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Reducing snail contamination at harvest

This season's extreme snail populations increase the risk of snails contaminating grain at harvest. Growers should monitor snail numbers up to four weeks before harvest, particularly those in the size range likely to be most problematic (i.e. similar in size to grain), to determine the need for header modifications and other strategies to minimise contamination. Be aware of receival standards for snails in different crop types which are available from [Grain Trade Australia Commodity Standards](#) or local grain traders. Keep grain losses to a minimum to reduce mouse feed over summer.

In spring, snails increasingly move into the crop canopy in preparation for summer aestivation. At harvest, snails present in the canopy above cutting height (and also in windrows) are readily harvested along with grain.

By harvest time, the options to reduce snail contamination are limited to (i) minimising the intake of snails into the header, (ii) maximising the separation of snails and grain within the header, and (iii) post-harvest grain cleaning. Reducing snail intake is easier to achieve early in the harvest season when fewer snails are present in the crop canopy, snails are more easily dislodged from plants with lower grain losses and snails still move down the plant canopy to feed in response to moisture events. There are several steps that can be taken to reduce snail contamination:

Harvest snail infested crops first where possible. Early harvesting after a light shower (~2.5mm) can also reduce snail intake without excessive grain moisture absorption.

Windrowing of cereal crops will dislodge some round snails and some may eventually move out of the windrows. However, windrowing of green crops (i.e. canola and pulses) may lead to more snails moving into windrows and eventually entering the header.

Dislodger bars knock some round snails from standing crops in front of the header and are most effective in crops being windrowed or harvested early. The design should be adjusted for different crop types and conditions to maximise snail removal while minimising grain losses. Travelling at right angles to the direction of crop lean where possible can further reduce losses.

Rotary stripping fronts on headers can significantly reduce snail intake in cereal crops relative to open front machines, improve harvest speed and will also smash some snails as they enter the header. **Raising the cutting height** is a cheaper but less effective option. Both approaches leave more standing straw and flattened straw lengths in wheel tracks which could create problems at sowing, but can be removed with a second pass; delaying this until mid summer (e.g. January) may also directly kill some snails.

Sieves and mesh screens should be set up correctly to maximise snail and grain separation within the header. Sheet metal (punch-hole and expanded mesh) sieves are usually more effective than louvre sieves in removing snails but have a lower cleaning throughput, therefore harvest speed may need to be reduced to avoid overloading and grain losses.

Post harvest grain cleaning is the last opportunity for snail removal, where differences in physical properties of snails and grain (i.e. weight, shape, size and strength) are used for separation. A combination of systems is usually required to meet receival standards without excessive grain losses. Post harvest rolling and crushing of snails is effective for all hard grains (except canola) at the optimal moisture content. Rolling is ideally combined with pre-scalping (sieving out larger snails first) and re-cleaning afterwards. An inclined belt separator is needed to remove small conical snails from canola.

Summer management as part of an integrated year-round approach should be a priority this season to reduce snail carryover into next season. Cultural practices for snail control should be balanced against other agronomic factors (e.g. erosion, mice). Control summer weeds initially to remove food and moist sheltering sites before undertaking other control methods. Bash stubble on hot days (> 35°C) ideally when several hot days will follow. A good even autumn burn after controlling weeds can also achieve high mortality.

In late summer and early autumn, monitoring snail activity and baiting early before egg-laying commences is critical to prevent breeding. Over last summer, prolonged moisture is thought to have led to a highly unusual egg-laying event in January / February producing a large juvenile population by autumn. If these conditions occur and snails remain active for an extended period, summer baiting under moist and overcast conditions (to reduce UV degradation of baits) should be considered. For more information on harvest techniques and integrated snail management, refer to the [Bash 'em, burn 'em, bait 'em publication](#) and [PestFacts Issue 6, 2011](#) (pdf).

