IDENTIFICATION AND CULTURAL CONTROL OF INSECT AND ALLIED PESTS OF CANOLA
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IDENTIFICATION AND CULTURAL CONTROL OF INSECT AND ALLIED PESTS OF CANOLA

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Summary

Canola crops are very susceptible to attack by pests in the early seedling stages, that is from emergence until they have five true leaves. If growers reduce pest numbers the year before sowing canola, the likelihood of having pest problems is decreased.

Crops should be checked during emergence and for the three weeks following emergence; this will enable appropriate control measures to be taken early and prevent excessive damage.

It is important to correctly identify the pest causing damage so appropriate control measures may then be taken. To assist in this, the type of damage caused by mites, lucerne fleas, weevils, false wireworms, earwigs, bugs, aphids and caterpillars is described and their management and biology is discussed. A guide of appropriate insecticides with rates of application can be found in Farmnote No. 1/2005 ‘Chemical control of insect and allied pests of canola’.

For pests not covered by this Bulletin, refer to your Department of Agriculture Office for advice.
Beetles

**False wireworm**

**Description**
False wireworms that damage canola crops are the larval stage of the bronzed field beetle. They are dark brown larvae up to 12 mm long with upturned spines on the end of the body. Vegetable beetle larvae are also called false wireworms but breed in summer so their larvae rarely damage winter crops. These larvae have a worm-like shape with shiny hard skin.

**Lifecycle and damage**
Bronzed field beetle larvae begin feeding in early autumn and become adults in spring. These larvae are most destructive when they have reached half size, before the crop emerges. Large areas of canola crops may be thinned or even destroyed by bronzed field beetle larvae chewing through stems of seedlings at ground level.

**Control**
Stubble retention practices favour this pest as crop or pasture residues on the soil surface are advantageous to their survival and breeding. Lupin stubble appears to be particularly suitable.

The most effective management for this pest is cultural control such as trash removal and maintaining recommended seeding rates. Insecticidal seed dressings have been tested and found to be ineffective.

The adult or beetle stage of false wireworms—vegetable beetle and bronzed field beetle—may be present in large numbers but usually cause little damage to canola.

For further information on biology refer to Farmnote No. 32/2002 ‘Bronzed field beetles attacking canola seedlings in Southern Australia’.
Weevils

Description

Weevils are beetles with ‘long snouts’. Pest weevils found in canola are grey so are often hard to find, but can be distinguished by the following:

- The vegetable weevil is about 10 mm in length with two short white stripes at an angle on each side of its abdomen.
- Desiantha weevil is small about 5 mm long, dark coloured and sometimes has grey flecks on its back.
- Small lucerne weevil is about 5 mm long, light grey in colour with a white stripe on each side.
- Fuller’s rose weevil is about 8-10 mm long but has yellow stripes on its side and back.

Life cycle

Vegetable weevils feed on capeweed, so are attracted to any paddock that has capeweed present. Following germination of capeweed, the vegetable weevil moves into the paddock to feed and lay eggs. The eggs hatch into the larval stage in early winter. Larvae feed on the plants on which they hatched.

The adult weevils may move into the edges of canola paddocks soon after crop emergence and eat leaves or whole plants. Crops in the high rainfall areas and next to bush areas are the most likely to be attacked.

Desiantha weevil adults emerge from the soil in spring to early summer and survive by hiding in soil litter, under stones, plants or clods. Eggs are laid into the surface of the soil and hatch when there is sufficient moisture for plant germination. Larvae feed on grass, and cereal seedlings. Adults feed on green plant material including canola and capeweed.
Small lucerne and Fuller’s rose weevil are mainly pests of the south coast. Adults of these two weevil species emerge from the soil in summer to early autumn prior to the first rains of the season. Little is known of the life cycle of these weevils. It is likely eggs are laid into the soil in winter when there is sufficient organic matter for the larvae to feed on.
**Damage**

Vegetable, desiantha, small lucerne and Fuller's rose weevils cause serious damage, especially when they chew through stems and kill canola seedlings. Adult desiantha weevil are the most abundant and damaging but are difficult to find due to their small size and colouring. Crescent shaped cut-outs from leaves is typical of weevil chewing damage.

