

## Agfact P2.2.25 Lucerne for pastures and fodder, continued –

The following section covers the second half of this Agfact, dealing with:

- Weed Control,
- Pests and Diseases
- References

The bulk of the text and illustrations dealing with lucerne for pasture and fodder is contained in the first section.

Please follow this link to [visit the first section](#).



W. McDONALD

**Using herbicides during winter can be very effective in controlling annual grasses and broadleaf weeds, ensuring a weed-free first cut in the spring.**

### WEED CONTROL

A large number of weeds affecting lucerne are of economic importance. The key to reducing production losses is the ability to recognise various weeds that have the potential to cause damage in your situation. A weed control strategy then needs to be built into your production system.

#### At establishment

Lucerne seedlings are very susceptible to competition. To overcome this problem, sow into a seedbed that is free of likely troublesome weeds, as far as is practicable. Good weed control in the preceding pasture or crop can significantly reduce the weed population during the establishment year.

In the establishment year, weeds can be controlled with conventional cultivation before sowing,

The increased seedling vigour of winter-active varieties promotes establishment, but it is not enough to overcome many of our most common weed problems.

The range of herbicides available to assist lucerne to establish is very narrow. Most are expensive and control only a limited range of weeds. One notable exception is the use of a

pre-sowing herbicide that gives effective control of the problem weeds, especially annual ryegrass and wireweed, at a reasonable cost.

If you are expecting a severe infestation of summer weeds (as is often the case under irrigation and on the North Coast), the best strategy may be to avoid the competition. This can be done by changing the sowing time from spring to autumn or early winter, rather than relying on expensive herbicides to salvage the spring sowing. The same strategy can be used where nutgrass is a problem, as chemical control is expensive.

If winter weeds, including broadleaved species, are likely to be present, either sow lucerne in spring or control weeds by prior cultivation or with a herbicide, subject to the availability of irrigation or a reliable rainfall in spring.

Couch grass is particularly difficult to control in lucerne. Where couch grass is a problem, it may be necessary to delay sowing the lucerne and crop twice to reduce the infestation. Cultivation to bring runners to the surface during dry or frosty periods is the main means of controlling couch grass. Heavy grazing followed by the use of a herbicide has also had some success.

Alternatively, a post-emergent herbicide is now available, but the cost may be prohibitive except under irrigated hay conditions.

### **In established lucerne**

Good management reduces weed problems in established lucerne. Herbicides are useful if they are used correctly, but they are much more expensive than good management. Sometimes they can temporarily depress the growth of the lucerne, allowing further weed invasion. In many situations herbicides are an essential part of management to allow profitable production.

If management procedures fail or are inappropriate, many weeds can be controlled by herbicides. Herbicides should never be a substitute for good management, but they can be a valuable aid in a sound management program. Sometimes herbicides are essential if lucerne is to survive and flourish. In places where weeds grow very vigorously – for instance, in summer grass on the North Coast – you must use a herbicide if you want good quality lucerne.

Control of winter-growing grasses and broadleaf weeds ('winter cleaning') is generally cost-effective in irrigated hay crops because of the relatively low cost and the combined advantages of quality, yield and possibly increased stand life.

### **Grazing management**

Rotational grazing, as described in the section on *Grazing management*, maintains a vigorous stand that resists invasion by weeds reasonably well. The stocking rate should be high enough to make full use of the available feed as far as practicable.

### **Fertiliser management**

Lucerne is very responsive to nutrients such as N, P, S and K, but too much fertiliser can encourage weeds such as barley grass, especially if competition is low. Good paddock records and soil tests are valuable aids in monitoring changes in soil fertility, allowing you to determine fertiliser needs more accurately.

Crop rotation needs to be considered to manage fertility built up by lucerne, as well as for many other benefits.

### **Cutting, slashing and burning**

Cutting hay or slashing in early spring may help to control many erect-heading weeds. Other weeds, such as couch grass and khaki weed, thrive on regular cutting. Burning may help to



R. TROUNCE

**Golden dodder is a serious parasitic weed of lucerne. It must be identified and eradicated early.**

remove weedy or insect-infested trash, and generally does little damage to well-established lucerne on moist soil.

The nutritive value of a lucerne-based pasture may not be improved by removing weeds. When lucerne is cut at the correct stage of growth, many weeds are young and highly nutritious. For example, first-cut grassy lucerne hay can have the same feed value as grass-free hay. However, grass-free hay attracts a premium on the market, and this may justify expenditure on herbicide. It may also be worthwhile to reduce grass seed contamination in wool.

