Reducing the risk of exotic and damaging pests becoming established on your farm
The Farm Biosecurity Manual for the Grains Industry was developed by, and is supported through, the Grains Farm Biosecurity Program. This program is a joint initiative of PHA, Grain Producers Australia and the Western Australian, Queensland, Victorian, South Australian, and New South Wales state governments.
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Six easy ways to protect your farm

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

Here are six simple, routine farm practices you can do to reduce the threat of new pests entering and establishing on your property. Each practice should be embedded in your farm’s everyday management as they make good business sense by reducing the risk of spreading any pest. Don’t put your livelihood at risk by neglecting farm biosecurity.

1. Be aware of biosecurity threats
   Make sure you, your farm workers and contractors are familiar with the most important grains pest threats. Conduct a biosecurity induction session on your farm to explain hygiene practices for people, equipment and vehicles.

2. Ensure seed is pest free, and preferably certified
   Ensure all seed and other farm inputs are fully tested, pest-free and preferably certified. Keep records of your farm inputs.

3. Keep it clean
   Practicing good sanitation and hygiene will help prevent the entry and movement of pests onto your property. Workers, visitors, vehicles and equipment can spread pests, so make sure they are decontaminated before they enter and leave your farm. Have a designated visitor’s area and provide vehicle and personnel disinfecting facilities.

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

5. Abide by the law
   Support and be aware of laws and regulations established to protect the grains industry, Australian agriculture, and your region.

6. Report anything unusual
   If you suspect a new pest – report it immediately.

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

EXOTIC PLANT PEST HOTLINE
1800 084 881
Biosecurity overview

This manual is designed to assist you in protecting your farm and the grains industry from new and invasive pests. By implementing the recommended measures in your day-to-day operations, you will improve your farm’s biosecurity and that of your region, while minimising crop losses and unnecessary costs.

What is biosecurity?

Biosecurity is about the protection of livelihoods, lifestyles and the natural environment, which could be harmed by the introduction of new pests.

Biosecurity is a national priority, implemented off-shore, at the border and on-farm. Biosecurity is essential for your business.

Australia’s geographic isolation has meant that we have relatively few of the pests that affect plant industries overseas. Freedom from these exotic pests is a vital part of the future profitability and sustainability of Australia’s plant industries. Biosecurity allows us to preserve existing trade opportunities and provide evidence to support new market negotiations.

The definition of a pest used in this manual covers all insects, mites, snails, nematodes, pathogens (diseases) and weeds that may harm plants or plant products. Exotic pests are those not currently present in Australia. Established pests are those present within Australia.

What is farm biosecurity?

Farm biosecurity is a set of management practices and activities that are carried out on-farm to protect a property from the entry and spread of pests. Farm biosecurity is essential for your business and is your responsibility, and that of every person visiting or working on your property.

Growers can play a key role in protecting themselves and the Australian grains industry from exotic pests by implementing effective farm biosecurity. If a new pest becomes established on your farm, it will affect your business through increased farm costs (e.g. changing of rotations, additional chemical controls, and other management treatments and strategies that need to be put in place), reduced productivity (yield and/or quality) or loss of markets.

Early detection and immediate reporting increase the chance of an effective and efficient eradication.

More information on how to secure your farm and secure your future can be found online at www.farmbiosecurity.com.au a joint initiative of Plant Health Australia and Animal Health Australia.
Regional biosecurity

To strengthen the biosecurity measures you undertake on your property, consider starting biosecurity meetings and activities to promote biosecurity at the regional level. Through this collaborative approach, biosecurity threats to all properties in your region can be minimized.

Potential sources of biosecurity threats may be neighbouring farms (whether producing grain, livestock or undertaking other activities), native vegetation, and garden and roadside plantings.

Implementation of farm biosecurity underpins regional biosecurity, which in turn underpins national biosecurity. Promotion of biosecurity at the regional level is enhanced through understanding the region, the source and nature of potential threats, and having a knowledge of the expertise and resources available to the region. This is supported by a commitment from everyone to implement biosecurity measures, carry out surveillance and report suspect pests.

If farm measures are supported by community based measures, a regional framework for biosecurity can be coordinated and is achievable.
The following are some key high priority exotic pest threats for the Australian grains industry as identified through the development of the Grains Industry Biosecurity Plan (IBP). Any of these pests would have serious consequences should they enter and become established in Australia. For a complete list of exotic pest threats for the grains industry, refer to Grains IBP available from [www.phau.com.au/biosecurity/grains](http://www.phau.com.au/biosecurity/grains).

### High priority exotic pest threats of the grains industry

#### Karnal bunt (*Tilletia indica*)
**OVERALL RISK – EXTREME**
- Hosts are wheat, durum and triticale
- Parts of seeds are blackened and crush relatively easily
- Infected grain has a distinct fishy smell
- If it became established in Australia, access to over 45 international markets would be restricted and grain price would be significantly reduced

#### Khapra beetle (*Trogoderma granarium*)
**OVERALL RISK – HIGH**
- Adults are small (2-3 mm long) and do not fly
- Spread in infested grain
- Larvae are hairy and can survive for over a year without food
- Phosphine fumigation gives poor control
- If established, it would affect market access

#### Phosphine resistant strains of stored grain insects
**OVERALL RISK – MEDIUM**
- Stored grain insects with strong resistance to phosphine have been detected internationally and in Australia
- Exports are threatened due to insects surviving in stored grain
- Incorrect phosphine fumigation and poor grain storage practices increase the selection of resistant insects
- Live insects remaining after fumigation should be reported and tested for resistance

#### Russian wheat aphid (*Diuraphis noxia*)
**OVERALL RISK – HIGH**
- Primary hosts are wheat and barley
- Light-green, elongated aphid (up to 1.8 mm long)
- Damage symptoms include:
  - White, purple or yellowish leaf streaks
  - Rolling of leaves, flag leaf and awns
  - Bleached heads with small grains
- Crop losses up to 75% could occur
**Hessian fly and Barley stem gall midge (Mayetiola destructor and M. hordei)**