**Control**

A border spray at crop emergence will help to control the *vegetable weevil* before it moves throughout the crop. Paddock boundaries should be checked every few days until the crop has four to five true leaves.

Vegetable weevil adults and the less damaging larvae can be reduced by decreasing the amount of capeweed in paddocks by:

- Spray-graze pastures to reduce capeweed biomass in the year before cropping canola.
- Control capeweed early in the season either by heavy grazing or herbicide application in paddocks destined for canola.

Weevils such as *desiantha, small lucerne* and *Fuller's rose weevil* are not controlled by border sprays. Unlike the vegetable weevil, these weevils tend not to migrate out of paddocks.
Caterpillars

*Brown pasture looper*

**Description**
The brown pasture loopers is grey or brown with black and cream stripes. Young caterpillars walk with a characteristic looping locomotion. When the caterpillars reach full size at 30 mm long, they cease to walk in this looping locomotion.

![Brown pasture looper on capeweed](image)

**Lifecycle**
Eggs are laid in early to mid autumn. The caterpillars that hatch from the eggs grow to full size in about two months, then pupate and remain in the pupal stage over spring and summer. They emerge as moths in the following season. Brown pasture loopers have only one generation per year.

**Damage**
Caterpillars chew the leaves of crops. They are often present around the edge of crops, having moved into the crop from adjacent pasture.

**Control**
Brown pasture loopers are easily controlled by insecticides. They are most damaging in autumn when large sized caterpillars (>20 mm) transfer from summer and autumn weeds onto newly emerged canola seedlings. Loopers are sometimes only present around the edge of the crop so a border spray may provide sufficient control.
Cutworms

Description
Cutworms usually feed at night and hide under debris or soil by day but can be found by scratching the soil surface near the base of affected plants. They grow up to 40 mm long and are smooth bodied with most having uniform colouring ranging from pinkish brown to black.

Lifecycle
Eggs are laid on plant material near the ground. The caterpillars emerging from the eggs grow with several moults until they are full size and then pupate in the ground. Adult moths emerge from the pupae usually after a month. Several generations are possible in one season but it is only in autumn that they damage canola.

Damage
Damage is often seen as bare or thinned patches in the crop. The caterpillars often chew through or “cut-off” the stems of young seedlings hence the name “cutworm”. Numbers can be easily underestimated, as they can be hard to find.

Control
Cutworms are easily controlled by insecticides. They are most damaging in autumn when large caterpillars (>20 mm) transfer from summer and autumn weeds onto newly emerged canola seedlings.

Cutworm larvae differ in colour
European earwig

Description

Adult European earwigs range from 12 to 20 mm in length. They are smooth and shiny, dark brown with pale yellow legs pincers and ‘shoulders’. The young earwigs (nymphs) are similar, but smaller and paler than the adults.

European earwigs are easily confused with native earwigs. Native earwigs generally have reddish brown foreparts and legs, with a darker abdomen and pincers. They are not known to damage canola.

Lifecycle

Adult females lay eggs in batches of 20 to 80 eggs in the topsoil usually in spring and early summer. Females may lay more than one batch of eggs per year. These eggs hatch after two to three weeks. Nymphs will moult six times before becoming adults.

Damage

Intensive cropping with and stubble retention favour this pest as crop residues on the soil surface are advantageous to their survival and breeding. Large numbers can build up in the stubble during autumn and early winter and damage crops sown into the stubble. Canola at emergence is particularly susceptible but heavy earwig infestations may also damage mature canola crops. As the earwigs also shelter under swaths, they may be harvested with the grain, becoming a grain contaminant.

Earwigs tend to feed on a front ie starting at one edge of the crop and moving into the crop. Earwig damage is typically irregular holes in the leaves of only some plants, adjacent plants being left undamaged.

