



SOUTHERN REGION

EARWIGS IN THE MEDIUM AND HIGH RAINFALL ZONES

European earwigs have emerged as a pest of increasing significance in the past five to ten years as a result of changes in farming practices.

KEY POINTS

- ▶ Minimum and no-till farming practices have been linked to an increase in earwig populations.
- ▶ Earwigs attack mainly canola but also cereals, lupins and some legume crops.
- ▶ Not all earwig species are pests – some are beneficial for integrated pest management.
- ▶ Monitoring for earwigs should occur at night as they are nocturnal.
- ▶ Minimise the risk of introducing earwigs to a property by ensuring all machinery, vehicles and equipment are clean.
- ▶ Reducing stubble retention and decreasing refuges are likely to be the most effective strategies for managing populations.

There are many species of earwigs in Australia. Some are beneficial while others, particularly the European earwig (*Forficula auricularia*), are increasing in status as agricultural crop pests.

The paddock habitat for earwigs and other invertebrates has altered in recent years with on-farm practice change. Retained crop residues on the soil surface are thought to contribute to populations building up and damaging crops during autumn and early winter. Increases in earwig populations have also been linked to increases in soil organic matter.



Increases in earwig populations have been linked to stubble retention and improvements in organic matter in soils.

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Description

The European earwig is native to Europe and was introduced into Australia. Adult European earwigs range from 12 to 20 millimetres in size. European earwigs typically have brown bodies that are smooth and shiny with light brown/yellow legs and forceps, called pincers. They have a flattened, elongated body with pale shoulders, a reddish brown head and slender, beaded antennae.

Male forceps are usually larger and curved while the female's forceps are straighter. Adults usually have wings folded under a short protective cover, called the elytra. Young earwigs (nymphs) look similar to adults but are smaller and paler.

European earwigs feed on a wide range of food types such as organic matter, fruits,

ornamental plants, vegetables, flowers and seeds. They also eat live and dead insects, including caterpillars, mites and other earwigs.

Many native earwigs feed mainly on leaf litter and other organic material and are not known to damage crops. Several species have reddish brown foreparts and legs with a darker abdomen and pincers. Some earwigs do not have any wings as adults.

Earwigs are nocturnal. During the day, they shelter under mulch, rocks, logs and retained stubble, or in cracked ground. European earwigs generally congregate together while native earwigs are more solitary by nature. Adults rarely fly and are mainly dispersed by human activity. In primary production, they are commonly transported in contaminated seed, machinery and vehicles.

Pest and native earwig identification

Beneficial species



PHOTO: DENIS CRAWFORD, GRAPHIC SCIENCE

Common brown earwig, *Labidura truncata* – a native and predatory species.

Major pest species



PHOTO: DENIS CRAWFORD, GRAPHIC SCIENCE

European earwig, *Forficula auricularia* – a pest species.

Beneficial species



PHOTO: DENIS CRAWFORD, GRAPHIC SCIENCE

Euborellia earwig – a native and predatory species.

Major pest species



PHOTO: © WA AGRICULTURE AUTHORITY 2008

Male (left) and female European earwigs have different-shaped pincers.

Minor pest species



PHOTO: DENIS CRAWFORD, GRAPHIC SCIENCE

Black field earwig, *Nala lividipes* – a predator and minor crop pest species.

When disturbed, earwigs may emit a foul-smelling liquid as a self-defence mechanism, but if further threatened, they can pinch with their forceps.

Species

Correctly identifying earwig species is important because they each have different roles as pests or beneficial species.

Not all earwigs found in crop paddocks are pests. While European earwigs are renowned as pests, other earwigs can be benign or beneficial. Other common earwig species include:

- Common brown earwig, *Labidura truncata*, which is a native and beneficial species. They are mostly red-brown in colour and range from 10 to 45 mm in length. This species is most common in sandy habitats, but occurs across southern Australia, and mainly feeds on soft-bodied insects, such as caterpillars, lucerne flea and mites. It can be distinguished by an orange triangle behind its head on the elytra (wing cases). Males have long slender forceps with a distinctive tooth near the middle of the inner edge.

- Black field earwig, *Nala lividipes*, which is a minor pest species of broadacre agriculture, only occasionally attacking crops. They are smaller at about 15 mm long, shiny black in colour and can be a pest of seeds and seedlings. Adults have wings and can fly while nymphs resemble adults but are wingless. The black field earwig is

omnivorous, meaning they can be a pest and a predator. They are known to attack wheat, sorghum, maize and sunflowers. They eat newly sown and germinating seeds and the roots of crops, resulting in poor establishment. Black field earwigs prey upon a range of insects, including wireworms and *Helicoverpa*.