OVERALL RISK – HIGH
- Adults are small (2-4 mm long) and look like mosquitos
- Pupae have a “flaxseed” appearance
- Attack leaves, stems and heads of cereals
- Most chemical controls are not effective
- Cereal crop losses up to 40% could occur

**Sunn pest (Eurygaster integriceps)**

OVERALL RISK – MEDIUM
- Brown bug with wide oval-shaped body (12 mm long) with a wide triangular head
- Attacks most cereal crops
- Colonies can be seen on cereal heads in spring
- Injects enzymes into the plant as it feeds which can result in grain damage and abortion

**Barley stripe rust (Puccinia striiformis f. sp. hordei)**

OVERALL RISK – HIGH
- Would infect barley in all Australian growing regions
- Approximately 80% of Australia’s barley varieties would be susceptible
- Yellow stripes of fungal spores produced between veins of leaves
- Can be spread by wind and rain, or on clothing, machinery and tools
- Any stripe rust on barley should be reported

**Wheat stem rust, pathotype Ug99 (Puccinia graminis f. sp. tritici)**

OVERALL RISK – HIGH
- Pathotype identified in Uganda in 1999 that has overcome several stem rust resistance genes
- Many Australian wheat varieties will be susceptible
- Elliptical blisters produced on stems, which break open to reveal a mass of rust coloured spores
- Stem rust on known resistant varieties should be reported

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Remain observant for anything unusual on your farm and in storage facilities. If a pest is found that is not normally present on your farm, it may be new not only to your farm, but to the region, state or even Australia.
Pest surveillance

Crop monitoring and surveillance, involves looking for and recording the presence, absence and population levels of pests. Conducting regular monitoring is a fundamental part of farm management and gives the best chance of spotting a new pest soon after it arrives.

Active pest surveillance is necessary because:

- Early detection of exotic pests improves the chance of eradication or containment within a region. If eradication or containment is not feasible, early detection, in conjunction with contingency planning and preparedness by government and industry, will minimise the impact of the pest.
- For market access, export destinations for grain require ‘proof of absence’ data for exotic and some established pests. The Australian grains industry, in collaboration with governments, must prove that exotic pests are absent. Surveillance data underpins claims of ‘area freedom’ in that a pest is ‘known not to occur’.
- Surveillance at the farm level contributes essential information to regional biosecurity efforts and ultimately to the national status (presence/absence) of a pest.

All pest (exotic and established) surveillance activities carried out on your property should be recorded. These records can be used in the response to a pest outbreak and provide support to industry surveillance activities. An example of a pest surveillance datasheet is included in this manual (page 29).

Report suspect pests

Early detection and reporting may prevent or minimise the long-term impact on your farm and the grains industry as a whole.

If you see anything unusual, call the Exotic Plant Pest Hotline on 1800 084 881.

Calls to the Exotic Plant Pest Hotline will be forwarded to an experienced person in your state or territory government, who will ask some questions about what you have seen and will either arrange to collect a sample or give information on how and where the sample should be sent.

Do not send samples without first speaking to someone from the state department, who can discuss the correct protocol for sampling, packaging, handling and transport to the laboratory assigned for diagnosis. Incorrect handling could spread the pest further or render the samples unfit for diagnosis.
In some states, the Exotic Plant Pest Hotline operates only during business hours. Outside these hours, leave your full contact information and a brief description of the issue and your call will be followed up as soon as possible. Every report will be checked out and treated confidentially.

If you have found a suspected exotic plant pest, the following precautions should be taken immediately to contain the pest and protect other parts of your farm:

- Do not touch, move or transport affected plant material.
- Wash hands, clothes and footwear that have been in contact with affected plant material or soil.
- Mark the location of the pest detection and limit access to the area.
- Restrict the movement of people, stock and equipment near the affected area.
- Restrict operations in the area while waiting for the identification of the suspected exotic pest.

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

**EXOTIC PLANT PEST HOTLINE**

1800 084 881

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The Emergency Plant Pest Response Deed (EPPRD) and the Grains Industry

The EPPRD is a formal, legally binding document between Plant Health Australia (PHA), Australian and state/territory governments, and plant industry signatories. As a signatory to the EPPRD, Grain Producers Australia (GPA) has a seat at the decision making table and also contributes to funding if an approved Response Plan is implemented to eradicate an Emergency Plant Pest (EPP).

Under the EPPRD, the grains industry has a responsibility to report suspect pests. The earlier a new pest is detected, the greater the chance an eradication response will be mounted and the more likely it will be successful.

Within an approved Response Plan, grower reimbursement payments (Owner Reimbursement Costs; ORCs) are included for direct costs incurred as a result of eradication of a pest incursion.
Purchase seed from a reputable source

Obtain clean seed from reputable suppliers in order to reduce the risk of introducing new pests. Infected, infested or contaminated seed is a major source of introduction and spread of pests and weeds to a farm.

You cannot accurately assess seed quality just by sight. Seed which appears clean and healthy can still carry pests without showing symptoms, and may also contain weed seeds. Hence, you should ask where the seed originally came from and always try to purchase certified or quality assured seed.

Read the label for information on pure seed content or obtain a Statement of Analysis detailing seed purity, weed seed content and germination quality.

Keep a copy of the certification report on record as this will assist with any trace-back activities should a new pest be found.
Biosecurity and Quality Assurance

If your farm operates under a Quality Assurance scheme (such as Graincare QA, Environmental Management Systems, Phosure or Better Farm IQ) or an industry Best Management Practice program, it is likely that some fundamental techniques of biosecurity best practice are already being applied.

Ensure that your scheme and your records allow full traceability. That is the ability to trace-back plant material on your farm to its source (including seed source, health testing specifics and authenticity records) and to trace-forward plant material or produce that has left your property. Records of surveillance and pest management practices undertaken on your property should also be kept.

Auditable Quality Assurance schemes and achievement of membership to them, is beneficial in terms of biosecurity, market access, meeting specifications and customer expectations, and food safety. Involvement in these schemes makes good business sense as they provide the foundations for good record keeping, assessment against industry best practice and external scrutiny through auditing. They are the basis for continual improvement of your business and will increasingly be a requirement to secure markets for grain.