Control

Currently there are no registered chemicals for the control of earwigs in canola crops. Reducing stubble residue in paddocks in most cases leads to a decrease in earwigs.
Lucerne Flea

Description
Lucerne fleas are 3 mm in length and have a round plump body. They vary in colour, mainly greenish with a mottled pattern of brown and yellow. Lucerne fleas also jump upwards when disturbed.

Lifecycle
The first soaking winter rains cause the over-summering eggs to hatch. Several generations may develop over the growing season depending on the weather. At the onset of warmer and drier conditions, over-summering eggs are produced which are protected by a clay cement layer excreted by the females. Consequently, this pest is more common on heavier soils and cannot survive on very sandy soils with low clay content.

Damage
Lucerne flea feeds on the green leaf tissue, leaving a surface layer of the leaf as a whitish film, resembling a window. Severely affected areas may look bleached and resemble redlegged earth mite damage. Canola seedling growth may be retarded and seedlings may die if attacked by heavy infestations.

Control
Canola crops are most likely to have lucerne flea problems where they follow a weed infested crop or a pasture in which lucerne flea has not been controlled. Consider implementing lucerne flea control in the season prior to sowing canola to minimise numbers in your canola crop.

Insecticides that control mites, do not necessarily control lucerne flea. For example commonly used synthetic pyrethroids do not control lucerne flea. Be aware that by controlling competitors, this may leave a niche in which lucerne flea may multiply. If both lucerne flea and redlegged earth mite are present, it is recommended to undertake control measures which are effective against both.
Mites

**Redlegged earth mite**

**Description**

Redlegged earth mites (RLEM) are pinhead sized (up to 1 mm), with a velvety black body and 8 orange/red legs. They are often found in high numbers.

**Lifecycle**

Mites hatch from over-summering eggs, after adequate exposure to moisture and low temperatures during autumn. Several generations (usually three) develop over winter and spring. Towards the end of spring, mites produce thick-walled, over-summering eggs that can resist dry summer conditions and carry the mite population to the next season.

**Damage**

RLEM cluster on the young seedlings, rupturing cells and sucking the juices; this leads to a leathery and silvery appearance of the leaves. More severe symptoms of RLEM damage are shrivelling, twisting, slowing of growth, and in some instances, death of plants. A heavy infestation of RLEM may decrease plant density, retard the development of a canola crop and reduce yield, or even kill every seedling.
RLEM are the most serious pest of emerging canola crops. Action should be taken in the preceding season to reduce their numbers. If no action has been taken, daily inspections will be required during emergence.

One or more of the following strategies will decrease RLEM:

1. Reduce mite numbers in the previous crop or pasture phase by:
   - Controlling weeds in the crop. A weed free crop, especially cereals, will have very few mites and over-summering eggs to carry through to the following season.
   - Grazing pastures throughout the previous spring to less than 2 T/ha Feed On Offer (dry weight) will reduce mite numbers. If achieved this will control RLEM as effectively as chemical sprays.
   - Spraying for RLEM at the correct time before summer eggs are laid eg TIMERITE® is a free package that provides a date in spring for a single spray to stop females from producing over-summering eggs. For further information contact www.timerite.com.au or the Department of Agriculture.

2. A bare-earth spray immediately after seeding can be very effective. Bare-earth chemicals provide protection to germinating seedlings during and after emergence. RLEM can cause considerable damage to unprotected germinating seedlings especially if insecticide application is delayed until just before emergence. Bifenthrin has the longest effect; other bare-earth chemicals may require a follow-up spray after two to three weeks.

3. Insecticide-treated seed may provide some protection to germinating seedlings if low RLEM populations are present. Where RLEM populations may be large, follow-up sprays may be required.