Locust adults

Locusts are now starting to fledge in the southern **Flinders Ranges, Mid North, Murray Flats** and western **Eyre Peninsula** districts of South Australia (see PestFacts Issue 10) with remaining nymphs mainly 4th and 5th instars. Landholder treatment has somewhat reduced locust numbers but there remains a likelihood of localised formation of small swarms. These adults could move within and across various agricultural districts in coming weeks, including potential for small scale migration into the **South East** region. The overall locust population in South Australia remains much smaller than last spring and no further adult migration from interstate is expected.

Landholders are encouraged to continue treating nymphal bands on sight where possible to reduce populations prior to commencement of harvest withholding periods (see [Biosecurity SA media release](#)).

Locusts will be searching for green feed to build fat reserves and continue development. Any crop that remains green or partially green (including maturing cereals) is still at risk. Growers should be prepared to undertake treatment of crops where necessary to prevent damage. Treatment should directly target locusts when they are settled, either on the crop and/or in adjacent pastures. Preventative sprays are unlikely to protect crops.

Swarms are highly mobile and will often move on when they have the opportunity. Adults usually undertake short 'rolling' daytime flights in light winds (< 3 m/sec) when temperatures are between 20-35°C. They are more likely to settle if conditions are cooler (< 20°C), are either windy (> 3 m/sec) or very calm, and often in the late evening or early morning.

Locusts can also contaminate grain during harvest. Where possible avoid harvesting when large numbers of locusts are settled on the crop. If necessary, delay harvest or reap a different paddock first. Feedback from some growers last spring indicated that harvesting at slower speeds resulted in most locusts flying out of the way of the header.

Growers are reminded to be aware of harvest withholding periods when considering chemical options. Select insecticides with short withholding periods or delay harvest or windrowing if necessary. Consult with local agronomists and chemical resellers. Information on livestock residues and stock withholding periods can be downloaded from [SAFEMEAT Australia](#). For regular situation updates and further locust information, refer to the [Biosecurity SA locust webpage](#), [PestFacts Issue 10, 2011](#) (pdf) and continue to report significant locust activity to the locust hotline on 1800 833 451.

Armyworm alert

Growers in the upper **South East** should check maturing cereal crops for armyworm larvae and/or head lopping damage. Agronomist Craig Bell reported mid to late instar larvae (15-40mm) in 300 hectares of maturing barley at **Coomandook**, in numbers averaging 4-5 larvae per 10 sweeps. Lower numbers (1-2 larvae per 10 sweeps) were found in wheat crops. The grower will aerially treat barley with alpha-cypermethrin to remove potential for severe crop damage before harvest in around ten days. There were also reports at **Coonalpyn** and treatment of barley at **Keith**.

Armyworms are most damaging in cereal crops in late spring with barley most susceptible. Mature larvae lop through the last remaining green tissue below the head and once damage begins many heads can be lopped within a short time. One large larva can sever up to 7 heads of barley per day. At 1 larva per m², this equates to around 70 kg/ha lost grain per day. Threshold guidelines are approximately 3 large larvae per m² in barley and 10 per m² in wheat and oats, for crops more than a week away from harvest. Larvae grow up to 40 mm long, are distinctly striped and are distinguished by three prominent white stripes on the 'collar' behind the head running along the length of the body.

Monitor numbers of armyworm by checking in square metre plots (or row lengths converted to m²) in a number of areas through the crop. Sweep netting can underestimate numbers of this pest due to its variable behaviour. Armyworms are mainly nocturnal feeders and often shelter beneath plant material during the day; the first visible sign is often frass (droppings) at the base of plants. If warranted, treatment should be conducted in the late afternoon or early evening. Standard insecticides should control larvae provided there is adequate penetration through the canopy. For more information, refer to [Armyworm control in cereals - SARDI](#) (pdf), [Armyworm in cereal crops - DAFWA](#) (pdf) and [Armyworms - Vic DPI](#) .

Grain storage insects

With harvest commencing it is now time to think about managing grain storage. Grain quality is highest when harvested grain is first loaded into storage but can steadily deteriorate if the storage environment is not well managed.

