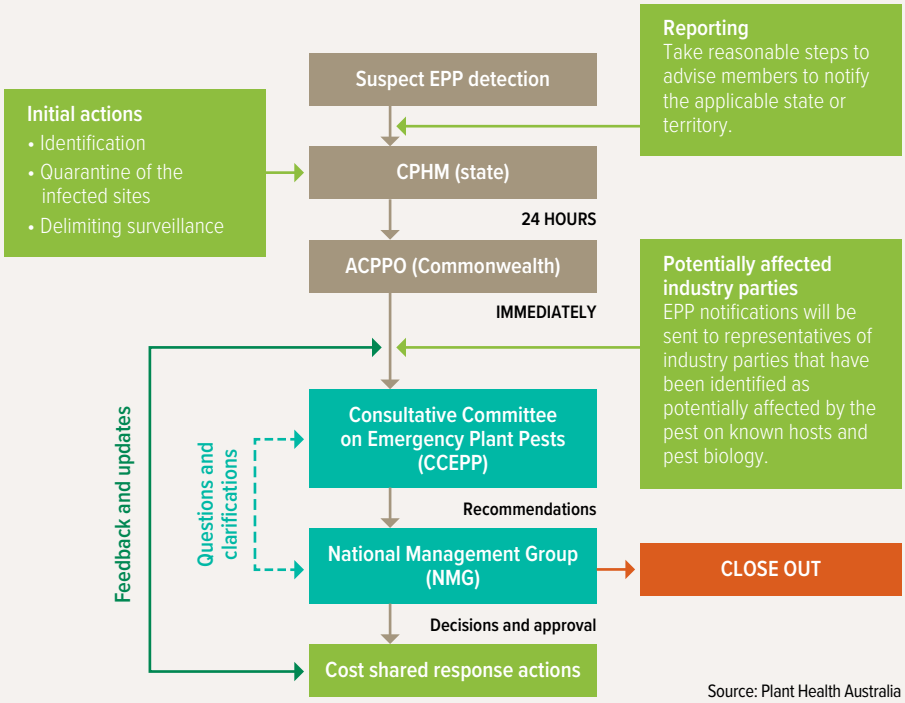
CPHM – chief plant health manager

EPP – exotic plant pest

EPPRD – Emergency Plant Pest Response Deed

NMG – National Management Group

Figure 2: Overview of an emergency plant pest (EPP) response.



Source: Plant Health Australia

arrangements to fund the response.

To determine the feasibility of eradication, the CCEPP considers:

- the technical feasibility, including the likelihood of a successful eradication; and
- the cost–benefit of eradication.

During the investigation and alert phase, the affected area may be placed under quarantine or pest control notices issued until a decision is made by the NMG on whether to eradicate or control the pest. Efforts then enter the operational phase until eradication has been achieved or a transition to management is required. □

More information: Jeff Russell, jeff.russell@dpird.wa.gov.au; Plant Health Australia, www.planthealthaustralia.com.au/biosecurity/emergency-plant-pest-response-deed

EMERGENCY-USE CHEMICALS

GRDC has multiple investments to improve exotic plant pest incursion preparedness. One key focus is obtaining emergency and minor-use permits of chemicals that might be needed to control future incursions

By Gordon Cumming

Manager chemical regulation, GRDC

Should a new plant pest enter Australia, one of the first steps in either an eradication or a management program is the identification of control methods for that pest.

In many instances, control might be best achieved using chemicals. However, even chemicals used to eradicate or control exotic plant pests (EPPs) must be registered or be under permit for use through the Australian Pesticide and Veterinary Medicine Authority (APVMA).

That means emergency or minor-use permits are often required to ensure that chemicals are available in the first stages of an incursion response.

Criteria for selecting chemicals during a response to a particular EPP include:

- chemicals that are used to control the pest overseas, or have been shown to be highly effective at controlling the pest in the scientific literature;
- chemicals that are registered in Australia; and
- chemicals registered in Australia for use in a similar way and at a similar rate on host crops.

Chemicals already registered in Australia on the host crop are likely to be readily available, acceptable to overseas markets and also meet APVMA requirements relating to human and environmental health.

Recent exotic pest incursions, most notably the presence of Russian wheat aphid and fall armyworm, highlight the need for development of pre-emptive control measures and the appropriate implementation of management plans when incursions do occur. □

Photo: MA Nash

Russian wheat aphid.

More information: Gordon Cumming, gordon.cumming@grdc.com.au

Fall armyworm: steps and lessons

Fall armyworm is a highly invasive pest native to the Americas. It was first detected in Africa in 2016 and has subsequently expanded its distribution throughout Africa, the Middle East and Asia, with the first detections reported in tropical regions of northern Australia in early 2020

By Lisa Bird

NSW Department of Primary Industries

The arrival of fall armyworm (FAW) in 2020 is a timely illustration of the importance of being forewarned and forearmed.

Australia's biosecurity system at the Commonwealth, state and territory levels was prepared for the arrival of FAW and this allowed immediate actions to be taken, including;

- issuing of emergency permits for FAW control options;
- making available FAW identification guides;
- hosting webinars and training events to update industry;
- rapidly putting into place networks of pheromone traps for early detection of the FAW moth in new regions to share information; and
- making diagnostic services available to confirm moth and larvae identifications.

An important step taken by GRDC was to invest in the development of a 'continuity plan' for FAW. This plan collated information about the pest's biology, behaviour and management in similar crops and environments overseas. This information guided actions until further local research could be completed.

Since FAW arrived in Australia, the northern tropics have experienced continuous infestations of maize crops. Crop growth rates and yield are affected, as well as grain quality due to secondary infections entering the cobs.

Seasonal migrations are likely to result in annual southerly distribution of FAW into areas of grain production in southern Queensland, southern Western Australia, New South Wales, Victoria and, in some years, South Australia and Tasmania.

FAW is an extremely challenging pest to manage with insecticides. This is due to the frequency of egg lays and concealed feeding sites of larvae (in the whorl, silks and cobs). This renders chemical control only partially effective. To optimise the cost of insecticide applications, surveillance using moth traps and in-field monitoring for larvae and crop damage is critical as it allows targeting of the most vulnerable life stages.

Another challenging aspect is FAW's strong track record of developing insecticide resistance. Global reliance on chemical control resulted in resistance to at least 29 insecticide active ingredients in six mode-of-action groups.

In Australia, toxicity profiles of insecticide groups that are available for FAW control have been generated to help develop sustainable management strategies. This work was undertaken by the NSW Department of Primary Industries (DPI) in partnership with the Queensland Department of Agriculture and Fisheries (DAF) and the Western Australian Department of Primary Industries and Regional Development (DPIRD), with support from the Cotton Research and Development Corporation (CRDC).

Over the past two seasons, this information assisted decision-making by growers managing outbreaks and has promoted the recommended thresholds and integrated pest management (IPM) practices outlined in the Fall Armyworm Continuity Plan (link below).

This research also resulted in the development of diagnostic tests for detection of resistance in FAW to IPM-compatible insecticides. Ongoing resistance surveillance will be important to preserve the activity of selective insecticides (with low non-target impacts) and enhance IPM in grains.

These testing procedures will be implemented in a new collaboration between DAF and DPI to deliver resistance surveillance in key crop production regions of Queensland. The results from the project will help to guide further research by public and private agencies to develop and improve FAW management strategies. □

Photo: John C. French Sr

Fall armyworm.