4. The crop may be sprayed at emergence. If mites are causing serious damage as the first plants are emerging, a contact chemical should be used. Systemic chemicals such as dimethoate and omethoate will be ineffective if used on bare ground. A follow-up spray within two weeks of seedling emergence may be required if redlegged earth mites hatch over an extended period.
Clover mite or Bryobia mite

Description
The clover mite is often confused with redlegged earth mite; it is reddish-grey, pie-shaped, with red legs and two long forelegs.

Lifecycle
Adult clover mites are most active in warm conditions especially in late spring summer and autumn. These mites do not generally survive cold winter conditions or very dry summer conditions. All life stages can be present in protected areas if there is sufficient green plant material. Over-wintering eggs are most likely laid early to mid winter and hatch as conditions warm up in spring. As pastures deteriorate in late spring or summer, over-summering eggs are laid. These eggs hatch as soon as there is sufficient moisture for plants to germinate.

Damage
This mite causes similar damage to canola as RLEM. Clover mite also creates long trails composed of whitish grey spots on the top of the leaf surface.

Control
Clover mite may be a serious pest of canola in years where there are early autumn rains. Early rains allow weed growth that lead to increased mite populations. It is a difficult pest to control and is best dealt with by killing all weeds well before seeding and/or applying a miticide to the weeds with the knockdown herbicide.
**Balaustium mite**

*Description*

Balaustium is often confused with the above two mite pests but grows to be twice the size of a redlegged earth mite, about 2 mm in length. It has a rounded body, densely covered with stout hairs.

*Lifecycle*

Balaustium mites survive all year round if green material is present. Unlike redlegged earth mites, Balaustium mite eggs do not have a cold temperature requirement to stimulate hatching. As pastures deteriorate in late spring or summers, over-summering eggs are laid. These eggs will hatch as soon as there is sufficient moisture for plants to germinate.

*Damage*

This mite causes typical mite damage, that is, cupped leaves, which may have a leathery appearance.

*Control*

Balaustium mite is often found in southern coastal areas after early autumn rainfall before redlegged earth mites appear. It may transfer from weeds to canola, but is usually less abundant than other pest mites. Balaustium is not susceptible to the chemicals used for the other mites and should be managed by killing all weeds several weeks in advance of seeding. No insecticides are registered for control of this pest but its numbers are reduce by broad spectrum chemicals applied with knockdown herbicides.

*Leaf damage symptoms* can help to identify the different mite species:

- Redlegged earth mite causes silvering of leaves
- Clover mite (Bryobia mite) creates long trails composed of whitish grey spots on the top of the leaf surface
- Balaustium causes cupping and leathering of canola cotyledons
Slugs

Description
The most common species are the black keeled slug and the reticulated slug. Both species grow to 25 mm long. The black keeled slugs are black to brown with a ridge down the back. Reticulated slugs have dark brown mottling and range in colour from light grey to fawn.

Lifecycle
Slugs inhabit the heavier soils, especially soils that form cracks or large clods that the slugs are able to use as refuges from hot and dry conditions. Slugs may move to a depth of 20 cm or more then re-emerge any time conditions improve.

Slugs are hermaphrodites, and both members of a mating couple can lay eggs. Mating usually occurs when favourable moist conditions occur after summer. Eggs are laid into moist soils usually in mid-autumn to mid-winter. They hatch in two to four weeks. The eggs cannot survive a hot dry summer or lay dormant in the soil. Young slugs become sexually mature at a year old.
Damage

Irregular pieces chewed from leaves and shredded leaf edges are typical of slug damage but many seedlings will be eaten down to ground level and will be difficult to detect. The slugs hide under trash, clods or rocks during the day, but are active at night, especially moist, warm and still nights. Their fresh trails of white and clear slime visible in the morning indicate their presence.

Control

An accurate count is difficult to establish especially in cracking soils, but ten large slugs per square meter may completely destroy an emerging crop. A useful method to detect areas infested with slugs, prior to seeding or crop emergence, is to lay lines of slug pellets with a rabbit baiter. In infested areas, slugs are attracted to the freshly turned soil and pellets placed in the furrow. Very large numbers can be found dead or dying in the furrows or nearby. An alternative method to gain an indication of the numbers of slugs present in a paddock is to place carpet squares or tiles on the soil surface, with pellets under them. After a few days, count the number of slugs under and around each square. Once the crop has been seeded and germination is commencing, crops should be examined at night for slug activity.