Chemical residues

Chemical residues on grain can result in grain being rejected from export and domestic markets. As most grain ends up being used as human food, even if fed to livestock, inappropriate use or application of pesticides can pose a risk to human health through the presence of chemical residues.

Appropriate training and advice on the safe use of pesticides should be obtained prior to chemical control of pests and always follow label regulations and withholding periods. Don’t put your livelihood or the industry at risk through poor or illegal practice.

In most states and territories, farmers and contractors who apply pesticides must complete an accredited chemical training course (for example ChemCert® or SMARTtrain) to gain the appropriate training, knowledge base and legal requirements for the safe use of pesticides.

Details about regulations for agricultural and veterinary chemicals can be found through the Australian Pesticides and Veterinary Medicines Authority (APVMA) www.apvma.gov.au or from relevant state agencies. Consult these sources frequently for information regarding chemical regulations as these can change regularly.
Grain storage

Grain markets demand that delivered grain is free of live insects. Currently, phosphine fumigation is a commonly used and inexpensive method for the treatment of insects in grain storages.

Insects showing levels of phosphine-resistance have been observed in stored grain internationally and in Australia. Further development of resistance to phosphine in stored grain pests is a biosecurity threat to Australian grain. The presence of phosphine-resistant insects means there is a greater chance that live insects will remain in export grain after standard fumigation treatment, and the shipload could be rejected at its destination.

Fumigation must be carried out in sealable (gas tight) storages to ensure that the fumigant is contained at appropriate concentration levels for the duration of the fumigation. This will ensure that all insect life stages, especially eggs and pupae, are controlled. Incorrect fumigations will select for phosphine-resistant insect strains.

Always follow the label instructions when using phosphine. For safety, signs should be put on all silo access points while fumigation and ventilation is being completed. These signs should indicate the start and finish date of the fumigation and ventilation.

Stored grain should be inspected every month for live insects and grain should only be treated when insects are found. However, no more than three phosphine fumigations should be conducted on any single parcel of grain.

A combination of good storage and equipment hygiene, plus well-managed aeration of stored grain, significantly reduces insect pest numbers. The removal of sheltered food sources together with cooling stored grain to around 20°C or below is a strategy that will reduce the number of required fumigations and limit the potential for insect resistance to phosphine to develop.

For further information on obtaining fumigation signs for your property, contact PHA or your state Grains Biosecurity Officer, details at www.phau.com.au/biosecurity/grains
Good biosecurity practice for grain storage includes:

- Completing phosphine fumigations in sealable silos at the correct concentration and length of time, as recommended on the label.

- Maintaining good hygiene around your storage areas, including making sure grain handling equipment like headers, augers, field bins, silos and bulk storages are cleaned out well before the next harvest.

- Separating the first grain to pass through harvesters at the start of each season as there is a high risk that it may contain pests.

- Removing all grain residues to limit the areas where insects can survive and breed.

- Keeping good records of your phosphine treatments in each sealable silo.

- Pressure testing sealable silos and repairing any faulty rubber seals.

- Conducting no more than three phosphine fumigations on any single parcel of grain.
Managing people movement

People moving between farms and regions can spread pests on vehicles, equipment, boots and clothing. The most obvious risks are pests carried in soil and plant material.

Implementing the following measures will reduce the threat of people movement introducing new pests onto your farm:

- Maintain a visitor register (example on page 28), which will record visitor movements and help manage safety issues.
- Brief all workers, contractors and visitors on your farm biosecurity measures.
- Employee and visitor footwear and clothing must be free of soil and plant material before entering or leaving the farm.
- Provide scrubbing brushes, footbaths, boot covers, rubber boots and protective clothing such as disposable overalls, for people entering or leaving your farm, or moving from contaminated to clean areas of the property.

Biosecurity signs

Well designed signage informs visitors that biosecurity on your farm is a focus and that they share responsibility for maintaining it. The signs serve to alert people to the potential impact of their visit.

Signs also demonstrate your commitment to farm hygiene, safety and auditable systems. Biosecurity signage should be placed at the main gate, external entrances, visitor parking areas and wash-down facilities.

Biosecurity signs at entrances or near storages should direct visitors to contact the owner or farm manager to formally register their presence, before entering any production areas. The sign should include important contact details, such as the home telephone number, mobile number and/or UHF channel.

For further information on obtaining biosecurity signs for your property, contact PHA or your state Grains Biosecurity Officer, details at www.phau.com.au/biosecurity/grains
Overseas travellers

People returning from overseas are a threat to our biosecurity, especially if they have visited crops, farms or markets where plant or animal material was sold. Check that family members, employees and visitors recently returned from overseas have washed their clothes, cleaned their footwear and have not brought in plant or animal material.

Clothes, hair and even watchbands can carry fungal spores such as rust and bunt, and weed seeds can easily lodge in clothes and pant cuffs. Visitor’s clothing, hair and footwear should be washed before they come onto your farm. Great care should be taken to prevent the accidental introduction of overseas crop pests into Australia. Be aware that plant pests are only a few hours away by air travel.

Contractors and utility providers

The term ‘contractors’ includes farm contractors, earthmoving companies, utility providers, research personnel, consultants and mining operators who enter a farm in their day to day operations. While their contribution is highly valued, they are a particular biosecurity threat because they move from farm-to-farm and region-to-region. They can potentially spread pests from and to susceptible plants on their clothing, equipment and vehicles.

Placing biosecurity signs on external farm gates can play an important part in raising farm biosecurity awareness with contractors, especially providers of power, water, gas and communications. Limit the risk of contractors introducing new pests onto your property, by requesting all contractors’ vehicles and equipment be cleaned before starting work on your property. Provide a suitable wash-down bay to complete this task.

Pests can be transported onto your farm in many different ways. For example, they can be contained within hay still in the contractors’ machine when they arrive at your farm. In this case, all hay in the machine should be removed before entering your paddocks.

Providing a copy of the Contractors’ checklist, available from www.farmbiosecurity.com.au, or leaving copies at external gate entrances will help raise awareness of your farm hygiene. This includes the need to inspect, clean and disinfect equipment, and have contractors sign a Visitors register (page 28) to record movement between properties.