As lucerne pastures thin and weeds invade, the practice of drilling in a winter cereal or forage grass (for example, ryegrass) can reduce weed invasion and maintain livestock production while using soil nitrogen, thus reducing the bloat risk and prolonging the life of the remaining lucerne.

For information on the herbicides that are available and the weeds they control, see the *Weed control in lucerne and pastures* booklet, available from NSW Agriculture regional and district offices.

## **PESTS AND DISEASES**

A great number of insects and related forms can be found in lucerne. Some are pests that can be very damaging when conditions favour them, but many are harmless, and some are useful natural enemies of lucerne pests.

The most important pests of grazing and haymaking stands are aphids, blue oat mite, red-legged earth mite, lucerne flea, cutworms, sitona weevil, white-fringed weevils, lucerne leaf roller, lucerne leafhopper and – in tablelands and slopes districts – wingless grasshopper. Occasionally



other, usually minor, pests such as lucerne crown borer, heliothis and weed web moth may also be significant.

Seed crops may also be severely affected by thrips, heliothis, lucerne seed wasp, lucerne seed-web moth and green vegetable bug. (See *Growing lucerne for seed* section.)

A variety of diseases also affect lucerne, and some of them can cause considerable loss in production. The most important of these are *Phytophthora* root rot, a range of crown rots, stem nematode, Australian lucerne yellows, bacterial wilt and various leaf spots.

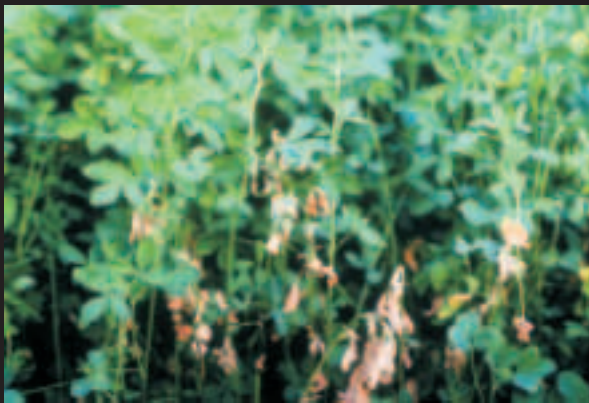
All of these pests and diseases are listed in Tables 7 and 8.

#### DISEASES OF LUCERNE



The effects of *Phytophthora* root rot are evident in this irrigation bay. Note that there is less damage on the better drained bank.

W MCDONALD



The initial signs of crown or root rot damage can be detected by wilting and dead stems.

W MCDONALD



Severe damage caused by *Phytophthora* root rot

G STOVOLD



Common crown rot. Note the brown discoloration extending into the root.

A NIKANDROW



The crown rot symptoms of *Colletotrichum trifolii*. Note the dark ash discoloration in the split crown.