The best time to apply pellets is early in the season after good germinating rains, this is when slugs are emerging from their hiding places and are looking for food. Late applications are less effective at attracting the slugs as there is a lot of green material that provides an alternative food source. Large slugs are surprisingly mobile in moving to baits and plants.

Baiting with multiple applications rather than a single application of a high rate is best as the pellets lose their effectiveness after a few nights. Pellets may become covered by soil during rain and decay after wetting. Consider reapplying baits after large rainfall events. Medium and large sized pellets have been as effective as small hard pellets. The larger pellets are possibly more palatable and less likely to be covered by soil.
Aphids

Description

Aphids are small soft bodied insects that grow up to 3.6 mm long. Adults can be winged or wingless; all immature forms are wingless. There are three types of aphids that can attack canola; turnip aphid, cabbage aphid and the green peach aphid. Cabbage aphids tend to heavily colonise single plants or groups of plants in “hot spots” within the crop, whereas turnip aphids invade more evenly across a whole paddock and can cause damage that is less noticeable without close inspection. Green peach aphid can be found on the underside of older leaves. Turnip and cabbage aphid tend to attack the growing point of canola, for example the flower buds, which is more damaging than attack on leaves.
FLOWERING AND PODDING PESTS

Lifecycle

Turnip aphid, cabbage aphid and green peach aphid have numerous generations throughout the year and survive the off season on alternative hosts.

Damage

Aphids may be present on seedlings but they commonly occur in canola during budding and flowering. Although they may cause some damage, canola plants often compensate for this damage and chemical control may not be warranted.

Aphids also transmit virus diseases. The most significant virus in canola crops in WA is beet western yellow luteovirus (BWYV) the vector for which is the green peach aphid. This virus can be yield limiting where infection occurs early in the seedling stage.

Control

In high to medium rainfall areas canola crops appear to have the ability to recover from aphid infestations which occur during flowering. Canola grown in low rainfall areas is less likely to compensate for any damage by aphids.

In making the decision to apply insecticide for aphid control, consider the two main risk factors that are likely to result in yield loss:

- a threshold of 20 percent, or more, plants infested with aphids
- marginal growing conditions.

Border sprays under these conditions can sometimes be justified for cabbage aphid, which can colonise heavily around the perimeters of crops.

For further information on aphid management, refer to Farmnote No. 45/2004 ‘Aphid management in canola crops’.
Caterpillars

Native budworm

Description
Native budworm larvae are shades of orange, brown and green and usually have a dark stripes along the body. They grow up to 40 mm long.

Lifecycle
The native budworm can develop large populations over extensive areas on native plants. These populations often migrate into agricultural regions in late winter and spring. Migratory flights are unpredictable, as moths are carried hundreds of kilometres from breeding areas by high altitude currents.

Damage
It is in those years when native budworm larvae are present as when canola crops are maturing that serious damage may occur. The canola pods only become attractive to the...
caterpillars as the crop nears maturity and begins to hay off. Native budworm will also continue to damage seed pods if the crop has been swathed when many pods are still green with soft seed.

Control

It is essential to determine native budworm numbers by sampling crops using a sweep net because in dense canola crops the grubs are very difficult to detect. Thresholds are given in Table 1.

The decision to spray for native budworm in canola can be left until pods are beginning to mature. If caterpillar numbers are below threshold limits, the decision to spray should be delayed and periodic sampling continued. One well timed spray to control caterpillar populations is all that is required in most situations.

