

Suppression of alligator weed in pastures

For areas of NSW where alligator weed is declared a Class 3 noxious weed

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Introduction

Alligator weed (*Alternanthera philoxeroides*) is a highly invasive weed that grows both on land and in water. Due to its ability to tolerate herbicides and spread easily by fragments, it is a serious weed of waterways, wetlands and floodplains in Australia¹.



Figures 1 and 2. Alligator weed. Photos: B. Auld and B. Worboys.



Figure 3. Alligator weed infested pastures in the Hunter region. Photo: E. van Oosterhout.

Irrigated and floodplain-based farming is threatened by alligator weed and the worst infestations currently affect grazing lands in the Hunter region of NSW.

The pasture management technique presented in this Primefact is for the ongoing suppression of extensive alligator weed infestations occurring in pastures and grazing lands in areas of NSW where alligator weed is declared a Class 3 noxious weed.

The technique is not appropriate for areas of NSW where alligator weed is declared a Class 2 noxious weed due to the requirement for Class 2 plants to be eradicated and because of the risks of spread associated with slashing and grazing (See page 5).

The application of this technique will enable graziers to change alligator weed dominated pastures into pastures dominated by desirable species, and maintain long term suppression of alligator weed through careful grazing management and strategic control on a year to year basis.

¹ In high rainfall areas alligator weed can persist and grow above a floodplain. Please refer to the publications listed under 'Further reading' on page 6 for advice on the identification and profile of alligator weed.

The pasture management technique

This technique is based on two to three applications of the selective herbicide metsulfuron-methyl 600 g/kg each year, with the height of the pasture canopy reduced either by slashing or grazing prior to each herbicide application, combined with careful pasture management.

The research supporting this technique was done in a pasture comprising 90% alligator weed and 10% kikuyu. In the research trial the pasture composition changed from 90% alligator weed to 10% alligator weed and correspondingly 80–90% kikuyu 1 month after the first spray treatment.

Very good results can be obtained after the first season but it will take two to three seasons of treatment and ongoing pasture management to achieve significant long term suppression.

How does it work?

The selective herbicide will suppress alligator weed and allow viable pasture grasses to compete and dominate. However, small alligator weed plants persist beneath the pasture canopy, and as the grass becomes dominant, it becomes difficult to apply follow-up treatments to the remaining alligator weed as the thick pasture canopy prevents contact of the herbicide with the alligator weed. The pasture canopy must be reduced either by slashing or grazing prior to every herbicide application. This promotes alligator weed regrowth and allows better contact of the herbicide with the alligator weed foliage.

Once alligator weed levels have been reduced, grazing must be managed so that the pastures provide a high level of ground cover and a very competitive canopy. This helps with further suppression of alligator weed and lowers the risk of the infestation spreading throughout the pasture by preventing the establishment of new plants from stem fragments.

The continual pressure applied to the alligator weed gradually depletes the weed's below-ground storage tissues. After long term application of this technique there may be situations where plant numbers are reduced to the point that eradication strategies could be successful over small areas (see the *Alligator Weed Control Manual* listed in 'Further reading' on page 6 for information on eradication). In most cases alligator weed will always be present but at much reduced and suppressed levels.



Figure 4. An infested pasture (90% alligator weed) before application of the pasture management technique. Photo: T. Cook.



Figure 5. After treatment, the proportion of alligator weed was reduced to 10% and the kikuyu increased to 90%. Photo: T. Cook.

Applying the technique

The steps involved in applying the technique are described below. The main consideration for the timing of the first herbicide treatment is that the alligator weed is actively growing and has reached the required height or leaf stage for herbicide treatment (10 to 20 cm; six to eight pairs of leaves). Best results occur after heavier rains, particularly following dry periods.

1. Check pasture composition

Success depends on the presence of competitive pasture grasses (no less than 10% of the ground cover). Make sure that some competitive pasture grass species are present in the infested pastures.

Species that grow by stolons or runners, or summer active grasses that grow to at least 30 cm high, will provide strong competition (i.e. kikuyu, Swazi grass, Rhodes grass). Tussocky plants such as *Setaria* and some sedges and rushes can achieve the required heights, but provide too much light and space, allowing the alligator weed to compete easily. Other stoloniferous grasses do not grow tall enough to dominate alligator weed.

Seek agronomic advice on pasture species with the required height and running habit.

If a competitive grass needs to be introduced, oversow in mid-autumn, at least 3 months after any metsulfuron-methyl application. This will allow the pasture to establish before the following spring when the herbicide program is repeated. It also allows enough time in more acidic soils for the metsulfuron-methyl residues to break down.

2. Slash or crash graze and then remove the stock

If alligator weed is dominant there may be no need to slash or crash graze in order to get good herbicide contact. In this case remove the stock (see 'Grazing as part of this technique') and go straight to step 3.