G STOVOLD

**Table 7. Major diseases of lucerne**

Symptoms	Occurrence	Spread	Control
<p>Phytophthora root rot (<i>Phytophthora medicaginis</i>) – fungus</p> <p>Wilting, purple, yellowing and reddening of plants. Sometimes only a few shoots are affected. Taproot rots away after dark brown to black sunken lesions appear.</p>	<p>State-wide. Most common during extended wet weather or after too much irrigation, especially on poorly drained clay soils. Symptoms appear in late spring and summer.</p>	<p>Surface drainage water, soil.</p>	<p>Select free-draining soils. Good irrigation layout essential, especially for heavy soils. Sow resistant varieties.</p>
<p>Anthracnose and Colletotrichum crown rot (<i>Colletotrichum trifolii</i>) – fungus</p> <p><i>Anthracnose</i>: Scattered dead shoots appear throughout the stand, with elongated dead areas on the lower stem with black dots (fungal fruiting bodies).</p> <p><i>Crown rot</i>: Shoots suddenly wilt and turn yellow with crown rot. Areas of dead and discoloured tissue in the crown often extend into the taproot (dead tissue turns black with age).</p>	<p>State-wide, but most severe in northern districts. Associated with high humidity and summer rainfall or irrigation.</p>	<p>Survives on dead organic matter in the soil. Spores are spread by machinery, rain or irrigation water.</p>	<p>Use resistant varieties.</p>
<p>Common crown rot (combination of several fungi, primarily <i>Acrocalymma medicaginis</i>, <i>Phomopsis</i> sp. and <i>Phoma medicaginis</i>) – fungi</p> <p>First signs are wilting followed by death of individual shoots. Initially only portion of the crown may be affected. Internally, the crown and upper tap root show a reddish-brown rot, with red flecking in the most recently affected tissue where <i>A. medicaginis</i> predominates. Older rotted tissue is dry and crumbly. The presence of lighter brown to whitish rotted tissue, bordered by black 'zone' lines indicates that <i>Phomopsis</i> is the predominant cause.</p>	<p>State-wide. Often follows conditions of stress or mechanical injury. High-crowned varieties are more subject to injury, and therefore more prone to the disease.</p>	<p>Spores on machinery and during rain or irrigation. Fungi can survive for a long time on dead crowns.</p>	<p>Avoid practices that cause mechanical injury to crowns. Crop rotation can help. There are no known resistant varieties.</p>
<p>Stem nematode (<i>Ditylenchus dipsaci</i>) – tiny wormlike organism, 1 mm long</p> <p>Dwarfing; distortion; swollen shoots; leaves clustered towards ends of stems. Plants die in patches.</p>	<p>Most common on irrigated flats and in river valleys in slopes districts. Favoured by cool, showery weather. Most obvious in spring.</p>	<p>Contaminated hay, seed, machinery, floodwater and the feet and bodies of animals. May remain dormant in diseased tissue for up to 6 years.</p>	<p>Sow resistant varieties. Graze or plough out. Rotate crops. Use certified seed.</p>
<p>Bacterial wilt (<i>Clavibacter michiganense</i> ssp <i>insidiosum</i>) – bacterium</p> <p>Yellowing, small leaves; general stunting of plants. Poor growth after cutting and grazing.</p>	<p>Southern, central and coastal river valleys. Less so in northern inland regions. Losses can be severe, especially under irrigation.</p>	<p>Plant material, especially hay; also seedborne. Injured plants become infected.</p>	<p>Sow resistant varieties. Use certified seed.</p>
<p>Common leaf spot (<i>Pseudopeziza medicaginis</i>) – fungus</p> <p>Small, dark spots containing raised, dark-brown fungal fruiting bodies on leaves and sometimes stems. Severe infections cause leaf yellowing followed by leaf drop.</p>	<p>State-wide, but especially in humid, higher rainfall areas. Especially evident in spring and autumn on mature stands.</p>	<p>Spores that are on fallen leaflets are spread by wind and rain. Infection is encouraged in thick stands.</p>	<p>Cut or graze to remove infected material. Infection builds up gradually on growing plants.</p>

**Table 7. Major diseases of lucerne *continued***

Symptoms	Occurrence	Spread	Control
<p>Rust (<i>Uromyces striatus</i>) – fungus</p> <p>Red-brown pustules on undersurfaces of leaflets, and sometimes on stems.</p>	State-wide, especially in wet, warm conditions.	Airborne spores in warm showery conditions.	Cut or graze to remove infected material.
<p>Pepper spot, burn (<i>Leptosphaerulina trifolii</i>) – fungus</p> <p>Small, pinhead-sized spots on leaves (pepper spot) may coalesce to kill the whole leaf (burn) and cause extensive leaf drop.</p>	State-wide, but especially in humid, high-rainfall areas. Usually a problem in late summer-early autumn.	Airborne spores released from spots on leaves. Also spread by rain splash action. Usually appears on older growth.	Cut or graze at correct stage of growth. Difficult to prevent losses in extended periods of showery weather.
<p>Stemphylium leaf spot (<i>Stemphylium botryosum</i>) – fungus</p> <p>Light brown, scattered spots. Margins of spots often dark brown.</p>	State-wide, but more common where good autumn/winter rain occurs or under irrigation.	Airborne spores. Fungus survives on diseased fallen leaves.	Cut or graze to remove infected material.
<p>Downy mildew (<i>Peronospora trifoliorum</i>) – fungus</p> <p>Light green or yellow areas on upper leaf surfaces. Light brown fungal growth on undersides of affected leaflets. Stems may also be affected.</p>	State-wide, in wet areas with high humidity. Attacks seedling stands only.	Present in infected leaflets and crop debris. Spread by airborne spores.	Not necessary. Clears up in warm, dry weather.
<p>Damping off (<i>Pythium spp.</i>) – fungus</p> <p>Patchy establishment. Extensive rotting of primary root on young seedlings.</p>	State-wide, especially in coastal regions and tablelands. Infection worse where seedling emergence is retarded (e.g. wet, cold soil).	Present in soil.	Avoid sowing in wet or cold weather. Irrigate before rather than after sowing. Seed treatment with a registered fungicide is useful.
<p>Sclerotium wilt (<i>Sclerotium rolfsii</i>) – fungus</p> <p>Wilting, rotting of crowns and stems, sometimes extending into the tap root. White fungal growth covers the surface of rotting tissue. Small, (1 mm) blackish-brown, spherical resting bodies of the fungus are produced on the surface of affected tissue.</p>	Most common in coastal districts, where high rainfall and humidity favour the disease. Young stands are most affected.	Fungus survives on organic matter in the soil.	Control broad-leaved weeds that may host the fungus. Rotate lucerne with cereals.
<p>Black stem (<i>Phoma medicaginis</i>) – fungus</p> <p>Elongated, dark-brown to black lesions occur on the lower stem particularly, but may also affect the leaves. Stems and young shoots may be killed.</p>	Usually only a problem in higher rainfall coastal and tableland areas during spring and autumn.	Spores of the fungus spread by rain splash and on farm machinery.	None recommended. Disease will clear up in warm, dry weather
<p>Witches' broom – a phytoplasma-like organism</p> <p>Dwarfing, fine shoots, rounded, small leaves. Crown often rots.</p>	State-wide, but more common inland.	Brown jassid (leaf hopper) in warm, dry weather.	Graze or plough out non-productive stands, killing all plants.
<p>Australian lucerne yellows – a phytoplasma</p> <p>Leaves are bright yellow or reddish. The inside of bark, when peeled off the tap root, shows a marked yellow to orange discolouration. This discoloured layer appears as a ring in cross section. The inner, woody portion of the root remains white and unaffected, unlike in bacterial wilt or Fusarium wilt, where this portion of the root is discoloured. Initially, infected plants produce spindly shoots and usually die after one or two seasons.</p>	Riverina and western areas. Develops in mid- to late summer. Infection can be severe in hot, dry summers.	Probably transmitted by leafhoppers.	Plough out if heavily infected. Rotate crops.