To ensure your property does not become the source of pest infections for others, you have a responsibility to inform contractors of any declared or notifiable pests already present on your farm. This will enable them to clean down properly or take other appropriate actions.
Movement of vehicles and machinery

Vehicles and farm equipment can carry pests in soil and plant material. Pests can then be introduced to a previously clean property or crop.

It is impractical to stop all vehicle and equipment movement on and off the property, but using dedicated farm vehicles, washing down machinery on concrete pads and denying access of dirty machinery can aid in reducing the spread of unwanted pests around your property.

Contractors, re-sellers, service providers and drivers of delivery trucks and earth moving equipment entering the property should be requested to clean vehicles and equipment before entering your farm. Inspecting and cleaning machinery is more time and cost effective than managing a new pest.

Properties open to growers (e.g. for field days or equipment demonstrations) have a heightened risk and assigning designated parking areas away from production sites is a critical factor in reducing potential risk.

Measures to reduce the risk of pest entry on your property include:

- Cleaning vehicle floors and tyres of soil, plant material and pests, especially after visiting other properties.
- Where possible, use your own vehicle to carry visitors around your farm.
- In cropping areas, keep vehicle movement to a minimum, especially on wet soil. Stick to regular pathways through the farm to minimise the threat of spreading pests.
- Use high pressure water or air to remove plant material and soil from larger equipment and machinery in a designated wash-down area before moving between properties. Ensure that waste water and debris don’t enter production or storage areas.
- Regularly monitor areas around wash-down facilities.
- Ensure contractor equipment is washed down thoroughly to remove any plant material or soil before entering your farm.
- Always make sure that borrowed and second-hand equipment and machinery is cleaned of all plant material and soil before bringing them onto your farm.
- Regularly clean all tools and equipment, preferably with an antiseptic or bleach solution.
Designated parking areas

A well sign-posted designated parking area should be provided for all visitors. Ideally, dedicated farm vehicles should be used for transport around your property with other vehicle movement limited to direct entry to a designated visitor parking area only.

Parking areas contain the entry of new pests away from production sites. It also allows for the inspection of tyres, equipment, floor mats and boots for soil and plant material which may carry new pests. This area should be regularly monitored for the presence of new pests.

A biosecurity sign in the parking area will remind visitors of the threat of spreading pests between properties. Do not allow the movement of farm machinery through the parking area.

Wash-down facilities

A wash-down facility allows farm employees, contractors and visitors to clean their vehicle and equipment in an easily managed area where waste water is contained.

Providing a high-pressure wash-down facility with cleaning equipment will assist you and your visitors to clean vehicles and equipment.

For additional protection, an added detergent-based degreaser or disinfectant (for example, Septone Truckwash®, Castrol Farmcleanse® or Virkon®) may be appropriate.

For best results, remove as much soil and plant material as possible from the equipment before using the disinfectant and seek advice from re-sellers on the best product.

The wash-down area should have a sump or waste water collection area. The sump and area surrounding the wash-down facility should be treated and checked regularly for the presence of pests and weeds.

The wash-down area may be the same as that used for chemical wash-down of vehicles and equipment. If so, all occupational health and safety issues associated with chemical wash-down areas must be taken into account.

In some cases, using compressed air is a better method for cleaning machinery (for example, when cleaning the header), while machinery with mud attached will need to be cleaned down with high-pressure water.
When cleaning equipment with high pressure air or water, make sure mud, soil and plant material are kept away from crops, storage areas or waterways. There’s no point cleaning weed seeds and plant pests out of machinery if they’re blown or washed into a nearby crop, silo, hayshed or dam.

Clean machinery from the top down to avoid contaminating areas already cleaned, and consider the following points:

- Dismantle as far as practically possible to give access to internal spaces.
- Leave covers off after cleaning to allow inspection.
- Get a second opinion – a fresh look will see contamination you may have missed.

Wash-down areas should:

- Be readily accessible and located between the driveway and farm roads.
- Be isolated from production areas.
- Have access to power and high-pressure water.
- Have a sealed (concrete or bitumen) or packed gravel surface.
- Not drain into a waterway or cropping area.
- Have a sump to collect waste and for easy inspection.
Feed, water and livestock

Pests can be easily introduced and spread onto the farm when you bring in grain, hay or livestock.

When buying fodder, be aware of where it has come from and inspect it for pests and weed seeds. The main risk is during dry seasons when fodder is transported long distances from other localities. While not always possible, buying locally can help prevent the introduction of new pests to the region.

When buying grain, ask the seller about pests that are present on their farm or in their crop. If possible, obtain a vendor declaration of weed status or have a sample checked by a seed/plant testing laboratory. If in doubt have the grain cleaned.

Additionally, livestock should be fed in the same paddock or fodder fed out in the same area of each paddock. Inspect for unwanted germinated weeds or new pests at the break of the season or after sufficient rain.

Newly purchased livestock should be isolated in a holding paddock for at least seven days to allow weed seeds to pass through their digestive system. This also helps to contain any weeds transported on fleeces and coats. Isolation of stock can be combined with a drenching program to control animal parasites and is an essential part of farm biosecurity practice to minimise the introduction of new animal diseases onto a property.

Ideally the holding paddock should be near the house so that regular checks can be conducted on the animals themselves and to control germinated weeds.
To ensure your farm has the best protection against the introduction and spread of new pests, identify the strengths and weaknesses of your farm’s biosecurity activities through the following self-assessment questions.

Once identified, a few simple, non-costly and practical procedures can be implemented to strengthen areas of greatest risk to your farm. While changing everyday practices can take more effort in the short term, these will become second nature with time and are easier and cheaper than dealing with the introduction of a new pest onto the farm.

Complete the biosecurity best practice checklist to identify activities required to protect your farm from new pests. Place a name and a date for implementation next to each practice to ensure the job is completed.