If alligator weed is in amongst grasses and other weeds, slash or crash graze the area. Then keep the area destocked until after the spray program has finished for the season (crash grazing can be used for the subsequent pasture height reductions in step 4).

If slashing, cut to 10 cm (no higher) and make sure the blades are kept above ground level to reduce the risk of soil or root fragment spread. Use standard machinery hygiene practices for slashers, tractors and mowers to prevent the spread of alligator weed between paddocks



Figure 6. Alligator weed is exposed after slashing pasture to 10cm. Photo: T. Cook.



Figure 7. Alligator weed regrowth is obscured by grass when the pasture is slashed any higher than 10cm (this site was slashed to 20cm). Photo: T. Cook.

or properties (refer to the *Alligator Weed Control Manual* listed in 'Further reading' on page 6).

3. Spray when the alligator weed regrowth reaches 10–20cm or has six to eight pairs of leaves

This should take around 2 weeks during the growing season and 4 weeks in the cooler months. Apply the first treatment of metsulfuron methyl 600 g/kg at the registered rate.

4. Allow the herbicide to take effect, then slash or crash graze again

Alligator weed will take at least 1 to 2 months to die back. Yellowing may occur in some pasture grasses (particularly kikuyu) but established grasses will recover 2–4 weeks after treatment. All legumes will be killed.

Allow time for the herbicide to take effect on the alligator weed and for the pasture grass growth to increase. Slash or crash graze again to no higher than 10 cm.

5. Spray again when alligator weed regrowth reaches 10–20cm or has six to eight pairs of leaves

Wait for the alligator weed regrowth to reach the required level of growth and then apply the second treatment of metsulfuron-methyl 600 g/kg at the registered rate.



Figure 8. Alligator weed regrowth ready to spray. Photo: T. Cook.

6. Repeat steps 4 and 5 in accordance with alligator weed growth

Always carry out pasture height reductions prior to any further herbicide applications.

7. Manage grazing

Once the pastures have been re-established some grazing pressure is acceptable, but the pasture must be left with a competitive canopy. Only graze for short periods (up to 1 month), and allow pastures to rest for longer periods between grazing (2 to 3 months). Grazing pastures to below 10 cm for longer than 1 month at a time will encourage rapid regrowth and dominance by alligator weed.



Figure 9. Heavy grazing will promote domination of the pasture by prostrate alligator weed. Photo: B. Worboys

Grazing as part of this technique

There is no withholding period for metsulfuron-methyl. Stock can be used for the pasture height reductions before each herbicide application but they should not be constantly grazing areas undergoing treatment. Trials show that immediate grazing after the herbicide applications resulted in lower levels of alligator weed suppression.

The grazing of alligator weed itself has been associated with photosensitivity and resultant skin lesions, liver damage and death in cattle, calves and lambs in Australia and New Zealand. Research in India has shown that alligator weed should not make up more than 15% of a ruminant's diet in order to avoid malnutrition from a lack of essential amino acids. Always monitor stock grazing in infested paddocks and avoid grazing alligator weed wherever possible.

Apply the technique carefully

Trials have shown that slashing and grazing promote alligator weed growth. Slashing or grazing alone will allow alligator weed to dominate and will promote a prostrate growth habit, which is then harder to suppress with herbicide. This technique uses slashing or grazing to increase the effectiveness of selective herbicide treatments.

Flooding can kill pastures and allow alligator weed to dominate. As long as some competitive pasture species are present or have been reintroduced after flooding, this pasture management technique can be used again for ongoing suppression.

Never use glyphosate herbicides or other non-selective herbicides in association with slashing or grazing, as removal of competitive grasses will worsen infestations.

Risks of spread

There are very high risks of spread associated with stock and machinery movements from infested areas. Grazing stock can carry stem fragments in their hooves and mouths. It is extremely important that proper hygiene protocols for stock and machinery are followed.



Figure 10. Grazing alligator weed has been associated with photosensitivity and resultant skin lesions, liver damage and death in cattle, calves and lambs. Photo: A. Storrie.