DISEASES OF LUCERNE



Alfalfa mosaic virus. A very conspicuous disease but rarely of economic importance

G STOVOLD



Pepper spot

G STOVOLD



Common leaf spot

G STOVOLD



Leaf rust can cause severe damage.

G STOVOLD



Leaf diseases such as *Stemphylium* leaf spot can reduce yields, especially in humid environments or under irrigation.

W MCDONALD



Bacterial wilt can be a problem in some river valleys, especially in southern NSW. Note the yellow discoloration of the tap root.

G STOVOLD

DISEASES OF LUCERNE



L. PILKINGTON



A. NIKANDROW

Australian lucerne yellows, a problem in drier areas of NSW. Left: Foliage symptoms. Right: Root symptoms



W. McDONALD

Distorted regrowth caused by stem nematode infection



G. STOVOLD

Discoloration in roots caused by stem nematode infection



**Table 8. Main insect pests of lucerne**

Pest	Damage	Significance	Control
<b>Spotted alfalfa aphid (<i>Therioaphis trifolii</i>) – SAA</b>			
<p>Adults 1.5–2.0 mm, long, wingless or winged. Yellow or yellowish green with six or more transverse rows of dark dots on the back. Winged forms have smoky areas along the wing veins.</p> <p>Nymphs are born alive and resemble wingless adults, but are smaller.</p>	<p>Sucks sap mainly from the underside of the lower leaves. Also injects a toxin and secretes large amounts of honeydew, which hosts sooty mould, giving it a black sticky appearance. Seedlings are especially susceptible.</p> <p>Veins of affected leaves become whitened or yellowish then turn yellow, and plant may defoliate from base upward.</p>	<p>Active from spring to autumn, but usually most numerous in autumn.</p> <p>Can kill seedlings or establishing stands and defoliate older stands of susceptible varieties.</p> <p>Honeydew may interfere with cutting, drying and baling of hay and reduce its quality.</p>	<p>Establish and maintain vigorous stands of resistant varieties through adequate and timely watering, fertilising and weed control. Resistant varieties, parasites and predators normally control this pest.</p> <p>Chemical control sometimes necessary, especially on seedlings, to prevent rapid buildup, especially after cutting or grazing.</p>
<b>Blue-green aphid (<i>Acyrtosiphon kondoi</i>) – BGA</b>			
<p>Adults 2–3 mm long, wingless or winged and bluish green to green. Winged forms have uniformly dark antennae.</p> <p>Nymphs are born alive and resemble wingless adults, but are smaller.</p>	<p>Sucks sap mainly from terminal buds, upper leaves and upper stems.</p> <p>Damaged plants become stunted, with small, distorted leaves and shortened internodes, and turn yellowish. Severely damaged plants die from top down.</p> <p>Seedlings are particularly susceptible.</p>	<p>Active from autumn to spring, but usually most numerous in spring. Cool, wet conditions in summer also favour BGA build-up.</p> <p>Loss of production in spring, summer and autumn, and loss of plants in winter, can be serious. Severely damaged plants have significantly reduced yield in next regrowth period.</p> <p>Heavy infestation may prevent normal flowering of seed crops.</p>	<p>Establish and maintain vigorous stands of varieties with high resistance through adequate and timely watering, fertilising and weed control.</p> <p>Regularly check establishing stands and the regrowth of established stands after cutting or grazing. Populations can increase very rapidly.</p> <p>Cutting or grazing in early spring can delay buildup and assist control by predators, parasites and fungal diseases.</p> <p>Varietal resistance is effective but not always adequate to prevent damage by heavy infestations. Chemical control is sometimes necessary, especially in seedling stands.</p>
<b>Pea aphid (<i>Acyrtosiphon pisum</i>) – PA</b>			
<p>Adults 4–5 mm long and wingless or winged, with a pale green or yellow green body (sometimes tinged pinkish). Winged forms have banded antennae.</p> <p>Nymphs resemble wingless adults but are smaller.</p>	<p>Sucks sap from leaves, stems and terminal buds.</p> <p>Tops of infested plants have small leaves and spindly stems. Leaves become yellow and wilt and the tops of the plants die.</p>	<p>Active from spring to autumn, but usually most numerous in spring and autumn.</p> <p>Normally a minor pest, but heavy infestations can cause serious damage. May occur in association with blue-green aphid.</p> <p>Heavy infestation may prevent normal flowering of seed crops.</p>	<p>Varieties with resistance to blue green aphid are less affected by pea aphid.</p> <p>Cutting or grazing in early spring can delay build-up and assist biological control by predators, parasites and fungal diseases.</p> <p>Chemical control sometimes necessary to prevent loss of production in spring, summer and autumn.</p>



**Table 8. Main insect pests of lucerne *continued***

Pest	Damage	Significance	Control