GRDC Codes FMC2111-001CRX, FMC2111-002CRX, FMC2111-003CRX, DAQ2107-002RTX, CRD2005-002OPX, CES2004-003RTX, CSP2003-008RTX

More information: Lisa Bird, lisa.bird@dpi.nsw.gov.au;

Fall armyworm continuity plan: https://grdc.com.au/resources-and-publications/resources/fall-armyworm

PHEROMONE AND LURES

A collaborative project led by Macquarie University, with investment from Hort Innovation Australia and GRDC, aims to optimise pheromone blends and reduce by-catch in the lures used in moth surveillance.

Increased lure specificity will reduce the requirement for diagnostic services and could provide a pathway to fully transition surveillance to industry in the longer term.

This project has a national focus and involves collaborators at New South Wales Department of Primary Industries, Queensland Department of Agriculture and Fisheries, Western Australian Department of Primary Industries and Regional Development, the Northern Territory Department of Agriculture and Fisheries and CSIRO.

Three risk keys: research, resistance, reporting

Almost, if not all, Australian wheat and barley cultivars have at least some resistance to each of the three rust diseases. This resistance saves the wheat and barley industries an estimated $1.1 billion per year

By Professor Robert F. Park, Dr Yi Ding, Dr Mumta Chhetri

University of Sydney, Plant Breeding Institute Cobbitty

There are three rust diseases that afflict wheat:

- stripe rust, caused by *Puccinia striiformis* f. sp. *tritici* – abbreviated to *Pst*;
- leaf rust, caused by *Puccinia triticina*; and
- stem rust, caused by *Puccinia graminis* f. sp. *tritici* – abbreviated to *Pgt*.

Both stem rust and leaf rust have been present in Australia since at least the time that Europeans arrived, and possibly before then on native grass species. Stripe rust, on the other hand, was first detected in Australia in 1979.

Variants exist within each of these three rust pathogens, known as pathotypes (also called strains or races). These pathotypes have arisen locally via processes that include random genetic mutation. On occasion, new pathotypes have been introduced into Australia from overseas.

While resistance breeding has been effective in dealing with new pathotypes that arose locally, this approach proved less effective with pathotype incursions of exotic origin.

For example, the last incursions of stem rust occurred in 1969 when two new pathotypes appeared, seemingly carried here on high-altitude winds from central Africa.

Since the mid-1970s, however, stem rust of wheat has been very well controlled by genetic resistance. Key to this success was breeders' ability to focus on incorporating effective stem rust resistance in local cultivars in the absence of exotic isolates finding their way into Australia.

Improving the genetic basis of resistance to stem rust in the absence of exotic incursions has resulted in a huge reduction in the incidence of this damaging pathogen, in turn reducing its evolutionary potential and extending the 'use-by date' on resistance genes.

Stem rust is now hard to find in Australian wheat crops. In fact, it was not detected in any Australian wheat crop in 2021.

In contrast to stem rust, we have detected six incursions of exotic isolates of leaf rust and four of stripe rust, all of which have affected rust resistance pre-breeding and breeding.

The most obvious of these impacts in the past 20 years relate to stripe rust. Extensive epidemics of stripe rust have occurred following incursions in 1979, 2002, 2017 and 2018. The 2017 and 2018 incursions are responsible for the stripe rust seen in eastern Australia in 2020 and 2021.

Researchers within the Australian Cereal Rust Control Program (a GRDC investment) maintain strong international links with scientists engaged in researching new and emerging cereal rust threats.

This has allowed us to send Australian cereal germplasm overseas for testing against the most important rust threats in order to increase our preparedness should they manage to find their way here.

These threats include several African pathotypes of stem rust (such as Ug99) and the true stripe rust pathogen of barley.

Understanding the rust pathotypes prevailing across Australia and the risk posed by new and emerging rust threats around the world is fundamental to the effective use of genetic resistance to protect cereal crops.

Should you find any rust in a cereal crop, please forward freshly collected rust samples – in paper only – to the Australian Cereal Rust Survey, University of Sydney, Australian Rust Survey, Reply Paid 88076, Narellan, NSW 2567. □

Photo: Robert Park

Leaf rust on wheat.

Photo: Robert Park

Stripe rust on wheat.

GRDC Codes UOS1707-003RTX, UOS1801-001RTX, UOS1801-004RTX

More information: Robert Park, robert.park@sydney.edu.au;

Australian Cereal Rust Survey 2021 Sample Map – Google My Maps: google.com/maps/d/viewer?mid=17k2hAS9ProHR8c9DiAPlWJEUeoys5WLM&ll=-33.38254078173618%2C133.29536135&z=4;

The Cereal Rust Lab Cereal Rust Reports: www.sydney.edu.au/science/our-research/research-areas/life-and-environmental-sciences/cereal-rust-research/rust-reports.html;

https://nvt.grdc.com.au/nvt-disease-ratings

Where to now for wheat blast disease?

Wheat blast is a devastating disease with limited control options and, while the disease is not found in Australia, it presents a global risk to wheat production and is spreading around the world

By Jeff Russell

WA grains biosecurity officer

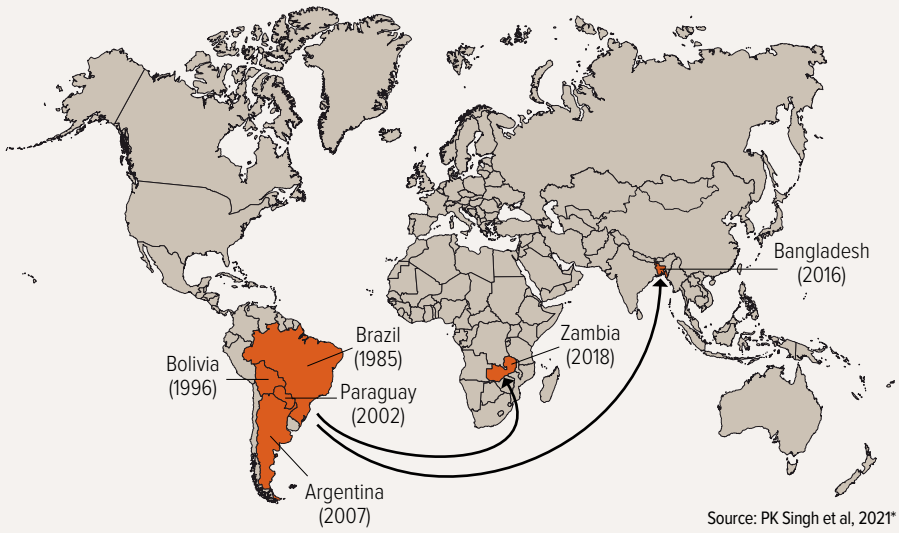
Wheat blast is a fast-acting, severe disease of wheat, caused by the plant fungus *Magnaporthe oryzae* pathotype *Triticum* (MoT), which causes bleaching of the heads. It lowers yields and can cause complete yield loss when conditions are favourable to the fungus.

The disease poses an increasing threat to grain growing regions in warm, humid and wet environments.

First detected in Brazil in 1985, it spread quickly through South America, infecting about three million hectares of wheat within a decade. In 2016 it arrived in Bangladesh and, by 2020, it was confirmed in Africa, in crops in Zambia.

In both cases, its spread has been attributed to transport through the international wheat trade (see Figure 1). It now threatens wheat production in South-East Asia and southern Africa, with possible further movement to other regions on these two continents.

Figure 1: Spread of wheat blast from South America to South-East Asia and Africa.



Source: PK Singh et al, 2021*

IMPACTS AND CONTROL OPTIONS

The disease predominantly affects wheat heads that become fully or partially bleached and results in poor-quality, small, shrivelled grains with a reduced test weight.

Maximum yield damage happens when head infection occurs during anthesis or early grain filling and/or when the fungus attacks at the base of the head, thereby restricting the development of the grains and killing the head completely.

Management of wheat blast using fungicides is possible, but they have varying effectiveness. Fortunately, certain seed treatments when used with foliar sprays have had a degree of success overseas.