Grain storage expert Peter Botta (PCB Consulting) says farm hygiene, aeration cooling and storage choice are three key factors that can provide significant benefits for grain quality and insect control in storage. Careful planning is essential for success and meeting end-user requirements. Generally, the combination of good farm hygiene and well-managed aeration cooling can overcome many problems with storage pests. Peter says 'prevention is better than cure' and recommends a number of basic steps to minimise problems that result in reduced grain quality:

- Maintain good farm hygiene. Ensure a safe start to the season by cleaning up grain residues in empty storage facilities and all grain handling and carriage equipment before new grain is stored and equipment used. Clean up spillages around silos and destroy all residues to prevent re-infestation.
- Ensure insect pests or weeds are not carried onto your property on farm equipment (i.e. harvesters). Equipment should be thoroughly cleaned down after use. The first grain through the header is often at the greatest risk of early infection.
- Once storages and equipment have been cleaned, treat them with an inert dust treatment.
- Check all seals on gas-tight sealed silos before each filling and replace them if they are worn or damaged. Conduct a pressure test to ensure the silo is gas-tight before fumigating.
- Install aeration cooling fans in storages to cool grain and install an aeration controller. Freshly harvested grain usually has a temperature of around 30°C which is an ideal breeding temperature for many storage pests.

Aeration fitted to stores will rapidly reduce grain temperatures, reducing insect breeding and aiding grain quality.

- Monitor grain monthly for insects, moulds, grain temperature and moisture.
- Generally, grain stored for more than six weeks should be treated for insect pests. All fumigation must be conducted in pressure-tested sealable gas-tight silos.

There are many damaging pests of stored grains; refer to the [GRDC Stored grain pests fact sheet](#) (pdf) and the southern Ute guide (pp. 104-117). South Australian Grains Biosecurity Officer Judy Bellati reminds growers to look out for any unusual pests or diseases such as [Khapra beetle](#) and [Karnal bunt](#) which are classed as [high priority exotic pests of the grains industry](#) and could have a significant impact on market access and stored grain quality if they were to establish in Australia.

It is imperative that growers are aware of phosphine resistance in stored grain insects. Phosphine fumigation for control of stored grain insects is very effective but must be conducted correctly, under gas-tight conditions held at lethal concentrations for 7-10 days (depending on temperature) to ensure effective control of all insect life stages. Poor fumigation often results in a partial kill (usually only adults), selecting for resistance by leaving immature insects, eggs, pupae and more resistant individuals in the population to survive and breed.

Judy also reminds growers that under phosphine label regulations, a “fumigation in progress” warning sign must be displayed. To obtain a free phosphine warning sign, contact Judy directly on judy.bellati@sa.gov.au or download from the [Plant Health Australia Biosecurity webpage](#). For more information on stored grain management techniques refer to the GRDC supported website storedgrain.com.au, the [stored grain photo gallery \(DPI&F\)](#) or contact Peter Botta on 0417 501 890 or pbotta@bigpond.com.

Remember, if you detect anything unusual send it in for diagnosis or call the Exotic Plant Pest Hotline on 1800 084 881.

Insect diagnostics

SARDI Entomology offers a **FREE insect diagnostic service for PestFacts subscribers**. Please send at least two intact specimens in a non-crushable container along with host food material, details of collection date, district, host-plant, description of damage caused and contact details, to:

NIPi insect diagnostic service
SARDI Entomology Unit
GPO Box 397, Adelaide 5001

Crop disease diagnostics

SARDI Field Crop Pathology Unit offers a range of diagnostic services: refer to [SARDI Crop pathology diagnostic services](#). Crop watch is an electronic newsletter service provided by SARDI. If you would like to receive Crop Watch please send your email address to Jon Lamb, Jon Lamb Communications jlcom@chariot.net.au titled “Crop Watch request”

PestFacts is a *FREE* service providing updates throughout the growing season on an “as-needed” basis of the latest information on invertebrate pests in broad acre crops in South Australia and western Victoria. It is supported by GRDC’s National Invertebrate Pest Initiative (NIPI). All information is sent by email to subscribers. Please email a coordinator to be placed on the circulation list. Your support and feedback are essential to the success of PestFacts.

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