<p>Blue oat mite (<i>Penthaleus major</i>) – BOM and Red-legged earth mite (<i>Halotydeus destructor</i>) – RLEM</p>			
<p>Adult mites are eight-legged, oval and about 1 mm long.</p> <p>BOM has a rounded dark brown to blue-black body, bright red or pinkish red legs and mouthparts and a red dot in the centre of the lower back.</p> <p>RLEM has a somewhat flattened black body, pinkish orange legs and mouthparts and no red streak.</p>	<p>Mites feed by rasping and sucking action on cotyledons and leaves of seedlings and first-year plants and on leaves of older plants.</p> <p>Damaged seedlings and plants progressively show yellowing and then whitening of cotyledons and/or leaves.</p>	<p>Primarily pests of seedlings and first-year plants in autumn, winter and spring. Can also severely reduce vigour, palatability and winter production of older plants.</p> <p>Heavily infested seedlings and first-year plants from autumn sowings may be killed or become stunted and weak.</p> <p>Both pests prefer light, sandy or loamy, well drained soils.</p>	<p>Spray in spring of previous year to reduce over-summering RLEM populations.</p> <p>Clean fallow and eliminate weeds from around paddock perimeter for at least one month before sowing.</p> <p>Sow insecticide-treated seed and apply a bare ground spray and/or one or more foliar sprays. Also spray headlands and surrounding vegetation if infestation severe.</p> <p>Inspect established stands weekly after autumn break and spray when mite numbers increase sharply. Two sprays a few weeks apart, plus a further spray in spring, may be needed.</p> <p>BOM and RLEM differ in their susceptibility to insecticides.</p>
<p>Lucerne flea (<i>Sminthurus viridis</i>)</p>			
<p>Wingless, globular, up to about 3 mm long and grey-green or yellow-green with dark patches. Hops about when disturbed</p> <p>Over-summeres as eggs, which hatch in the autumn (autumn break).</p>	<p>Very young nymphs make small membranous ‘windows’ in leaves. Older nymphs and adults eat out larger patches. Badly infested fields look whitish, and total defoliation may occur.</p>	<p>Primarily a pest of seedlings and first-year plants, but may also damage established plants. Severe infestations can kill seedlings from autumn sowings and seriously reduce winter production of established plants.</p>	<p>Clean fallow and eliminate weeds from around paddock perimeter for at least one month before sowing. Liming before sowing also helps.</p> <p>Sow insecticide-treated seed and apply one or more foliar sprays if necessary. Also, spray headlands and surrounding vegetation if infestation severe.</p> <p>Inspect established stands weekly after autumn break. Spray when flea numbers increase sharply. Two sprays 4 weeks apart about 1 month after the autumn break can prevent later problems.</p>
<p>Cutw orms (<i>Agrotis</i> spp.)</p>			
<p>Caterpillars grey-brown, green-grey, brown, green-brown, light to dark grey or nearly black, often with dark spots on back and sides. Length 25–50 mm when fully grown.</p>	<p>Feed on leaves and stems of seedlings, first-year plants and established plants.</p>	<p>Sporadic pests throughout year.</p> <p>May eat out or thin large patches of seedling or first-year stands and severely check regrowth of established stands after cutting or grazing.</p>	<p>Clean fallow and eliminate weeds from around paddock perimeter for at least one month before sowing.</p> <p>Regularly check seedlings, first-year stands, and regrowing established stands in evening or at night for cutworms. Early detection is essential. Use insecticides if needed.</p>
<p>Sitona weevil (<i>Sitona discoideus</i>)</p>			
<p>Larva up to about 5 mm long with a legless, slightly curved white body and orange-brown head.</p> <p>Adult 3–5 mm long and greyish brown with a short, broad snout and three yellowish white stripes on thorax.</p>	<p>Early-stage larvae feed within or on the root nodules. Older larvae feed on lateral roots and taproots.</p> <p>Adults make scallop-shaped notches along leaf margins and also chew stems of seedlings, first-year plants and established plants. Heavy infestations can defoliate established plants and may kill seedlings or first-year plants.</p>	<p>Persistent heavy larval attack on hay or grazing stands less than about 4 years old may cause significant yield loss. Often present but only an occasional problem. Damage generally most serious in spring and autumn, but adults may also feed actively during warm weather in winter. Damaged seedlings may produce stunted and weak first-year plants.</p>	<p>No chemical treatment is available for larvae.</p> <p>Egg laying can be greatly reduced or prevented by controlling adult infestations in April–May. Check seedling and first-year stands regularly.</p> <p>Spray established stands if weevils are numerous and damage is worsening noticeably.</p>

