

## Controlling silverleaf nightshade (*Solanum elaeagnifolium* Cav.), a deep-rooted perennial weed, with herbicides and grazing

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**Summary** Silverleaf nightshade (*Solanum elaeagnifolium* Cav.) is South Australia's most intractable perennial weed, covering over 40,000 ha in the cereal growing areas and is still spreading, with potential to infest much of the state. Over 210,000 ha across Australia is infested with silverleaf nightshade, which competes aggressively with crops and pastures by depleting soil moisture and nutrient reserves. Crop losses attributed to silverleaf nightshade have been recorded in cotton, sorghum, maize, lucerne and cultivated pastures, but it is the losses in cereal yield of up to 70% that have raised the most concern. The weed's extensive root system makes it difficult to control with herbicides and there are no effective and affordable treatments for control of large, dense infestations. However, silverleaf nightshade density has been observed to decline to a much lower level three or more years after a cropping paddock has been returned to grazing. This suggests grazing could be used to control large infestations, where herbicides are prohibitively expensive.

Trials were established in pasture and crop stubble in South Australia's Mid North and Eyre Peninsula in 2002 to determine the efficacy of grazing, alone or in conjunction with herbicides, for controlling silverleaf nightshade. Previous studies indicated goats grazed the weed more readily than sheep. Silverleaf nightshade is relatively unpalatable and applying sublethal doses of 2,4-D amine may make the weed more palatable to livestock. Replicated trial plots, which were untreated, sprayed, grazed by sheep or goats, and spray-grazed with sheep or goats, were monitored for changes in cover, number and size of shoots, flowering and berry set throughout the growing season. Livestock were introduced to the sites at relatively high stocking rates

for short durations to maximise grazing pressure and minimise paddock degradation. Silverleaf nightshade berries contain high levels of toxic alkaloids as well as a large number of seeds. Livestock were removed if berries had formed to reduce the risk of poisoning and to prevent livestock spreading the seed.

Preliminary results indicate that both grazing and spray-grazing will reduce the size and number of silverleaf nightshade shoots during the growing season, as well as suppressing flowering and seed set. In some cases, shoot density was reduced by up to 75% through grazing and spray-grazing. While plants recovered slightly following rain after the livestock were removed, this short term reduction in shoot density and suppression of seed set was maintained throughout the season by repeating these treatments as required. In essence, the livestock performed the same task as the biological control agent, *Leptinotarsa texana* Schaeffer, in South Africa – repeated defoliation of the plants throughout the growing season. At this stage it is too early to determine whether the long term growth, survival and regeneration of silverleaf nightshade is affected by grazing, alone or in conjunction with herbicides. A major reduction in silverleaf nightshade density may take several years due to the plants' extensive root systems and existing seedbanks. At the very least, grazing and spray-grazing can prevent further spread of silverleaf nightshade and replenishment of the seedbank. Continual removal of top growth may deplete the extensive root reserves and provide landholders with an economic control method for this intractable weed.

**Keywords** Silverleaf nightshade, *Solanum elaeagnifolium*, grazing, spray-grazing.