THE SEARCH FOR RESISTANT WHEAT VARIETIES

The use of resistant genes in breeding programs is considered the best plan of defence in Australia and the most effective means to tackle the wheat blast emerging in South America and Asia.

GRDC invested with the Australian National University (ANU) to assess the performance of some Australian wheat varieties. This work showed that, serendipitously, around a third of current Australian varieties had a level of resistance to wheat blast. While Australian conditions are less conducive to wheat blast, an outbreak would significantly affect wheat yields in affected areas (see GRDC *GroundCover*™ Issue 132, Jan-Feb 2018).

Subsequently, a project was launched by Dr Eric Huttner, the research program manager for crops at the Australian Centre for International Agricultural Research (ACIAR). The project aims to identify and map (at the gene level) new sources of wheat blast resistance and make the material available to breed resistant wheat varieties.

LIMITED SOURCES OF RESISTANCE

While genetic-based resistance is considered the best and most environmentally friendly blast management option, sources of resistance in the germplasms screened so far are still limited.

To date, 10 genes and a chromosomal segment have been identified as sources of resistance to wheat blast fungus. These resistance genes could be used in breeding programs to generate a high degree of resistance against wheat blast. □

GRDC Code AAA00006

More information: Jeff Russell, jeff.russell@dpird.wa.gov.au;

ACIAR, 2021. 'Managing wheat blast in Bangladesh', https://www.aciar.gov.au/project/crop-2020-165

DIAGNOSTICS OF WHEAT BLAST

What does wheat blast look like?

Wheat blast can infect all above-ground parts of the wheat plant. This is often first seen as a scattered patch in the crop. Then, with time, the patches converge and the whole paddock becomes severely damaged. Heads in the infected paddock become a silvery colour while the leaves below may remain green. Early symptoms include the upper stems and leaves being discoloured, with dark brown, eye-shaped lesions on the leaves. Wheat blast can shrivel and deform the grain in less than a week from the first symptoms.

Photo: C. Cruz, Purdue University

Wheat head affected by wheat blast.

What can it be confused with?

Wheat blast sometimes can be wrongly diagnosed because it may look similar to Fusarium head blight (FHB) and spot blotch, caused by *Fusarium graminearum* and *Bipolaris sorokiniana*, respectively. The white heads can also be similar to crown rot. It could also be mistaken for drought stress and deficiencies of micronutrients, such as copper.

Photo: C. Cruz, Purdue University

Typical eye-shaped lesions on wheat leaf.

What should I look for?

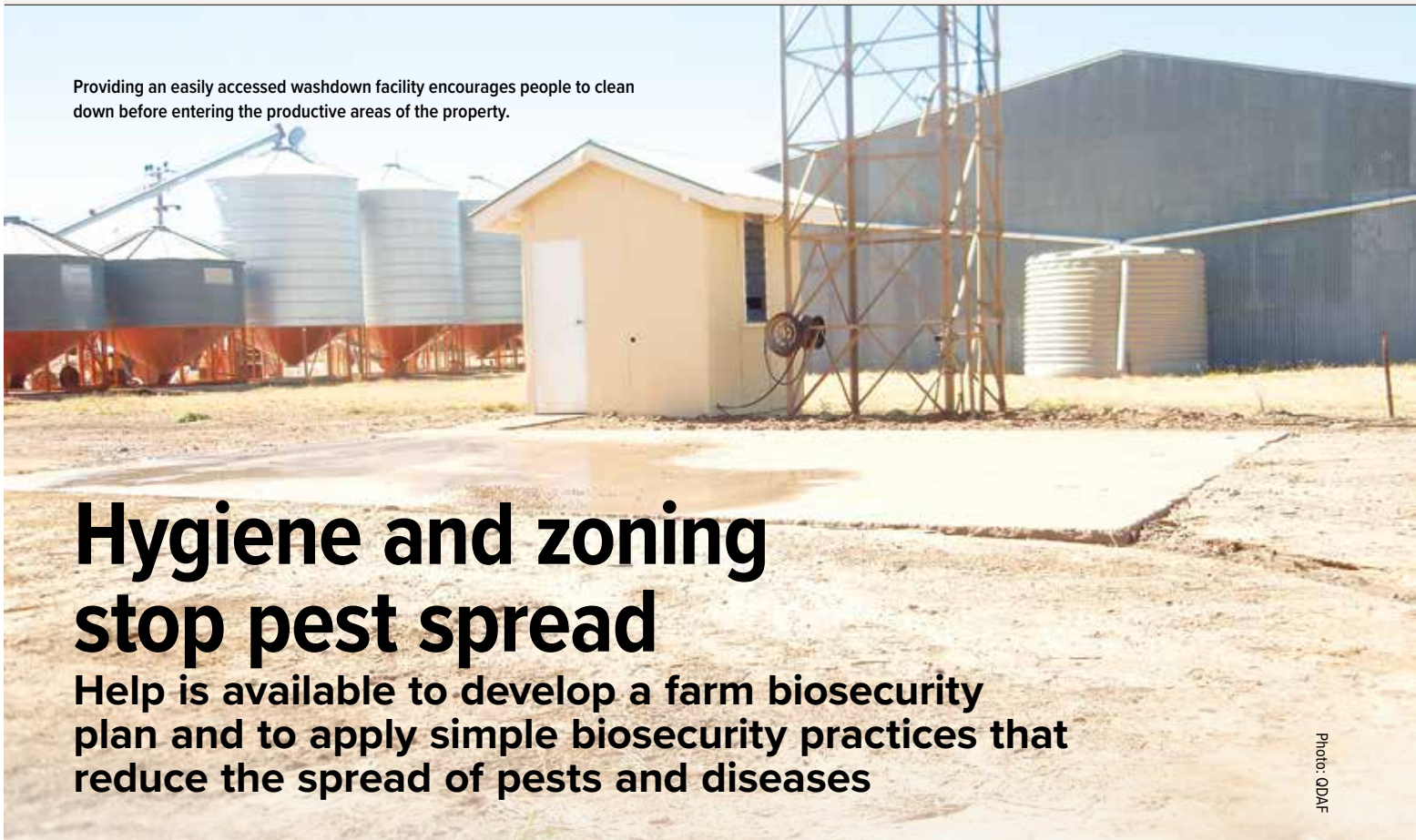
A key visual symptom is patches of bleaching heads in paddocks. Wheat blast infects all above-ground plant parts and causes leaf lesions and head blight. Seeds in infected heads are shrivelled, small and low quality. In severely diseased wheat heads, the seed may be absent. The disease takes hold in warmer regions (18˚C to 30˚C) with high humidity (over 80 per cent).

Photo: C. Cruz, Purdue University

A severely blast-affected wheat field, with many affected heads.

More information: **Plant Heath Australia fact sheet, grainsbiosecurity.com.au/resources/wheat-blast**

* Singh PK et al, 2021. Wheat blast: A disease spreading by intercontinental jumps and its management strategies. *Frontiers in Plant Science*, www.frontiersin.org; July 2021, Volume 12, Article 710707.



Providing an easily accessed washdown facility encourages people to clean down before entering the productive areas of the property.

Photo: QDAF

Hygiene and zoning stop pest spread

Help is available to develop a farm biosecurity plan and to apply simple biosecurity practices that reduce the spread of pests and diseases

By Jim Moran

Victorian grains biosecurity officer

Annually, more than $5 billion is spent by Australian grain growers on controlling weeds, plant diseases and invertebrate pests. Implementing good farm biosecurity practices is a proven way to take control and reduce these costs.