**Table 8. Main insect pests of lucerne *continued***

Pest	Damage	Significance	Control
<b>White-fringed weevils (<i>Graphognathus leucoloma</i>)</b>			
<p>Adults: 10–13 mm long and dark grey to blackish brown with two whitish bands along each side of head and thorax, and a whitish band along outer margin of each wing cover. Adults cannot fly, but all can produce eggs.</p> <p>Larvae: legless, with slightly curved white, greyish white or yellowish white bodies, indistinct pale heads and black mouthparts. Up to 13 mm long and 6 mm wide.</p>	<p>Larvae feed on the roots of seedlings and first-year plants.</p> <p>Larvae also burrow well into taproots of established plants and make deep grooves to about 20 cm below crown.</p> <p>Adults make scallop-shaped notches along leaf margins.</p>	<p>Heavily infested seedling and first-year stands can be so badly damaged that resowing is necessary.</p> <p>Established plants can support high numbers of larvae with no apparent effect on productivity or longevity, provided they are not placed under additional stresses such as inadequate fertiliser, grazing mismanagement or severe drought.</p> <p>Can progressively thin stands, which then require replanting.</p> <p>Feeding by adults is seldom serious. Insecticides against adults from December–February may reduce larval numbers.</p>	<p>No chemical treatment available for larval control in establishing stands.</p> <p>Free ground of larvae before sowing lucerne by thoroughly cultivating in October–November and then sowing weed and legume-free cereal or grass forage crops for at least 2 years. Sow new stands as far away as possible from older stands.</p>
<b>Lucerne leaf roller (<i>Merophyas divulsana</i>)</b>			
<p>Young caterpillars pale yellow. Older caterpillars up to 15 mm long, with slender yellowish green or green bodies and dark heads. When disturbed they wriggle backwards and drop from the leaves.</p>	<p>Populations cycle every 4–5 weeks in summer and can attack at any stage of crop growth. Caterpillars are sometimes most abundant in seed crops shortly before flowering. Feed on the terminal leaves and flowering stems, webbing them together.</p>	<p>A sporadic pest of grazing or hay crops in spring, summer and autumn. Heavily infested plants become stunted and yield and quality of hay seriously affected.</p> <p>Sometimes, also severely reduces pod set of seed crops.</p> <p>Damage often most important in moisture stressed unirrigated stands.</p>	<p>As a guide, spray grazing or hay stands when about 30% of terminals are rolled in the first half of regrowth.</p> <p>If the stand is approaching maturity, early cutting or grazing may be an acceptable alternative.</p> <p>Cutting or grazing when eggs or small larvae are present and then at 4–5 week intervals can keep numbers low.</p> <p>Maintains optimum soil moisture levels.</p>
<b>Wingless grasshopper (<i>Phaulacridium vittatum</i>)</b>			
<p>Adults: 12–15 mm long and grey or brown, usually with two white stripes along each side and orange-red shanks of the hind legs. Most have short scale-like wings, but some are fully winged.</p> <p>Hopper stages: smaller and dull brown to almost black.</p>	<p>Feed on the foliage and stems. Heavily infested stands severely defoliated or eaten out.</p>	<p>Can be severe pest in summer and autumn, mainly on the tablelands and upper slopes.</p> <p>Infestation usually most common in dry weather.</p>	<p>If wingless grasshopper is a problem contact local Rural Lands Protection Board for advice about spraying.</p> <p>Only margins of stand may need treatment if hoppers are moving in from outside.</p>
<b>Lucerne crown borer (<i>Corrhenes stigmatica</i>, <i>Zygrita diva</i>)</b>			
<p>Adult beetle: 10–13 mm long and dark orange-yellow with variable number of irregular black spots and transverse bands. It also has a pair of long, slender black antennae.</p> <p>Larva: legless, whitish and up to about 20 mm long and 5 mm wide.</p>	<p>Larvae tunnel inside the crown shoots and taproot. Tunnels surrounded by dry rotted, brown and shredded tissue.</p> <p>Damaged plants occasionally wilt and die.</p>	<p>Usually a sporadic minor pest of stands older than 2 years, in northern and central inland areas. Sometimes infests young stands. Note: Detailed investigation in southern Queensland in 1970s showed that lucerne crown borer was an insignificant cause of lucerne decline.</p>	<p>Plough out heavily infested stand in winter and re-sow paddock with two successive cereal or grass forage crops. Sow new stands as far away as possible from affected older stands or land infested with alternative host plants.</p>

