MANAGING LUCERNE STRIPS IN COTTON

Graham Charles and Robert Mensah
(NSW Dept of Primary Industries)

Background

Lucerne strips are valuable for promoting beneficial insects in cotton and as trap crops. They provide a refuge for beneficial insects and spiders which can then be encouraged to move into cotton with the strategic use of Envirofeast® sprays. Used this way, lucerne strips can be an effective management tool, providing beneficial insects that help with the early-season control of *Helicoverpa* spp. in conventional cotton varieties.

Lucerne strips can also be used as an effective trap crop for green mirids and aphids, as these insects prefers lucerne over cotton.

Well managed lucerne can be a useful for managing insects in cotton, and can be a valuable tool for managing weed problems such as nutgrass.

Alternatively, lucerne can be planted in a field adjacent to a cotton field or on a centrally located block on the farm, and still effectively serve as a trap for mirids and aphids as well as enhancing the build up of beneficial insects.

Establishing lucerne strips

Lucerne can be planted as strips within a cotton field. Strips of 8, 12 or 16 rows of lucerne should be planted every 300 rows of cotton. This equates to about 2.0-2.5% of the field area. Alternatively, lucerne can be grown on the borders of a field, using an area equivalent to 5% of the field, or can be planted in a field adjacent to cotton.

A range of lucerne varieties is available. Varieties with good resistance to lucerne aphids, phytophthora root rot and colletotrichum crown rot should be selected. Lucerne should ideally be sown from April to June, and no later than August. August planted lucerne may need an additional irrigation in November of the establishment year. A strong and dense plant stand is needed, so good seed bed preparation is important as lucerne has a very small seed. Seeding rates of 10 to 15 kg/ha (irrigated) or 5 kg/ha (dryland) are required. Irrigated lucerne should be sown on beds (not 1 m hills), using two beds of 4 rows in an 8 row strip, or two beds of 6 rows in a 12 row strip.

Weed control is important in establishing lucerne, as lucerne has a small, relatively slow growing seedling. A range of herbicides is available for use in lucerne but not all can be safely used in cotton. Of the commonly used herbicides of cotton production, trifluralin can be applied pre-planting with lucerne, and some of the grass herbicides such as Sertin Plus® and Fusion Super® are registered for post-emergence grass control.

Prometryn can be applied early post-emergence for broad-leaf weed control in pastures including lucerne (applied after lucerne reaches 5 true leaves). All of the other products registered for broad-leaf weed control in lucerne are likely to damage cotton if drift occurs. Bromoxynil and 2,4-DB for example, could be used over winter but would not be safe to apply to a lucerne strip within a cotton crop.

Refer to the NSW Department of Primary Industries publication "Weed control in lucerne and pastures" for more information on registered products. Always follow the directions on the product label.

Lucerne seedlings are susceptible to damage from some insect pests. Blue oat mite, redlegged earth mite, lucerne flea and cutworms can all cause severe damage to seedling and young lucerne stands. Mite damaged seedlings progressively show yellowing and then whitening of the cotyledons and/or leaves. Lucerne flea make small membranous 'windows' in the leaves, with ultimately only the skeletons of the leaves remaining. Badly infested strips look whitish.

In severe cases, pests may need to be controlled with pesticides during the first few weeks after seedling emergence. However, the use of pesticides beyond this point would be counter productive, removing the beneficial insects the lucerne has been planted to promote.

Managing lucerne strips

Lucerne needs to be managed to maintain new growth and attractiveness to green mirids and aphids throughout the season. The aphid species that infest lucerne will not infest cotton, but are a food source for predators that can move into the cotton. Half of each lucerne strip should be cut (slashed or mown) every 4 weeks and before the lucerne begins to flower. Cutting should commence in November, and continue throughout the cotton season.

Lucerne needs to be watered to maintain fresh growth and has a similar water requirement to cotton. Irrigation can most easily be timed to coincide with cotton irrigation.

Lucerne should not be allowed to set seed or hay off, as it is much less attractive to insects once this occurs. Volunteer lucerne plants can also be a serious nuisance in following crops. This problem can be avoided by timely slashing, preventing lucerne setting seed.

Apart from being a refuge for beneficial insects and a trap crop for green mirids, lucerne can also be an important contributor to the nitrogen budget, fixing up to 200 kg N per year.