For further information and help in improving the biosecurity practices on your property contact the Grains Biosecurity Officer in your state, www.phau.com.au/biosecurity/grains

Remember, cleaning plus disinfection equals decontamination. Add to this farmer vigilance, determination and monitoring and you have a recipe for defending against the establishment and spread of plant pests.
Date of biosecurity check: ________________

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<th>RECOMMENDED PRACTICES</th>
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<th>COMMENTS</th>
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<td><strong>Pests</strong></td>
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<td>Crops and pastures regularly inspected for exotic pests.</td>
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<td>Maintain vigilance for “anything unusual”</td>
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<td>Active pest surveillance is regularly conducted, with activities and results, recorded even when nothing is found</td>
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<td>You, your staff and family are familiar with the high priority pest threats for the grains industry</td>
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<td>You, your staff and family know how and where to report suspect pests</td>
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<td>Pest management plans developed for the farm</td>
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<td>Work with neighbours, government agencies, LandCare and/or pest control groups to reduce the spread of unwanted pests</td>
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<td><strong>Product management</strong></td>
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<td>Seed is checked to be free from pests</td>
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<td>Seed is certified to be pest-free</td>
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<td>Records of seed and its source maintained</td>
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<td>Grain loaded and unloaded on compacted surfaces away from production areas</td>
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<td>All grain storage and handling equipment thoroughly cleaned out at least three weeks before harvest</td>
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<td>Areas around grain silos kept free of spilt grain, weeds and general rubbish</td>
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<td>Fumigations only carried out in sealable (gas tight) storages</td>
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<td>Silos pressure tested to ensure they are sealable</td>
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<td>Aeration units for cooling and/or drying stored grain fitted to storages</td>
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<tr>
<td>Warning signs shown on grains silos during fumigation and ventilation</td>
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<tr>
<td>Bins, containers and bags of plant and seed material covered during transport</td>
<td></td>
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<tr>
<td>People movement</td>
<td>YES</td>
<td>TO DO</td>
<td>COMMENTS</td>
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<tr>
<td>Biosecurity sign advising visitors to make contact, located on gates and fences, with house phone, mobile phone and/or UHF channel</td>
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<tr>
<td>Visitor access restricted to designated visitor parking areas</td>
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<tr>
<td>All visitors sign a Visitor register on arrival to track on-farm movements and for trace-back purposes in case of biosecurity emergency</td>
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<tr>
<td>Only on-site farm vehicles used to transport visitors and equipment around the farm. All visitor vehicles remain in designated quarantine/parking area or pass inspection prior to entry</td>
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<tr>
<td>Contractor entry to the farm conditional on being made aware of farm biosecurity plans and hygiene protocols. Site biosecurity inductions delivered where appropriate.</td>
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<tr>
<td>Contractors are signatories to an industry recommended hygiene protocol or program and maintain records and log books</td>
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<tr>
<td>Contractors/visitors made aware if property has a declared or notifiable pest</td>
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<tr>
<td>Visitors clothing, footwear and tools are free of soil or plant matter before entering or leaving the farm</td>
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<tr>
<td>All people recently returned from overseas have clean footwear and clothes before entering the farm</td>
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<tr>
<td>Farm biosecurity plan available for farm personnel, consultants, contractors and visitors</td>
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<tr>
<td>Farm personnel trained in biosecurity and farm hygiene practices (e.g. pest management, personal, equipment and vehicle hygiene practices and reducing risks from livestock and fodder transport)</td>
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<tr>
<td>Personnel hygiene supplies available where appropriate (e.g. hand sanitiser, gloves, masks, disinfectant foot baths, disposable over boots and overalls)</td>
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<tr>
<td>RECOMMENDED PRACTICES</td>
<td>YES</td>
<td>TO DO</td>
<td>COMMENTS</td>
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<tr>
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<tr>
<td><strong>Equipment and vehicles</strong></td>
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<tr>
<td>Designated parking area for non-farm vehicles and contractor equipment available and clearly signed. Area checked regularly for new pests</td>
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<tr>
<td>Cleaning and wash-down facilities, preferably on a concrete pad, provided for people, machinery and equipment and clearly signposted with instructions</td>
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<tr>
<td>High pressure water and air available for use to remove plant material and soil from equipment and machinery</td>
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<tr>
<td>Machinery entering the farm inspected for insects, soil and plant material prior to entry</td>
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<tr>
<td>Borrowed and second-hand machinery and equipment is cleaned of all plant material and soil before use</td>
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<tr>
<td>Sump installed in wash-down facility to catch unwanted pests and waste, and stop run-off into waterways</td>
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<tr>
<td>Wash-down facility and surrounds inspected on a quarterly basis (i.e. check that everything works, clean the sump and check it for unwanted pests). Records kept and updated</td>
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<tr>
<td>Vehicle movement kept to a minimum in production areas</td>
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<tr>
<td>Machinery cleaned before being moved off property</td>
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<tr>
<td><strong>Feed, water and livestock</strong></td>
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<tr>
<td>Ensure all grain and hay purchased for stock feed is free from unwanted weeds, soil and pests. Undertake an audit of known outbreaks of pests in the area of origin</td>
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<tr>
<td>Purchased grain and hay fed out in the same area which is monitored regularly for new weed growth and pests</td>
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<tr>
<td>Newly purchased livestock isolated in a holding paddock for 7 days</td>
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<tr>
<td>Holding paddock regularly checked for new pests and weeds</td>
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<tr>
<td>All livestock movements onto and within the farm recorded in a stock diary</td>
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<tr>
<td>Boundary fences and gates maintained to prevent straying animals, unwanted visitors and unintentional equipment entry</td>
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<tr>
<td>Stray animals captured and isolated as soon as possible</td>
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</tbody>
</table>
More information on biosecurity, farm hygiene, pests and the grain production industry can be found through the following sources.