Managing the movement of people, vehicles and machinery on the farm is one of the most effective ways to reduce the spread of pests and diseases. People can carry weeds, pests and diseases onto and around your property on vehicles, equipment or clothing without realising it.

Restricting movement and adopting good hygiene practices, such as ensuring cleanliness of people and vehicles, are core practices to reduce the spread. However, it is not practical or possible to stop all vehicles or people from coming on to the farm, and clean-downs can be costly and time-consuming.

This is where property zoning as part of a farm biosecurity plan can help to reduce the spread of pests and maintain efficient farm operations.

Property zoning is where you divide up your farm based on the level of biosecurity activity required to minimise the possibility of pests and diseases entering and establishing on your property. It is a powerful tool to protect your property from weeds, pests and diseases entering from another property via people, vehicles, machinery, fodder, livestock and wildlife.

In most cases, there will be three distinct zones to a farm:

- Zone one, **the access zone**;
- Zone two, **the separation zone**; and
- Zone three, the **farming (production) zone**.

Each zone will have a different level of access and set of hygiene protocols. These are based on the level of risk that access could result in pest introductions and the ability to undertake risk reduction activities within the zone. Every farm is different, so it's useful to start planning your biosecurity farm zones with a map of your property.

ACCESS ZONE

The access zone is considered low risk and includes the home residence and often the sheds or office if there is no contact with crops or produce. Visitors, staff and deliveries can come and go, with no need to clean their vehicles because they are parked in designated areas near the farm entrance, office or house. Everything arriving here must be considered 'dirty' and unable to proceed to another zone without biosecurity and hygiene activities.

SEPARATION ZONE

Zone two, the separation zone, often includes the area around sheds, silos or other grain storages where trucks pick up crop products or livestock, food, fertiliser or fuel deliveries. The major roads on the property might also be included in the separation zone as they provide access to different areas on-farm and might need to be used by emergency vehicles.

It is often a good idea to have a clean-down facility located in zone two for vehicles, machinery and equipment that need to access the productive areas (zone three).

There could be significant vehicle and people movement in this zone, so it is important to consider ways to reduce the risk of a new pest establishing. This can be achieved by ensuring that the area is well gravelled and kept clean of weeds. It should also be inspected regularly for new pests and weeds so they can then be controlled before they establish on the farm.

PRODUCTION ZONE

Zone three is the all-important farming (production) zone and is the most important area to protect. Stricter hygiene protocols are important for these parts of the property.

Where possible, access to zone three is restricted to designated vehicles and farming equipment. Prior to entry to this zone, equipment from outside the property should be inspected and cleaned of any dirt, plant matter and animal faeces that could harbour all manner of biosecurity threats. Important places to inspect include the tyres, radiator grille and around the chassis. If not clean, they should be directed to a clean-down facility before proceeding further.

It is also a good idea to interview anybody tasked with taking themselves and their machinery or vehicles into your production zone for essential work. Ask them about the previous properties visited, the pest and disease burdens, their efforts to clean down prior to arriving at your property and what assurances they can give that this was done. Alternatively, you can provide them with a vehicle to access the property.

However, it is not just about the vehicles and equipment – the visitors themselves could also be a pathway for weeds, pests and diseases to enter the farm. International visitors or people recently returned from overseas must not be wearing shoes or clothing (including hats or caps) that were recently worn overseas unless they have been carefully cleaned and disinfected.

BIOSECURITY PLAN

Once the zoning of the farm has been determined, it is important to have a plan for telling people about your requirements. Biosecurity gate signs provide an immediate signal to all visitors, contractors, workers and family that you have biosecurity and hygiene protocols in place and want them observed.

It will have to be followed up by advice on what the requirements are for each zone, which might also be communicated by further signs at checkpoints, training programs and routine compliance checks.

You probably already do this in an informal way, but it is a simple matter to make it a more formal system to protect your livelihood.

So, sign up now to signal your commitment to biosecurity zoning with a biosecurity gate sign. It is a small step towards the bigger goal of preventing the spread of pests, weeds and diseases on your property and protecting your livelihood.

New or replacement biosecurity gate signs are available free from the grains biosecurity officer in your state. They are supplied through grain grower levies, so you have already paid for them.

See the back cover for your state's grains biosecurity officer contact details. □

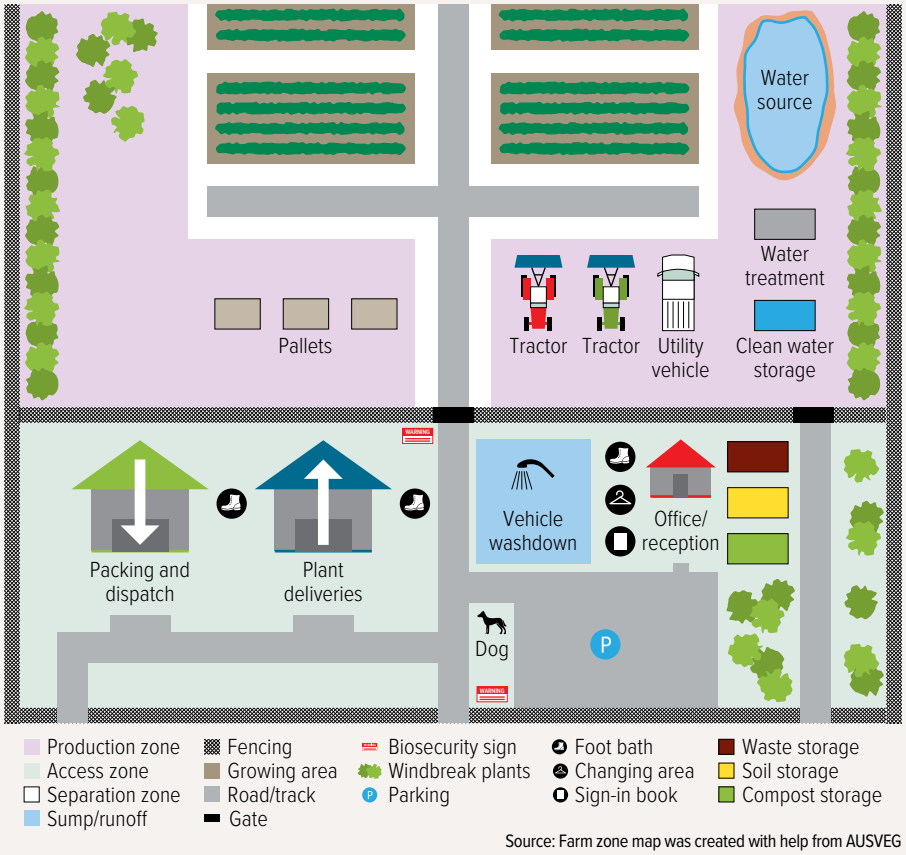
More information: Jim Moran, jim.moran@agriculture.vic.gov.au

See more about property zoning at farmbiosecurity.com.au/using-property-zoning-to-implement-biosecurity-on-farm

Photo: QDAF

Vehicle tyres and chassis are important areas to focus on when inspecting or cleaning down a vehicle.

Figure 1: Farm zones: example of best places to put features such as signs, parking and washdown areas.



Source: Farm zone map was created with help from AUSVEG

Multi-crop pests tackled on a coordinated front

Through better targeting and coordination of research priorities, members of the Plant Biosecurity Research Initiative ensure investment in biosecurity RD&E is efficiently applied against pests that damage multiple crops, such as the fall armyworm, khapra beetle and the brown marmorated stink bug

By Jo Luck

Program director, Plant Biosecurity Research Initiative

Photo: PBRI

The PBRI members and partner representatives discuss future collaboration opportunities at a PBRI planning meeting held in the Adelaide Hills on 13 May 2022. Pictured are Dr Ken Young, GRDC (second from left) and Dr Jo Luck, PBRI (sixth from left).