- Euborellia* spp. are small, dark-coloured earwigs ranging from 10 to 25 mm in size. There are many sub-species that can be difficult to distinguish. They are flightless and appear to form mating

pairs that maintain a small territory. Male and females will often be found together and, at times, with a brood of young earwigs. Early research has indicated they may not be plant feeders and are likely to be more predatory.

Life cycle

European earwigs complete one generation per year although females can produce two broods in some years. They can survive in a range of environments and the length of their life cycle depends on temperature.



PHOTO: KYM PERRY, SAROLI

Earwig damage to a canola seedling.

At 25°C, development from egg to adult takes nine to ten weeks but at 15°C it takes up to five weeks longer.

In winter, adult females lay batches of 20 to 80 white oval eggs in burrows in the topsoil which hatch in two to three weeks. In some years, under favourable environmental conditions, earwigs may lay eggs in late spring to produce a second summer brood. There are several nymphal instars (stages between moults). Female earwigs remain in the burrow, protecting the eggs and nymphs. Females guard the early instar nymphs initially but after a couple of moults, the young must fend for themselves or risk being cannibalised.

Adults are inactive over summer while nests of juveniles become active in winter and mature over spring.

Crop damage

European earwigs mainly attack canola but will also attack cereals, lupins and some legume crops. Damage can be scattered because of their patchy distribution.

Earwigs chew the stems and cotyledons of emerging seedlings, killing plants or slowing plant development. As the plant grows, foliar damage includes shredded leaf tips and jagged holes in leaves. Earwigs can completely defoliate young seedlings leaving only stems or bare ground in patches. They can also chew through seed pods.

Earwigs feed together at night, and in many cases, damage will start along the edges of a paddock. Earwig damage to plant leaves closely resembles feeding damage caused by slugs.

Damage has been reported mainly in the medium and high rainfall zones including South Australia's Mid North and South East regions, Victoria's Western Districts and the South West Slopes of New South Wales. Nearly all cases of damage have occurred in paddocks where minimum or no-till practices were used with high stubble loads, and often on heavier soils.

Windrowing and harvesting

Grain with high numbers of earwigs may require cleaning to meet delivery standards. Trials have shown that earwigs are more likely to be found sheltering under windrowed crops than in standing crops.

If windrows are harvested during the heat of the day, the number of earwigs found in the grain is not significantly different to that in a standing crop. During the hottest part of the day the earwigs remain on the soil surface under the windrows. At night, earwigs move out from under the windrow into the top of the windrow. As a result, grain harvested at night is more likely to contain earwigs and require cleaning.

When windrowing crops, maintain the correct windrow height ensuring the swath remains above the ground. If windrows are sitting close to or are on the ground, earwigs are more likely to be harvested with the grain. If these windrows are harvested using crop lifters, there will be significantly more invertebrates, such as earwigs, present in the harvested grain compared with grain harvested using a belt pick-up front.

Monitoring and management

It is important to distinguish earwig species in order to make the most appropriate



PHOTO: DEPARTMENT OF AGRICULTURE AND FOOD WA

European earwig damage to a lucerne seedling is clear with irregular chewed edges to the leaf.

management decision and accurately assess the risk of attack to emerging crop seedlings. Native earwig species can have an important role in integrated pest management and control of other insects.

Monitoring for earwigs is best conducted at night using a torch because they are nocturnal feeders. Another approach is to set pitfall traps – a small plastic cup buried flush in the soil. A small amount of liquid in the bottom will help to contain the insects that fall into the trap. Traps should be left for at least 24 hours but preferably longer and are useful for catching invertebrates,

such as earwigs, which actively move across the ground. Refuge traps such as carpet squares can also be used.

Minimise the risk of introducing European earwigs to a property by ensuring all machinery, vehicles and equipment arriving on the property are clean and check seed and plant material for live insects before allowing them on-farm.

Control

Control options in broadacre crops are limited. Cultural control practices such as reducing stubble retention and decreasing available refuges are likely to be the most effective strategy for managing populations over time. Burning has been successful in reducing populations in some instances.

If any damaged areas need to be reseeded, a higher seeding rate is recommended to compensate for further damage.

There are no sprays registered for in-crop control of earwigs. Fipronil seed dressings are registered for protection of sorghum and sunflower crop seedlings from black field earwigs in all states except South Australia and Tasmania. Imidacloprid seed dressings are registered for black field earwig in maize, sorghum, sunflower and sweetcorn in all states.

At times European earwigs are a nuisance around buildings. They have been known to spread into crops from infestations around agricultural sheds and buildings. Insecticides are registered for use around the exterior of buildings and structures.

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This information, along with advice and recommendations, is emailed to nearly 2000 individuals, organisations and businesses working with broadacre crops and pastures. Subscribe in South Australia by contacting Kym Perry, 08 8303 9370 or kym.perry@sa.gov.au and in Victoria and New South Wales by contacting Paul Umina 03 9349 4723 or email pestfacts@cesaraustralia.com

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