### Useful contacts

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Contact details</th>
</tr>
</thead>
</table>
| Grain Producers Australia | Phone: 02 6273 3000  
Website: [www.gpau.com.au](http://www.gpau.com.au) |
| Plant Health Australia | Phone: 02 6215 7700  
Email: biosecurity@phau.com.au  
Website: [www.planthealthaustralia.com.au](http://www.planthealthaustralia.com.au) |
| Farm Biosecurity | Phone: 02 6215 7700  
Email: info@farmbiosecurity.com.au  
Website: [www.farmbiosecurity.com.au](http://www.farmbiosecurity.com.au) |
| Australian Government – Department of Agriculture, Fisheries and Forestry (DAFF) | Phone: 02 6272 3933  
Website: [www.daff.gov.au](http://www.daff.gov.au) |
| New South Wales – Department of Primary Industries | Phone: 1800 808 095 or 02 6391 3100  
Website: [www.industry.nsw.gov.au](http://www.industry.nsw.gov.au) |
| Northern Territory – Department of Primary Industry and Fisheries | Phone: 08 8999 5511  
| Queensland – Department of Agriculture, Fisheries and Forestry | Phone: 13 25 23 or 07 3404 6999  
Website: [www.daff.qld.gov.au](http://www.daff.qld.gov.au) |
| South Australia – Department of Primary Industries and Regions | Phone: 08 8207 7820  
Website: [www.pir.sa.gov.au](http://www.pir.sa.gov.au) |
| Tasmania – Department of Primary Industries, Parks, Water and Environment | Phone: 1300 368 550  
Website: [www.dpipwe.tas.gov.au](http://www.dpipwe.tas.gov.au) |
| Victoria – Department of Primary Industries | Phone: 13 61 86 or 03 5332 5000  
Website: [www.dpi.vic.gov.au](http://www.dpi.vic.gov.au) |
| Western Australia – Department of Agriculture and Food | Phone: 08 9368 3333  
Website: [www.agric.wa.gov.au](http://www.agric.wa.gov.au) |

If you see anything unusual, call the Exotic Plant Pest Hotline 1800 084 881.
# Visitor register

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

<table>
<thead>
<tr>
<th>Date</th>
<th>Time on property</th>
<th>Name</th>
<th>Reason for visit</th>
<th>Vehicle registration or mobile</th>
<th>Details of last contact with grain crop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arrival</td>
<td></td>
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<td>Departure</td>
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If you see anything unusual, call the Exotic Plant Pest Hotline on 1800 084 881

An electronic version of this Visitor register can be downloaded from the Farm Biosecurity website www.farmbiosecurity.com.au
# Pest surveillance data sheet

**Farm:** ________________________________

**Name of person inspecting:** ________________________________

**Date:** ________________________________

<table>
<thead>
<tr>
<th>Paddock</th>
<th>No. sites</th>
<th>Established pests</th>
<th>Exotic pests</th>
<th>Other pests found</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pest 1</td>
<td>Pest 2</td>
<td>Pest 3</td>
<td>Pest 4</td>
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</table>

If you see anything unusual on your farm call the Exotic Plant Pest Hotline on 1800 084 881

Estimated established pest infestation level (e.g. zero/low/med/high or % crop affected) and exotic pest presence/absence should be scored.

Pests targeted by surveillance must be named before surveillance initiated (for both established and exotic pests)

An electronic version of this Pest surveillance datasheet can be downloaded from the Farm Biosecurity website [www.fambiosecurity.com.au](http://www.fambiosecurity.com.au)
Karnal bunt

What is Karnal bunt?

Karnal bunt (Tilletia indica) is a fungus affecting grains of wheat, durum and triticale. It reduces grain quality through the production of masses of powdery spores that discolour the grain and grain products. It is recognised by a “dead fish” smell.

If Karnal bunt was detected in Australia, grain export markets would be affected, as many countries have import restrictions for this pest. Therefore, this fungus poses a major threat to Australia’s grain industry. The sooner a potential introduction of Karnal bunt is detected and reported, the greater the chance of rapid and effective eradication.

What does it look like?

Symptoms of this fungus are most easily seen in harvested grain, and range from pinpoint sized spots to thick black spore masses running the length of the groove in the grain. Usually only part of each grain is affected, although occasionally the whole seed will be blackened with a sooty appearance. Infected parts of each grain will crush easily producing a black powder between the thumb and forefinger. Often the grain will have a rotten fish smell.

Detecting the pest on cereal heads in the paddock is difficult, as usually only a few seeds in each head are affected.

What can it be confused with?

Karnal bunt looks and smells very similar to Common bunt, which is found in Australia. However, Common bunt affects entire heads and seeds of the cereal plant while Karnal bunt usually affects only portions of some seeds in the head.

Karnal bunt is also similar to Loose smut, Flag smut and Black point. Loose smut converts grain seeds and flowering parts to masses of black spores and is very obvious. Flag smut affects the leaves. Black point is a dark discolouration at the ends and crease of wheat and barley seeds which is caused by environmental conditions. No spores are produced by black point.
What should I look for?
Infected parts of grain will have a blackened and sooty appearance, and may produce a ‘dead fish’ smell. Infected parts of grain may crush when handled producing a greasy black powder.

How does it spread?
Karnal bunt spores can survive in grain, soil and cereal trash, and spread with these commodities. These fungal spores are small, light and long-lived, and as such can be spread between paddocks by wind and water, and on machinery or in soil.

Where is it now?
Karnal bunt was first detected in India and is found in many middle-eastern countries. Although also present in South America, South Africa and the USA, it is confined to specific areas in those countries and is under quarantine.

How can I protect my farm from Karnal bunt?
Check your stored grain frequently for the presence of new pests and unusual symptoms. Make sure you are familiar with common grain pests so you can tell if you see something different.

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

EXOTIC PLANT PEST HOTLINE
1800 084 881

For more information visit www.planthealthaustralia.com.au
Khapra beetle

What is Khapra beetle?
Khapra beetle (*Trogoderma granarium*) is a serious pest of stored grain and dry foodstuffs worldwide. It can cause losses of up to 75% from direct feeding. Infested grain also becomes contaminated with beetles, cast skins and hairs from larvae, which can be a health risk and are difficult to remove from grain storage structures and transport vessels. This beetle is not present in Australia and poses a major threat to Australia’s grains industry.