Many pests can damage multiple crops across multiple industries, necessitating a coordinated, national approach to control measures and research.

This need has been met with the Plant Biosecurity Research Initiative (PBRI), formed in 2017 to promote collaboration, coordination and co-investment in cross-sectoral plant biosecurity research.

The PBRI has 10 foundation members:

- AgriFutures Australia;
- Cotton Research and Development Corporation;
- Council of Rural Research and Development Corporations;
- Department of Agriculture, Fisheries and Forestry;
- Forest and Wood Products Australia;
- Grains Research and Development Corporation;
- Hort Innovation Australia Limited;
- Plant Health Australia (PHA);
- Sugar Research Australia Limited; and
- Wine Australia.

All 10 organisations are signatories to a collaboration agreement and representatives attend quarterly PBRI committee meetings.

A five-year strategy (2018–23) was developed by members to map out the cross-sectoral opportunities for co-investment.

Nineteen biosecurity research, development and extension (RD&E) projects have been contracted with a total value of about $52 million (cash and in-kind).

FOCUS AREA

The PBRI has six key focus areas, with projects underway in each area. Here are some examples in each category.

1 Preparedness

A series of nine podcast episodes on the impact and management of fall armyworm were released by the PBRI, produced with growers in mind. This PHA-led project features interviews with local growers and agronomists talking about their first-hand experience managing pests. It also includes information from leading Australian researchers on their latest findings and international experts who share their experience and learnings.

2 Diagnostics

Established in 2019, the GRDC-led project 'Boosting Diagnostic Capacity for Plant Production Industries' seeks to increase Australia's ability to detect, contain and eradicate plant pests and disease outbreaks. The project supports the development of new diagnostic tools, underpinned by effective communication and extension activities to raise awareness of these tools among diagnosticians and industry. These tools will assist in early, rapid and accurate detection of pests and diseases on-farm and allow swift and precise responses from industry.

3 Surveillance

The *iMapPESTS* project is a collaboration of government, industry and researchers working to develop a mobile cross-industry plant pest surveillance network. The aim is to provide information to primary producers and government on endemic, established, trade-sensitive or exotic pests. The project focuses on pest management, biosecurity and area freedom.

4 Partnerships

To extend the collaboration, the PBRI has formalised links with Better Border Biosecurity (B3) New Zealand, the European Plant Health Research Community (Euphresco) and the Australian Centre for International Agricultural Research, and, in November 2021, the PBRI also commenced a new partnership with the Plant Health Committee. The benefits of these partnerships have been increased research collaboration, new co-investment opportunities, the international exchange of expertise and the alignment of research investment to national and international biosecurity priorities.

Photo: PBRI

The Ritman Scholarship recipients receive their awards on the International Day of Plant Health on 12 May 2022 at the PBRI Symposium. Left to right: Rebecca Degnan (University of Queensland), Bianca Rodrigues-Jardim (La Trobe University), Jo Luck (PBRI), Tavish Eenjes (Australian National University) and Salome Wilson (Australian National University).

5 Cross-industry biosecurity extension

Prompted by the fall armyworm incursion in Australia, a new network – the Biosecurity Extension Community (BEC) – was created by the PBRI. This project is for extension experts working across plant industries and government. The aim is to increase the coordination of cross-sectoral biosecurity extension efforts.

So far, 110 members have joined from plant industry sectors – such as citrus, nursery, vegetables, forestry, grains, cotton, wine, melons, mangoes and protected cropping – private consultants, RDC extension groups, PHA and state governments. There have been four community meetings held so far, with a focus on learning from biosecurity incursions, sharing biosecurity knowledge and experience, and enhanced professional development for extension practitioners. The BEC has the collective aspiration of increasing the value of plant biosecurity along the supply chain.

6 PBRI events

The PBRI holds regular think-tank style workshops that focus on high-priority biosecurity issues. They include Australian and New Zealand researchers presenting solutions around a defined cross-sectoral priority area. The workshops have focused on shipping container hygiene, sustainable pest management, fall armyworm, biosecurity in the Pacific, surveillance and diagnostics technology. The aim is to identify new areas of research for collaboration and co-investment.

The second Plant Biosecurity Research Symposium was held in May at the National Wine Centre in Adelaide. The two-day symposium, sponsored by the Department of Agriculture, Fisheries and Forestry, included a program of plant biosecurity research, supported by the PBRI member organisations and partners. This event attracted more than 150 researchers and industry members and included a trans-Tasman research session and a partnership panel on enhanced international and national collaboration.

The inaugural Ritman Scholarship, supported by PBRI, was awarded to four PhD students for excellence in plant biosecurity. This travel scholarship enabled the students to attend the symposium to present their research and meet the Australian plant biosecurity community. □

More information: Jo Luck, jo.luck@horticulture.com.au

BOOSTING DIAGNOSTIC CAPACITY

By K'trie Coster

Rural R&D for profit (boosting diagnostics) project manager

When a new pest or disease arrives in Australia, our ability to contain and eradicate the pest depends on how rapidly we can accurately diagnose the problem. The 'Boosting Diagnostic Capacity for Plant Production Industries' program focuses on diagnostics for high-priority exotic pests in order to mitigate threats to production, trade and market access.

Twenty-nine new or revised and updated diagnostic tools are being developed that will greatly assist the early detection of exotic pests and diseases. Exotic pests and diseases – such as Khapra beetle, exotic nematodes, exotic *Begomoviruses*, *Fusarium oxysporum, Luteoviridae* and *Poleroviruses* – are all viable threats to the grains industry. New tools and extended knowledge on these potential threats will benefit grains industry across the spectrum.

More information: K'trie Coster, ktrie.coster@grdc.com.au

Surveillance around the country

All states and territories conduct a range of surveillance activities throughout the year. The following provides a snapshot of projects and programs underway

VICTORIA: THE CROPSAFE PROGRAM

By Kellyanne Harris

Program manager, Grains Industry and Digital Networks

CropSafe is Victoria's surveillance system for new pests and diseases across the grainbelt. During 2021, more than 200 agronomists inspected more than 1.5 million hectares of crops in Victoria as part of the program.

CropSafe's network of agronomists submit plant samples with unusual, unknown or potentially exotic symptoms during the year. Any suspicious samples are sent on to Crop Health Services for formal identification. Once a sample has been identified, agronomists are provided with a report detailing which diseases/pests were identified in the sample.

At the end of the year, the data collected provides a level of confidence that many exotic pests and diseases are not present in the Victorian grains industry.

CropSafe has been successful in detecting and supporting the identification and tracking of a range of exotic pests and diseases, including Russian wheat aphid spread during 2016 and fall armyworm during 2020-21.

Root lesion nematode in a vetch root.

Photo: Agriculture Victoria

Barley plant sample submitted to CropSafe with a foliar disease. Good sampling method was used and roots and leaves were able to be examined.

Photo: Agriculture Victoria

NSW: REGIONAL EXERCISES INCREASE BIOSECURITY FITNESS

By Kate Glastonbury

NSW grains biosecurity officer

In NSW, the Department of Primary Industries (DPI) is the lead agency for responding to plant pest incursions but it works closely with other agencies, such as the NSW Local Land Services (LLS), when an emergency response occurs. Regular training exercises simulating exotic plant pest incursions (and related surveillance activities) test their ability to work together and that their processes are constantly fit for purpose.

In the 2021-22 financial year, NSW DPI and LLS were able to complete three regional training exercises related to high-priority pests from the grains industry, one in the central-west and another in the north-west.