However, poorly managed lucerne strips can be a source of green mirids to cotton and a source of weed seeds.

Weeds can be controlled in established lucerne more than 1 year old (in cotton) with the residual herbicides diuron and prometryn (prometryn is registered for controlling weeds in pastures including lucerne), and grass weeds can be controlled with post-emergence grass herbicides such as Verdict and Sertin. Bromoxynil and 2,4-DB can also be used to control small broad-leaf weeds in lucerne after cotton picking and before cotton planting.

Removing lucerne strips

Established lucerne strips can be difficult to remove, with scattered plants potentially remaining as weeds in following cotton crops. Volunteer lucerne seedlings can also cause problems if lucerne has been allowed to seed, as none of the residual herbicides which kill lucerne seedlings are safe in cotton.

Established lucerne can be killed either with cultivation or with herbicides. When the soil is dry, heavy cultivation such as a crawler with a cutter bar across the rippers has been shown to be 100% effective in removing established lucerne plants. However, this approach is expensive and slow and the success of this technique requires dry soil and dry weather after treatment.

Herbicides are only effective for controlling lucerne when it is actively growing. Grazon DS® is registered for controlling established lucerne at 300-500 mL/ha + Roundup CT® at 1.2 L/ha. However, picloram, one of the components of Grazon DS, has a long plant-back period to cotton and some other rotataion crops, and so can't be used to remove lucerne prior to the planting of these crops. There is also a permit from the Australian Pesticides & Veterinary Medicines Authority (APVMA) to control established lucerne with 2,4-D Amine at 3 L/ha (500 g/L) or 2.4 L/ha (625 g/L) or 2,4-D ipa (Surpass®) plus glyphosate at 5 L/ha + 1 L/ha (450 g/L). Check the APVMA web site for the current permit status at: www.apvma.gov.au.

However, none of these formulations of 2,4-D can be safely used near cotton, so these herbicide options are limited to the period after cotton harvest, when no cotton is present. Any 2,4-D application must also be made well before cotton planting as a 14 day plant-back period for cotton planting after herbicide application applies. This 14 day period only commences following rainfall of at least 15 mm. Thorough decontamination of spraying equipment is essential after 2,4-D applications. For optimal control of lucerne, plants should be actively growing and at least 5 cm tall, and preferably 10 to 15 cm tall at the time of herbicide application. Cultivation is likely to give better control than herbicides when moisture is limiting.

Summary

Lucerne strips are valuable for promoting beneficial insects in cotton and as trap crops for green mirids. Lucerne strips can also be an effective tool, providing beneficial insects that help with the early-season control of *Helicoverpa* spp.

Lucerne can be planted as strips within a cotton field or grown on the borders of a field or in a field adjacent to cotton. A range of varieties is available, best sown from April to June. A strong and dense plant stand is needed, so good seed bed preparation is important.

Weed control is important in establishing lucerne, as lucerne has a small, relatively slow growing seedling. A range of herbicides is available for use in lucerne but some can not be safely used in cotton. Of the herbicides commonly used in cotton production, trifluralin can be applied pre-planting with lucerne, and some of the grass herbicides such as Sertin Plus® and Fusion Super® are registered for post-emergence grass control. Prometryn can be applied early post-emergence for broad-leaf weed control.

Lucerne needs to be managed to maintain new growth and attractiveness to beneficials. Half of each lucerne strip should be cut every 4 weeks before the lucerne begins to flower.

Weeds can be controlled in established lucerne with the residual herbicides diuron and prometryn, and grass weeds can be controlled with post-emergence grass herbicides.

Established lucerne strips can be difficult to remove, with scattered plants potentially remaining as weeds in following cotton crops. Volunteer lucerne seedlings can also cause problems as none of the residual herbicides which kill lucerne seedlings are safe to use in cotton.

Established lucerne can be killed with heavy cultivation or herbicides. Herbicides are only effective for controlling lucerne when it is actively growing. A tank mix of Grazon DS®+ Roundup CT® is registered for controlling established lucerne. However, picloram, one of the components of Grazon DS, has a long plant-back period to cotton and some other rotataion crops. There is also a permit from the APVMA to control established lucerne with 2,4-D amine. Check the APVMA web site for the current permit status at: www.apvma.gov.au.

However, none of the 2,4-D formulations can be safely used near cotton, so these herbicide options are limited to the period when no cotton is present.