**Table 8. Main insect pests of lucerne *continued***

Pest	Damage	Significance	Control
<b>Lucerne leafhopper (<i>Austroasca alfalfae</i>)</b>			
<p>Adults wedge-shaped, yellow or yellowish green and about 3 mm long.</p> <p>Nymphs resemble adults, but wingless and smaller.</p> <p>Note: Do not confuse these with the green or bright green and about 3 mm long, vegetable leafhopper, which seldom warrants concern. It produces a white stipple pattern on the leaves when it feeds.</p>	<p>Sucks sap from the conductive tissues and also injects a toxin. Heavy infestations cause leaves to turn yellow and fall and can stunt plants.</p>	<p>Mainly a sporadic pest of grazing and hay stands in summer and autumn. Infestation promoted by hot dry conditions, and moisture stressed, unirrigated stands are usually most at risk.</p>	<p>As a guide, spray if there are 20 or more adults and/or nymphs per sweep of a 35-cm -diameter net. Early cutting or grazing may be an acceptable alternative to spraying if hay stand is approaching maturity, but could induce movement into nearby crops.</p>
<b>Thrips (<i>Thrips</i> spp.)</b>			
<p>Adults: slender, 1–1.5 mm long and yellowish brown, brownish or blackish brown with narrow fringed wings.</p> <p>Nymphs: smaller, orange-yellow or yellowish and wingless.</p>	<p>Feed on immature flower buds whilst entire flowering stem is inside general bud sheath, producing dead greyish white ‘blasted buds’ and bare stems or ‘stripped racemes’.</p> <p>Also feed on the petals and tiny pods in unopened flowers and on the developing pods in opened flowers. Damaged flowers and very young pods may fall. Older damaged pods become distorted and hold mixture of malformed or shrivelled brown seeds and normal seeds.</p>	<p>Can cause considerable damage to seed crops in spring, summer and autumn.</p>	<p>Regularly inspect crops, from when regrowth is about 15 cm high until flowers commence opening. Look for thrips-damaged leaves that have silvery white blotches. Also, gather handfuls of stems and shake them into a white plastic bucket or similar container to dislodge the thrips.</p> <p>Insecticide treatments, before the flowers begin to open, may be necessary. If adjacent thrips-infested hay stands are close to harvest, consider delaying treatment to ensure that any migrating thrips are also controlled.</p>
<b>Heliothis (<i>Helicoverpa</i> spp.)</b>			
<p>Newly hatched caterpillars 1–1.5 mm long with dark-spotted white bodies and dark heads. Young caterpillars (up to about 15 mm long) have dark heads and pale yellow, greenish or brownish bodies, usually with conspicuous upper body hairs in dark bases and narrow dark stripes down the back and along each side.</p>	<p>Commonly a pest of seed crops at flowering. Early-stage caterpillars initially feed inside flower buds and then on tiny pods in opened flowers. Damaged flower buds and flowers do not set seed.</p> <p>Larger caterpillars feed on the foliage, flowers and developing pods.</p>	<p>Caterpillars often cause considerable damage to seed crops in spring, summer and autumn.</p> <p>Heliothis outbreaks can also heavily infest non-flowering hay stands and severely reduce the yield and quality of hay, usually in spring.</p>	<p>Keep a close watch during flower bud development and flowering for very small (1–5 mm long) caterpillars. Early detection is essential. One well-timed treatment is usually sufficient if small larvae are present.</p> <p>Note: In heliothis outbreaks heavy infestation may occur before and/or during early flowering and at least two sprays (the first at or before early flowering and the second as determined by follow-up inspections) will probably be needed.</p> <p>Follow pesticide resistance management practices.</p>
<b>Lucerne seed wasp (<i>Bruchophagus roddi</i>)</b>			
<p>Adults are about 2 mm long, with black bodies and brown or yellowish brown legs.</p>	<p>Eggs laid into developing seeds inside pods from one quarter to half formed. One larva develops in each seed, destroying it.</p>	<p>Can very badly damage seed crops. Dryland crops generally most at risk.</p>	<p>Carefully watch crop from start of pod formation until pods over half formed for adult wasps. Early detection is essential. A number of management practices can reduce infestation. Moisture stress during pod formation favours infestation. Irrigation reduces losses.</p>