The third collaborative exercise was called operation 'snailed it' – a hybrid training exercise and surveillance collaboration completed by NSW DPI, Murray LLS and Riverina LLS in May 2022. In addition to increasing operational skills, data was gathered to support NSW claims for freedom from an exotic snail. Diagnostics of samples collected during the exercise confirmed that no exotic snails were found during the operation.

SOUTH AUSTRALIA: PLANT HEALTH SURVEILLANCE

By Shafiya Hussein

SA grains biosecurity officer

South Australia's Department of Primary Industries and Regions (PIRSA) conducts general and targeted surveillance for exotic pests and those already present in other parts of Australia.

This activity is undertaken in support of market access and to maximise the likelihood of successful eradication following any incursion.

South Australia collaborates with Plant Health Australia, the Australian Department of Agriculture, Fisheries and Forestry, industry and research bodies in these programs.

The Grains Farm Biosecurity Program (GFBP) is conducting surveillance for khapra beetle and phosphine-resistant grain storage insects in South Australia.

Other surveillance includes the following pests that are known to be in other states but are not currently in South Australia:

- polyphagous shot-hole borer (*Euwallacea fornicates*) – detrimental to fruit trees, nut trees and forestry industry; and
- tomato potato psyllid (*Bactericera cockerelli*) – detrimental to vegetable crops.

In addition, PIRSA participates in national programs, such as the National Bee Surveillance Program and the National Plant Health Surveillance Program, to ensure that it can detect and rapidly respond to any exotic pest incursions.

The efficacy of PIRSA's surveillance systems has been demonstrated in recent years through the early detection and successful eradication of pests such as giant pine scale (*Marchalina hellenica*), a pest of forestry and amenity trees.

WESTERN AUSTRALIA: BIOSECURITY BLITZES ENLIST CITIZEN SCIENTISTS

Adapted from an article by Samantha Scott, Department of Primary Industries and Regional Development (DPIRD)

The MyPestGuideReporter™ app is rapidly becoming the go-to tool for citizen science surveys for exotic insect pests. It was developed by the Western Australian Department of Primary Industries and Regional Development (DPIRD).

DPIRD regularly runs initiatives such as the Biosecurity Blitz and Pantry Blitz to raise awareness about damaging pests by asking participants to report using the MyPestGuide® app.

During the Pantry Blitz, sticky traps are sent to participants to place in their pantry for a short period of time to see what insects might be caught. The participants can use the smartphone-based app to photograph the trap, answer a couple of questions and immediately report what was found.

If anything unusual or suspicious is identified, samples can be sent in to DPIRD entomologists for further diagnostics.

Data collected from these apps support Australia's access to existing or new overseas trade markets and the collected data might help prove Australia's freedom from certain exotic pests.

For more information: mypestguide@dpird.wa.gov.au.

Photo: DPIRD WA

DPIRD triage officer Elisha Cassidy looks for pests on a Pantry Blitz trap through a microscope at the department to provide diagnostic identification of the insects trapped.

Photo: FAR Australia

Ramularia leaf spot on barley.

QUEENSLAND: CROP SURVEILLANCE

By Kym McIntyre

Queensland grains biosecurity officer

Queensland Department of Agriculture and Fisheries (QDAF) pathologists have been undertaking a wide range of structured and random crop surveillance to gain a better understanding of endemic disease trends and to support absence of exotic diseases declarations.

Over the past three years, QDAF have coinvested with GRDC to undertake targeted surveillance in a wide range of crops including wheat, barley, sorghum, chickpeas, mungbeans, soybeans, faba beans and peanuts.

As well as identifying endemic diseases, the team looked for key exotic pests, such as exotic stem rusts (Ug99), barley stripe rust, wheat blast, karnal bunt, downy mildew of sorghum and mungbean yellow mosaic virus. The surveys covered the major cropping areas of Queensland, including the Darling Downs and central and north Queensland, as well as a range of coastal cropping regions.

In addition to the surveys, numerous samples were submitted to the QDAF pathology department for diagnosis.

No exotic pests were detected in the surveillance or the submitted samples. However, the wet summer encouraged an increase in many of the endemic fungal pathogens and viruses found in summer crops. The observed increase signalled a heightened risk for future summer crops.

Data from the surveys has been uploaded into the AUSPestCheck database for future reference. □

Photo: QDAF

QDAF plant pathologist Lisa Kelly in a mungbean crop.

WHAT LOOKS LIKE NET BLOTCH, BUT ISN'T NET BLOTCH? ANSWER: RAMULARIA LEAF SPOT

Ramularia leaf spot (RLS) is a fungal disease in barley plants that can reduce grain quality and yield, as well as cause lesions and premature leaf death. It is caused by the pathogen *Ramularia collo-cygni*, which is a seed and wind-borne fungus that causes toxins called rubellins. These toxins react to light to damage the leaf tissue.

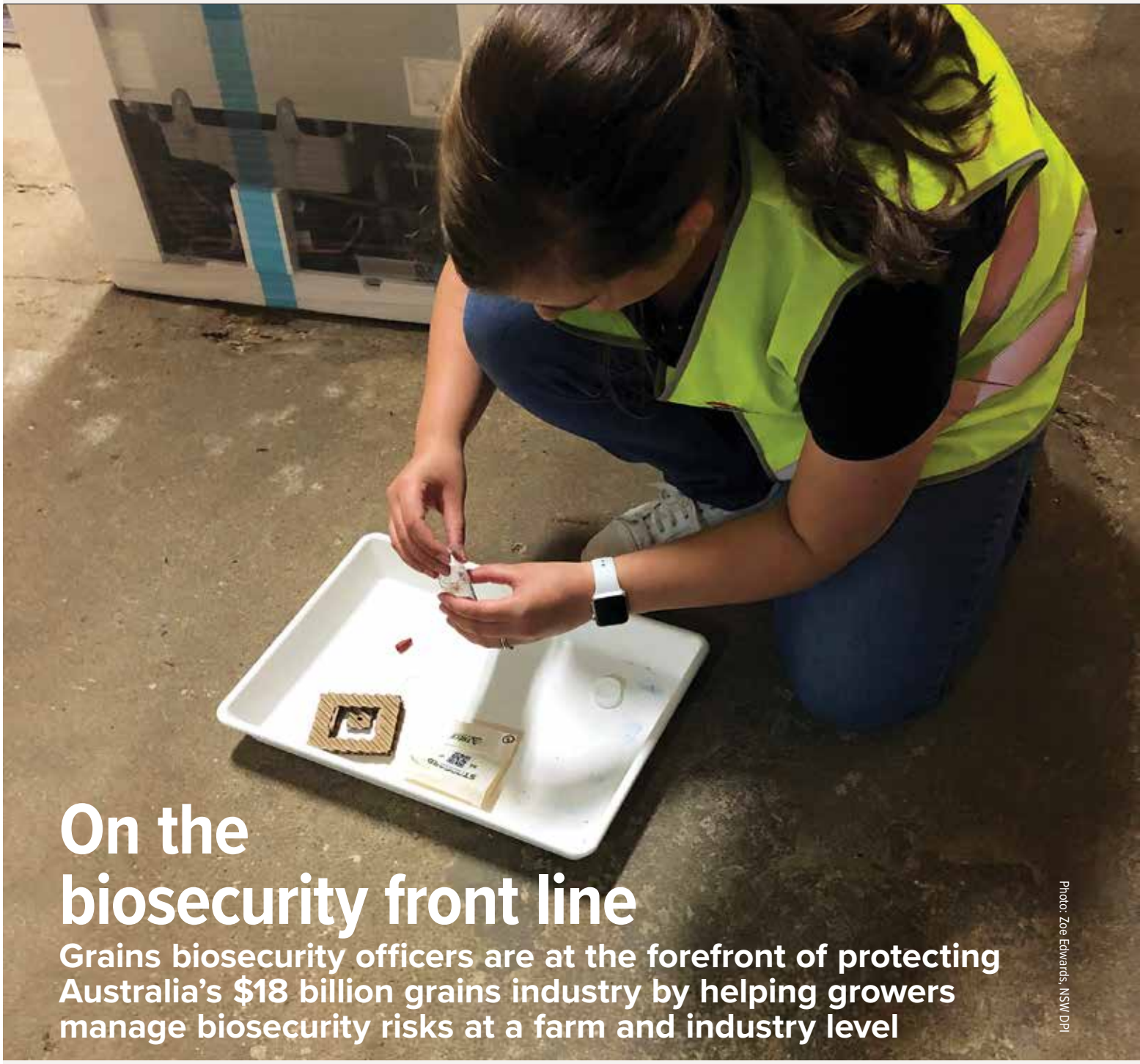
What should I look for?