Table 1. Economic spray thresholds for the major caterpillar pests of canola during flowering to maturity in Western Australia

<table>
<thead>
<tr>
<th>Canola plant stage</th>
<th>Thresholds for native budworm</th>
<th>Threshold for DBM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-flowering (stressed crop)</td>
<td>N/A</td>
<td>30 or more grubs per 10 sweeps</td>
</tr>
<tr>
<td>Pre-flowering (no stress)</td>
<td>N/A</td>
<td>50 or more grubs per 10 sweeps</td>
</tr>
<tr>
<td>Mid to late flowering (no stress)</td>
<td>N/A</td>
<td>100 grubs or more per 10 sweeps</td>
</tr>
<tr>
<td>Pod maturation</td>
<td>6 or more grubs per 10 sweeps</td>
<td>200 grubs or more per 10 sweeps</td>
</tr>
</tbody>
</table>

N/A: Not applicable or unlikely to occur.

NOTE: Sample several areas in a crop and spray if you get the average number of caterpillars in the table above.
Diamondback moth

Description
Take care not to confuse diamondback moth larvae (DBM or Plutella xylostella) with native budworm larvae. DBM larvae are usually pale green, cigar-shaped, wriggle violently when disturbed and can hang down on a fine thread. They are also a third of the size of a native budworm being up to 12 mm in length.

Lifecycle
Several generations of this pest may occur each year. Under warm conditions, they may complete their lifecycle in a fortnight. It is likely DBM breed up on volunteer canola, radish and other native plants in the off season. Adult moths disperse when green plant material has dried off. They may be carried long distances on prevailing winds.

Damage
DBM feed on the leaves, buds, flowers and seed pods of Brassica species. Small caterpillars leave irregular holds in the leaves. In high densities the DBM may leave only the leaf veins bleached white. Surface grazing of the pods does not appear to affect yield.
**Control**

DBM is a major vegetable pest over the warmer months and is difficult to control as it breeds prolifically and spraying has limited effect. It is not usually a major problem in the grainbelt with the exception of those years when abundant early rains and mild winters allow them to breed up on volunteer canola plants and radish.

Chemical control of DBM in canola is usually not warranted unless numbers exceed 100 grubs per 10 sweeps and more than 30 percent of these are less than 5 mm long at the mid-flowering to late flowering stage. (Refer to Table 1 on page 23 for thresholds). The application of a single insecticide spray on these populations of DBM in canola often gives poor results. Two or even three sprays applied at 7-14 day intervals may be required to reduce DBM numbers below damaging levels. It is important to monitor numbers a few days after each spray application to determine the effectiveness of the chemical.

*If the canola is under stress, or if crop yield is expected to exceed 1.5 tonne per hectare, then the threshold level for DBM should be reduced. Consult Cropline or your agronomist for recommendations on the threshold level for your crop.*
FLOWERING AND PODDING PESTS

Rutherglen bugs

Description
Adult bugs are greyish-brown with dark markings. They are narrow bodied, 3 to 4 mm long with wings that are folded flat when the bug is at rest. Immature bugs are dark red and more swollen in shape than the adults.

Lifecycle
Eggs are deposited on the soil, on grass blades and on the flower heads of weeds. These eggs hatch into nymphs, which grow through five moults until they become adults. The length of the life cycle from egg to adult is about four weeks. Rutherglen bugs survive winter as adults and breeding commences in early spring. Large numbers do not usually develop until early summer.

Damage
Rutherglen bugs are sap suckers and damage to susceptible plants is similar to that caused by aphids. Canola crops are not usually damaged by these bugs. When there is a green bridge over summer and mild autumn conditions, high numbers of rutherglen bugs may coincide with canola at emergence. In this case rutherglen bugs may damage the canola.

Rutherglen bugs may also cause problems by contaminating grain at harvest. Their presence in harvested grain may render it unacceptable as their body oils may taint the canola oil.

Control
Control summer and autumn weeds prior to seeding canola, particularly when there is a green bridge over summer and an early break, to minimise rutherglen bug populations at seeding. The problem of grain contamination can be solved by attaching screens to headers. Harvesting at night may attract more insect.
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