What does it look like?
Khapra beetle adults are small (2-3 mm long and 1-2 mm wide), brownish in colour with a smooth oval shaped body. There are 3 transverse bands (markings) of pale colour hairs on the wing covers. Eggs hatch into small hairy larvae that can grow up to 7 mm long, are reddish brown in colour and darken as they mature. Larvae have characteristic long hairs all over their body, especially at the rear end and can survive without food for over 12 months.

What can it be confused with?
Khapra beetle is almost identical to the Warehouse beetle, which is established in Australia, and some closely related native beetle species. If you find any beetle or hairy larvae fitting the description of the Khapra beetle, have it identified by an expert.

What should I look for?
As Khapra beetle is a stored grain pest it will only be found in stored products and around places where stored products are kept or transported. It can also be found between cracks and wall linings of storage containers. It will not be present in the field.

When examining grain samples, characteristic hairy larvae and cast skins are the most likely stage that will be seen.
How does it spread?

Khapra beetles are spread through the movement of stored grain and products or as contamination of seed, machinery and straw.

Where is it now?

Khapra beetle is found in Africa, India, Russia and many middle-eastern countries.

How can I protect my farm from Khapra beetle?

Check your stored grain and storage facilities frequently for the presence of new pests and unusual damage symptoms. Good hygiene measures around storage facilities, including cleaning up spillages, reduces the risk of storage pest infestations. Make sure you are familiar with common grain pests so you can tell if you see something different.

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

EXOTIC PLANT PEST HOTLINE
1800 084 881
Russian wheat aphid

What is Russian wheat aphid?

Russian wheat aphid (*Diuraphis noxia*) is a soft bodied insect that feeds mainly on wheat and barley, but can attack most cereal crops. If this pest enters Australia, it has been estimated that it could cause significant damage to crops, resulting in up to 75% yield losses.

What does it look like?

The aphid is small (up to 1.8 mm long), has a ‘needle-like’ mouthpart, and is light green in colour. The body is elongated compared with other cereal aphid species. Adults can be winged or wing-less. Juveniles (nymphs) look similar to adults but lack wings.

Characteristic features include dual structures at the rear (cauda) of the insect giving it a ‘double-tail’ appearance (see arrowheads in image top right) and lack visible siphuncles (‘exhaust pipes’ – circles in images on right) that are characteristic for most aphids.

What can it be confused with?

If it were present, Russian wheat aphid could be found with other cereal aphids on crops. The elongated body shape and lack of ‘exhaust pipes’ distinguish this aphid from common cereal species (compare top image to middle image).

What should I look for?

Whilst feeding, the aphid injects salivary toxins into the plant tissue causing the leaves to roll up and white, purple or yellowish streaks to form. Often awns can be trapped by the rolled flag leaf, and grain heads can be bleached in appearance. Unfortunately, these symptoms can also be caused by other diseases and disorders such as herbicide and virus damage, nutrient deficiencies and frost. If these symptoms are found in combination with aphids, have them checked by an expert.
How does it spread?
Adults can spread by actively flying throughout the crop or using wind currents. Long distance dispersal also occurs by ‘hitchhiking’ on machinery, clothes or plant material. Like all cereal aphids, Russian wheat aphid over-summers on volunteer grasses and alternate host plants.

Where is it now?
This pest has spread throughout all major grain growing countries except Australia.

How can I protect my farm from Russian wheat aphid?
Check your farm frequently for the presence of new or unusual pests and plant damage symptoms. Make sure you are familiar with common grain pests so you can tell if you see something different.

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

EXOTIC PLANT PEST HOTLINE
1800 084 881

For more information visit www.planthealthaustralia.com.au
Hessian fly and Barley stem gall midge

What are these pests?

Hessian fly (*Mayetiola destructor*) and Barley stem gall midge (*Mayetiola hordel*) are two serious fly pests of wheat and barley. They resemble mosquitoes, and feed on the leaves, stems and heads of plants, resulting in stunted growth and reductions in grain yield and quality. Hessian fly has been known to cause crop losses of up to 40%. Control of these pests would rely on host plant resistance and cultural control as chemical control methods are unreliable.

What do they look like?

These closely related flies are extremely difficult to tell apart and look similar to mosquitoes.

Adults are small flies 2-4 mm long, have one set of wings with a few weak veins, and beaded and elongated antennae. Larvae are maggots (legless) and can grow up to 3-4 mm in length with a cylindrical body shape tapered at one end.

Hessian fly larvae (initially white in colour and then turning brown) lodge between leaf sheaths above nodes. The pupa and puparium, present towards harvest at the base of the plant, are dark brown in colour, up to 6 mm long, slightly tapered in shape and commonly known as “flaxseeds”.

For Barley stem gall midge, larvae are pale red at first, becoming milky white. The most distinguishable characteristic that is produced from direct feeding is the formation of pea-sized galls (swellings of the plant tissue) at the base of host plants between the leaf sheath and stem.

What can they be confused with?

There are no flies in Australia that attack cereal plants “above ground” that could be confused with these pests. While these pests are difficult to tell apart, they are both exotic to Australia and any insect matching these descriptions should be reported immediately.
What should I look for?

Feeding damage on cereal plants can cause leaf discolouration, from a darker green to bluish green or yellowing of new growth in seedlings. Plants are often stunted and tillers can become weakened causing plants to lodge.

The ‘flaxseed’ pupae imbedded into cereal stems, particularly on wheat, is the most detectable stage of Hessian fly development. Barley stem gall midge can be detected by the galls produced on barley stems.

How do they spread?

Adults actively fly and can be dispersed by wind currents. All life stages can also spread by ‘hitchhiking’ on straw and other plant material.

Where are they now?

Hessian fly is widespread in the USA and Europe. Other counties such as New Zealand, Africa and Russia have had detections of the pest. Barley stem gall midge has been recorded in northern Africa, Spain, UK and France.

How can I protect my farm?

Check your farm frequently for the presence of new pests and unusual symptoms. Make sure you are familiar with common grain pests so you can tell if you see something different.