Lesions will begin to appear on the upper leaves from flowering onwards. Often lesions are only five millimetres long but will lengthen as lesions merge and senesce. Towards the end of the season, small white spores may be found on the underside of the leaf. The '5R' guide can help identify the disease:

1 ringed with yellow margin of chlorosis;
2 rectangular shape;
3 restricted by the leaf veins;
4 reddish-brown colouration; and
5 right through the leaf.

For more information see the GRDC fact sheet: grdc.com.au/resources-and-publications/all-publications/factsheets/2021/ramularia-leaf-spot-in-barley

GRDC Code DAW1909-003



On the biosecurity front line

Grains biosecurity officers are at the forefront of protecting Australia's $18 billion grains industry by helping growers manage biosecurity risks at a farm and industry level

Photo: Zoe Edwards, NSW DPI

Kate Glastonbury (NSW GBO) collecting a wall trap sample for khapra beetle surveillance.

By Karin Steenkamp
Plant Health Australia

Working closely with growers and others in the grains supply chain, specialist biosecurity officers operate in each of the grain growing regions of New South Wales, Queensland, South Australia, Victoria and Western Australia.

The team comprises:

- NSW – Kate Glastonbury;
- Queensland – Kym McIntyre;
- Victoria – Jim Moran;
- WA – Jeff Russell; and
- SA – Shafiya Hussein.

The grains biosecurity officers (GBOs) work with the Grains Farm Biosecurity Program (GFBP), which is Australia's flagship biosecurity extension program. Launched in 2007, the program is managed by Plant Health Australia (PHA) and funded by growers through Grain Producers Australia and state governments.

PHA manages the national program, which develops key information resources and tools such as farm gate biosecurity signs, fact sheets, communication products and management guides, to assist the officers in raising awareness.

The GBO team works across three main areas:

1. **surveillance coordination;**
2. **sharing information on managing farm biosecurity risk; and**

Photo: Biosecurity SA, PIRSA

Shafiya Hussein, SA GBO, at a south-eastern field day.

3 enhancing industry awareness and preparedness.

Surveillance is an important tool for early detection of pests and diseases. Growers and advisers can greatly increase our chances of early detection through crop monitoring and reporting unusual pests and diseases. GBO surveillance activities and increasing levels of industry reporting help maintain access to world markets for Australian grain exports.

The GBOs play an essential role in raising awareness of the industry's main exotic pest threats. They work with industry to improve farm hygiene practices that minimise the risk of disease and pest entry and spread on farms.

GBOs target surveillance for specific pests by using tools such as pheromone traps, monitoring and inspecting stored grain, and following up on community information received through the Exotic Plant Pest (EPP) Hotline. These tactics encourage growers to closely inspect their crops and report any changes or new pests and diseases to the EPP Hotline.

On a day-to-day basis, the GBOs attend field days, industry events, meetings and workshops, where they connect with growers, agronomists and government colleagues, such as Local Land Services officers. They provide training on surveillance techniques, how to identify pests, how to send samples for suspect exotic pests and they share information about managing and reducing risks at farm level.

Since the program's inception, the GBOs have distributed thousands of farm biosecurity signs and helped growers to set up their daily activities in a way that protects their business and the industry.

Establishing good biosecurity practices on-farm is not only good for individual businesses but it also adds another layer of protection to Australia's world-class biosecurity system.

If you spot anything unusual or find something you are not sure about, call the EPP Hotline on 1800 084 881. □

More information: Contact one of the grains biosecurity officers in your region for more information on how to implement farm biosecurity practices on your property. Visit the Grains Farm Biosecurity website at grainsbiosecurity.com.au for more information, latest news and helpful resources about grains farm biosecurity.

NEW BIOSECURITY HUB FOR THE GRAINS INDUSTRY

Plant Health Australia (PHA), in partnership with Grain Producers Australia (GPA), has launched an online hub of industry-specific biosecurity resources and tools.

Designed with grain growers in mind, the easy-to-use Grains Farm Biosecurity website provides fact sheets, videos, how-to guides, online training and strategies to prepare producers to manage on-farm biosecurity risks.

"With zero market tolerance for live pests in grain, farm biosecurity should be top of mind," says Stuart Kearns, PHA's national manager of preparedness and research, development and extension. "The new website offers a suite of practical biosecurity management tools that make a big difference."

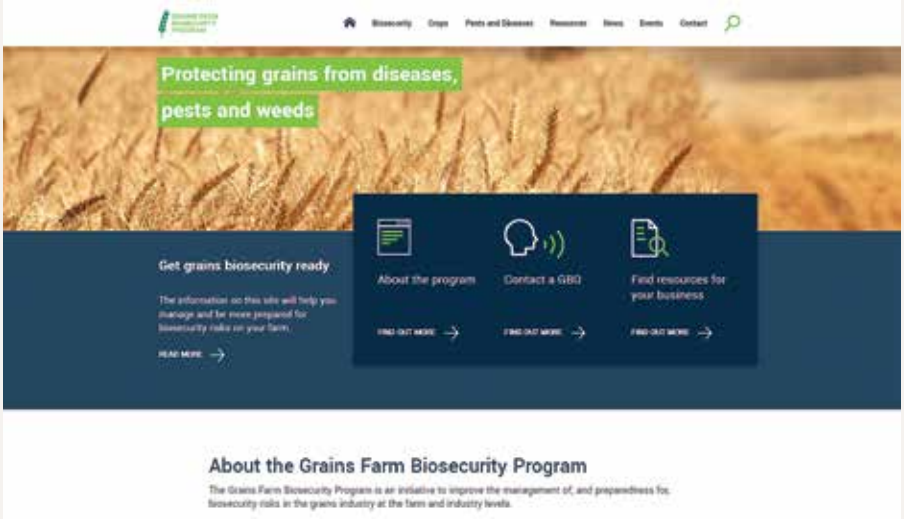
The industry-specific website provides:

- **biosecurity best practices;**
- **information about grain crops grown in Australia;**
- **pest reporting guidance;**
- **a pest and disease database;**
- **industry news; and**
- **a list of field days and other industry events.**

Delivered as part of the Grains Farm Biosecurity Program, which was established in 2007 and is managed by PHA, the website aims to improve the management and preparedness for biosecurity risks in the grains industry at farm and industry levels.

Everyone has a role to play in protecting Australia against harmful pests and diseases, so if you spot anything unusual or find something you are unsure about, call the Exotic Plant Pest Hotline on 1800 084 881.

Visit the Grains Farm Biosecurity website for the latest grains biosecurity news and information: https://grainsbiosecurity.com.au



The Grains Farm Biosecurity website portal.

Photo: Department of Agriculture, Fisheries and Forestry

Khapra beetle has increasingly been detected hitchhiking into Australia in and on sea containers.