**Table 8. Main insect pests of lucerne *continued***

Pest	Damage	Significance	Control
<p>Lucerne seed-w eb moth (<i>Etiella behrii</i>)</p> <p>Young caterpillars are white to cream with a shiny black head and shield behind the head. Older caterpillars have brownish heads and shields and cream to green bodies, usually with several dark red or purplish stripes down the back and along each side. Length 16–20 mm when fully grown.</p>	<p>Infestation usually commences during early podding. Newly hatched caterpillars bore into developing pods and initially feed within, and then on, the seeds. They emerge when about three quarters grown and sometimes make webbed shelters in centre of clusters of older pods.</p> <p>Late-stage caterpillars chew holes in older pods and eat seeds.</p>	<p>Sporadic pest of seed crops in summer and autumn. Damage has ranged from slight reduction to almost complete seed loss.</p>	<p>No specific chemical control measures are recommended.</p> <p>Moisture stress during early podding favours infestation. Irrigation reduces losses.</p>
<p>Green vegetable bug (<i>Nezara viridula</i>)</p> <p>Adults: 12–18 mm long, green with three or four yellowish white spots along the front margin of the triangular area between the wing bases.</p> <p>Final stage nymphs: wingless and mostly green to brown-black, with orange, yellowish white, pink or purplish red markings. Average length 14 mm.</p>	<p>Suck sap from the leaves, stems and immature seeds in pods. Large numbers clustering on pods can prevent seed development.</p> <p>Damaged seeds shrivel and turn brown.</p>	<p>Sporadic pest of seed crops in late spring, summer and autumn.</p>	<p>Check regularly during pod development for adults and nymphs. If necessary, spray using sufficient water to directly contact the bugs.</p>

**PESTS OF LUCERNE**



**High numbers of aphids can severely affect lucerne productivity**



**Spotted alfalfa aphid**



**Blue-green aphid**

PESTS OF LUCERNE



A white-fringed weevil larva (inset) in the crown of a lucerne plant



Lucerne leaf roller



Leaf damage caused by Sitona weevil (inset: adult). Note the characteristic u-shaped notches on the leaf margins.



Blue oat mite



Earth mite damage. Red-legged earth mite (inset) and blue oat mite are major pests of lucerne during establishment.



Severe damage caused by lucerne flea (inset)

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For information on **soil acidity and salinity** see NSW Agriculture's web page ([www.agric.nsw.gov.au](http://www.agric.nsw.gov.au)) under 'Natural Resources and Climate'.

For a summary of information on **sowing and managing lucerne**, look under 'Pasture Planner' by selecting 'Field Crops and Pastures', then 'Pastures' on NSW Agriculture's web page ([www.agric.nsw.gov.au](http://www.agric.nsw.gov.au)).

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