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

EXOTIC PLANT PEST HOTLINE
1800 084 881

For more information visit www.planthealthaustralia.com.au
Sunn pest

What is Sunn pest?
Sunn pest (*Eurygaster integriceps*) is a sap-sucking bug that feeds on grain crops, damaging leaves, stems and grain heads. Feeding damage is caused by the injection of toxins into the plant by their piercing and sucking mouthparts that can result in grain abortion and, in large infestations, plant death. In addition, the baking quality of the flour produced by infected grains is substantially reduced.

Sunn pest feeds on wheat, durum, rye, oats, sorghum, and barley.

What does it look like?
Adults (10-13 mm long) vary in colour from greyish-brown to reddish-brown and have a wide triangular head and oval-shaped body. They have needle-like sap-sucking mouthparts. Their wings are completely hidden by a hardened ‘shield’ that covers most of the body and is rounded on the bottom edge. Juveniles (nymphs) are rounder in shape and normally dark brown to black. Eggs are light green and are laid in two even rows on host plant leaves, and darken near hatching.

What can it be confused with?
There are several similar sap-sucking shield bugs. Differences in the ‘shield’ colouration differentiate the insects in this group.

What should I look for?
Sunn pest is most easily seen in spring on wheat heads. In the northern hemisphere, in the initial stages of infestation the insects are more abundant on the edge of the crop, near bushes and trees where they over-winter. When high numbers of insects feed on the crop, the plants can develop ‘white-heads’.
The symptoms of a Sunn pest infestation include yellowing and dieback of the stem and leaves, and stunting of the growth of tips and buds. Feeding on other parts of the plant causes abnormal flower formation and discoloration. Feeding before grains develop can result in grain abortion or, if feeding occurs only after development, the grains are left shrivelled, discoloured (white) and/or empty.

Both adults and nymphs are capable of feeding on dry grain, providing moisture is present.

How does it spread?

Sunn pests have wings (hidden under the shield) and can fly over large distances. Adults migrate up to 250 km, particularly in areas with continuous crops. Sunn pest can also survive long periods without food in soil and can be spread with the movement of machinery or equipment.

Where is it now?

Sunn pest is found in parts of North Africa, West and Central Asia and Eastern Europe.

How can I protect my farm from Sunn pest?

Check your farm frequently for the presence of new pests and unusual symptoms. Make sure you are familiar with common grain pests so you can tell if you see something different.

Sunn pest eggs, approximately 1 mm in diameter, are laid in clumps on host plant leaves

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

EXOTIC PLANT PEST HOTLINE
1800 084 881
Barley stripe rust

What is Barley stripe rust?
Barley stripe rust (*Puccinia striiformis* f. sp. *hordei*) is a fungal pest of barley, potentially affecting crops in all Australian growing regions. Barley stripe rust would have serious economic impacts following establishment in Australia, as it is estimated that approximately 80% of the barley varieties grown here would be susceptible. Damage to barley plants varies depending on the plant growth stage, but crop losses due to Barley stripe rust can be up to 100%.

What does it look like?
The fungus produces stripes of rust pustules between the veins of leaves, and can also form on barley heads. The pustules may be more yellow than orange, and hence the disease is sometimes referred to as yellow rust. Barley stripe rust can build up rapidly if conditions are cool and wet, and infection is often first noticed as ‘hot spots’ within the crop.

What can it be confused with?
Barley grass stripe rust (present in the eastern states of Australia), and occasionally Wheat stripe rust, can infect barley. However, any barley plants showing stripe rust symptoms should be sent for identification through laboratory analysis.

What should I look for?
The development of stripe rust symptoms on any barley plants. In certain conditions ‘hot spots’ of symptoms can develop in the crop.
How does it spread?
Rust spores are small, light and may survive for several days. They can be spread over large distances by wind and easily attach to clothing, machinery and tools, allowing movement and spread between farms and regions. They may also transfer across the world on travellers’ clothing.

Where is it now?
Barley stripe rust occurs in Asia, Europe, Central Africa and North, Central and South America.

How can I protect my farm from Barley stripe rust?
Check your farm frequently for the presence of new pests and unusual symptoms. Make sure you are familiar with common grain pests so you can tell if you see something different.

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

1800 084 881

Stripe rust can also show symptoms on spikes, as demonstrated by this Wheat stripe rust infection

Leaves take on a yellow colour under high levels of infection

Advanced symptoms present on barley leaf sheaths
Wheat stem rust, pathotype Ug99

What is Ug99?
Wheat stem rust (*Puccinia graminis* f. sp. *tritici*) is a fungal pest of wheat and other cereal crops. A number of pathotypes of this pest are already present in Australia and resistant wheat varieties have been bred to limit crop losses. However, a new pathotype was discovered in Uganda in 1999, known as Ug99, which has overcome the resistance gene *Sr31*. Two recently derived pathotypes have also acquired additional virulence for *Sr24* (2008) and *Sr36* (2009). While Australia uses other sources of resistance, it has been predicted that there will be significant increases in the cost of production to the wheat industry in Australia should this pathotype, or its derivatives, become established.

What does it look like?
As with other wheat stem rust pathotypes, the first symptoms are elliptical blisters on the stems and leaves of the plant running parallel to the long axis of the leaf or stem. These blisters break open after a couple of days to reveal a mass of rust coloured spores.

What can it be confused with?
Ug99 symptoms are identical to other wheat stem rusts already present in Australia. If stem rust is detected on any wheat lines that were thought to be resistant to Wheat stem rust, samples should be sent for testing.

What should I look for?
The development of stem rust symptoms on wheat lines that are resistant to endemic species of stem rust.
How does it spread?
Rust spores are small, light and may survive for several days. They can be spread over large distances by wind and easily attach to clothing, machinery and tools allowing movement and spread between farms and regions. They may also transfer across the world on travellers’ clothing.

Where is it now?
Pathotype Ug99 was first detected in Uganda in 1999, and subsequently reported in Kenya, Ethiopia, Sudan and Yemen. It was identified in Iran for the first time in 2007.

How can I protect my farm from Ug99?
Check your farm frequently for the presence of new pests and unusual symptoms. Make sure you are familiar with common grain pests so you can tell if you see something different.

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

EXOTIC PLANT PEST HOTLINE
1800 084 881