Heightened alert for khapra beetle

An increase in detections of khapra beetle (*Trogoderma granarium*) on non-commodity imports and sea containers has resulted in the federal government implementing a range of biosecurity procedures aimed at addressing risks

By Kym McIntyre
Queensland grains biosecurity officer

Khapra beetle (*Trogoderma granarium*) is considered a contaminating pest of wholegrains and nuts as well as many stored food products and is Australia's number two National Priority Plant Pest.

While an infestation of khapra beetle can cause significant grain loss, the ongoing contamination can also affect the quality and safety of the product, often making it unsuitable for human consumption. If it were to establish in Australia, khapra beetle could have significant impacts on the Australian grain export industry and related food supply chains. Potential losses over 20 years have been estimated at up to $15.5 billion.

Since 2020, the number of detections of khapra beetle on goods or sea containers entering Australia has increased, prompting the federal government (through the Department of Agriculture, Fisheries and Forestry) to implement a six-phase action plan.

This is designed to reduce the risk of khapra beetle entering Australia by applying stricter requirements within importation pathways and by broadening the range of imported materials targeted as khapra beetle carriers.

ACTION PLAN

The first three actions in the plan reduce the danger of khapra beetle entering Australia on high-risk plant products. This includes:

- banning high-risk plant products within Unaccompanied Personal Effects (UPE) and low-value freight;
- banning high-risk plant products on international travellers and mail articles; and
- tightening the requirements for high-risk plant products imported via commercial pathways.

As a result of phases 1 and 2, products such as rices, pulses, wheat, powdered herbs, nuts, beans, dried chilli and other seeds cannot be brought into the country by international travellers or sent through the mail. Under phase 3, commercial import pathways are now subjected to more stringent requirements.

The remaining actions (4, 5 and 6) involve new inspection and hygiene requirements for other risky plant products, seeds for sowing and sea containers.

In addition to the action taken at the border and pre-border, state government-led responses were taken in each of the states affected by the recent (2020 and 2021) post-border detections.

Surveillance of all sites identified by tracing commodity movements – including commercial premises (wholesale and retail) and private residences – has determined that the pest has been controlled.

The initial incursion risk was mitigated by the fast action undertaken by the federal government and the post-border detection responses led by affected states.

However, risks associated with increasing interceptions of khapra beetle require a longer-term plan of ongoing risk management.

As such, Australia's national Plant Health Committee has developed a 10-year action plan. This plan identifies actions required for a risk-based approach to reducing the potential for khapra beetle to enter and establish in Australia and covers four key areas of activity:

1. **prevention;**
2. **detection;**
3. **surveillance; and**
4. **cross-cutting issues, including communication and coordination.** □

More information: Kym McIntyre, kym.mcintyre@daf.qld.gov.au;
The National Khapra Beetle Action Plan 2021-2031 can be found at: www.awe.gov.au/sites/default/files/documents/khapra-beetle-nattional-action-plan.docx;
National Priority Plant Pests: agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/plant/national-priority-plant-pests-2019;
Six-phase urgent action plan: agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/plant/khapra-beetle/urgent-actions

GRDC GROUNDCOVER

Issue 160 | Sep – Oct 2022 | GRDC GROUNDCOVER SUPPLEMENT: Biosecurity

Protect your farm from hitchhiker pests

The Australian federal government (through the Department of Agriculture, Fisheries and Forestry) places strict requirements on importers to reduce the risk of hitchhiker pests, such as khapra beetle, entering Australia. Yet all parts of the supply chain – including growers – have an important role to play

By Kym McIntyre

Queensland grains biosecurity officer

Photo: Department of Agriculture, Fisheries and Forestry

Photo: Department of Agriculture, Fisheries and Forestry

Smaller than a grain of rice, the hairs of khapra beetle larvae can break off and cause grain contamination, resulting in the rejection of a shipment.

Cardboard provides an ideal hiding spot for khapra beetles and larvae.

While state and federal governments have put many measures in place to reduce the risk of hitchhiker pests such as khapra beetle entering and spreading in Australia, it is impossible to inspect every item that enters the country.

Unlike endemic stored grain pests, khapra beetles do not fly, so the most likely place for them to show up on the farm is not in the stored grain in the silo but in something that humans bring to the farm – for example, in groceries, deliveries or new equipment including household white goods.

To protect your farm, vigilance is vital. Look closely and take care to:

- inspect all goods coming on to your property, including their packaging. The cardboard packaging provides an ideal harbouring space for khapra;
- never assume that machinery is clean – make sure you check it yourself for any grain remaining in the hopper or augers, especially if it is second-hand; and
- undertake regular surveillance of high-risk places where khapra beetle could live and reproduce.

WHERE TO LOOK FOR KHAPRA BEETLE ON YOUR PROPERTY

- Home and shed pantries contain many highly attractive foods for khapra beetle, so clean them out regularly and identify any insects found.
- Undertake regular surveillance of stored seed or grain, no matter the source.
- Look out for unusual pests in machinery sheds or any protected spaces where you store goods or equipment.
- Bagged stock feeds or supplements should also be checked for insects.
- If you use sea containers for storage on the property, make sure they are inspected on arrival and regularly while they remain on the property. Remember khapra beetle can remain hiding in cracks and under the floors of sea containers for many years.

WHAT TO LOOK FOR

Khapra beetles are oval-shaped and about 1.6 to 3 millimetres long. They are light-yellow brown to dark brown in colour.

The adult beetles have many fine hairs and indistinct markings on their wing covers. Larvae tend to be larger than the beetle, ranging from 1.6 to 4.5mm long, golden brown in colour, and have distinctive hairs across the body, including longer hairs at the end of the body that resemble a tail.

There are a number of native *Trogoderma* species in Australia and it can be difficult to distinguish between them and khapra beetle. If you find something similar, it is important to get it identified. Call 1800 084 881 to report a plant pest. ☐

More information: Kym McIntyre, kym.mcintyre@daf.qld.gov.au

BIOSECURITY RESOURCES

ON-FARM SUPPORT

Establishing good biosecurity practices on-farm is important for individual businesses and adds another layer of protection to Australia's world-class biosecurity system. Contact the grains biosecurity officer (GBO) in your region:

- for support with implementing a farm biosecurity plan;
- to obtain a free grains biosecurity gate sign;
- to obtain stored product pest guides; or
- to obtain resources to identify emergency plant pests of grains.

YOUR GRAINS BIOSECURITY OFFICER

NEW SOUTH WALES	QUEENSLAND	SOUTH AUSTRALIA	VICTORIA	WESTERN AUSTRALIA
Kate Glastonbury	**Kym McIntyre**	**Shafiya Hussein**	**Jim Moran**	**Jeff Russell**
0417 687 307	**0429 727 690**	**0437 723 295**	**0418 377 930**	**0447 851 801**
kate.glastonbury@dpi.nsw.gov.au	kym.mcintyre@daf.qld.gov.au	shafiya.hussein@sa.gov.au	jim.moran@agriculture.vic.gov.au	jeff.russell@dpird.wa.gov.au





THE GRAINS FARM BIOSECURITY PROGRAM (GFBP)

Grains biosecurity officers (GBOs) develop and deliver materials through the Grains Farm Biosecurity Program, an initiative designed to improve the management of biosecurity risks and incursion preparedness in the grains industry at the farm and industry levels. Launched in 2007, the program is managed by Plant Health Australia and funded by growers through Grain Producers Australia together with the New South Wales, Queensland, South Australian, Victorian and Western Australian governments.

GRAINS FARM BIOSECURITY PROGRAM

Plant Health AUSTRALIA

IF YOU SEE ANYTHING UNUSUAL, CALL THE EXOTIC PLANT PEST HOTLINE
1800 084 881