Alligator Weed

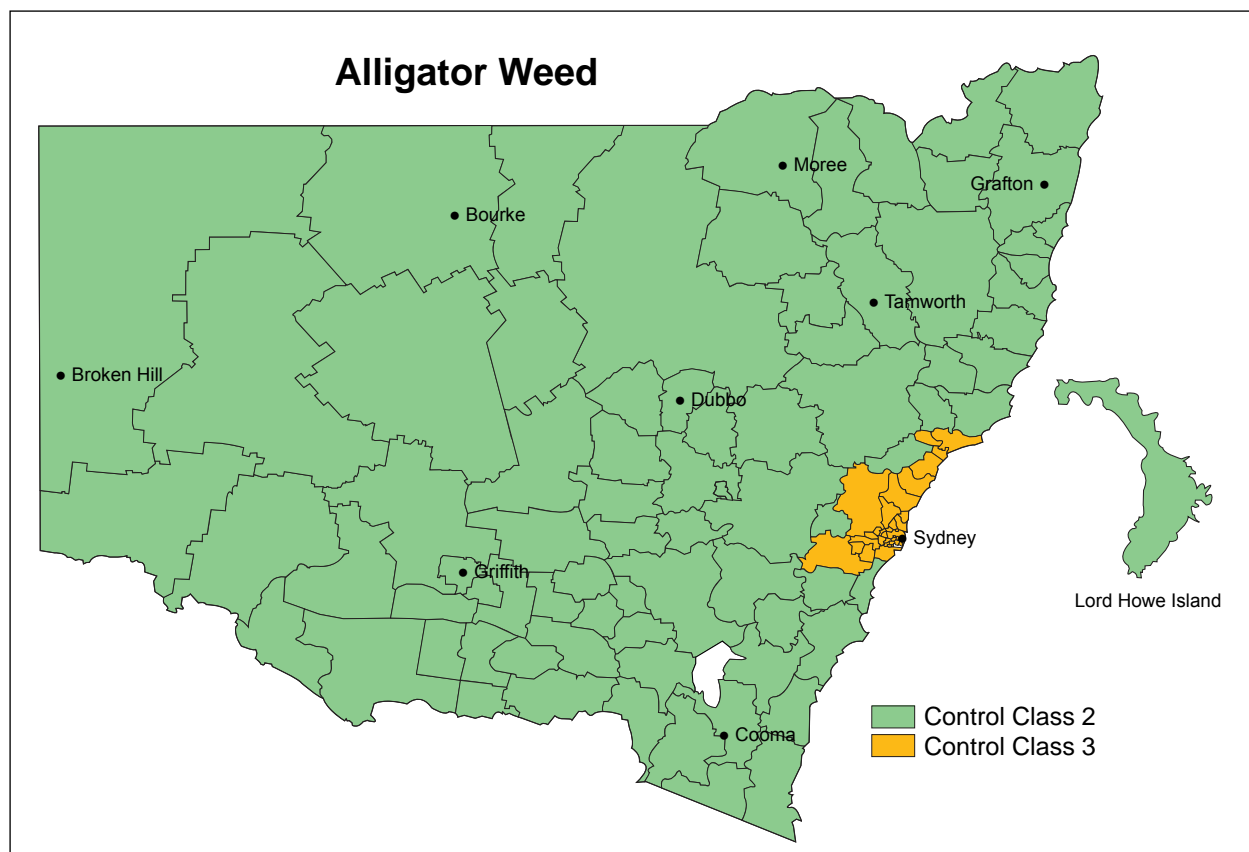


Figure 11. Declarations for alligator weed in NSW. A. Maguire.

Legislation

Alligator weed is declared a Class 2 or Class 3 noxious weed under the NSW *Noxious Weeds Act 1993* (see Table 1 and Figure 11).

The responsibility for the control of noxious weeds on private land rests with the land owner or occupier of the land. This responsibility extends to the middle line of any adjacent watercourse, river or inland water (tidal or non-tidal).

This plant must not be sold anywhere within NSW.

A full list of noxious weeds and requirements under the Noxious Weeds Act can be found at www.dpi.nsw.gov.au/weeds

Table 1. Declaration of alligator weed by local government area.

Class	Local Government Areas
<p>Class 3</p> <p>Control requirements for Class 3 noxious weeds are that 'the plant must be fully and continuously suppressed and destroyed'</p>	<p>Auburn, Bankstown, Baulkham Hills, Blacktown, Burwood, Camden, Campbelltown, Canterbury, Sydney, Fairfield, Gosford, Hawkesbury, Hawkesbury River County Council, Holroyd, Hurstville, Kogarah, Ku-ring-gai, Lake Macquarie, Lane Cove, Leichhardt, Liverpool, Maitland, Manly, Marrickville, Mosman, Newcastle, North Sydney, Parramatta, Penrith, Pittwater, Port Stephens, Randwick, Rockdale, Ryde, Strathfield, Sutherland, Botany, Ashfield, Hunters Hill, Hornsby, Warringah, Waverly, Willoughby, Wollondilly, Woollahra, Wyong.</p>
<p>Class 2</p> <p>Class 2 noxious weeds must be eradicated from the land and the land must be kept free of the plant. As a notifiable weed, all outbreaks must be reported to the local council within three days.</p>	<p>Throughout the State except for the Local Government Areas where alligator weed is declared a Class 3 noxious weed.</p>

References

Cook, T. and Storrie, A. (in press), Tactics for the control and possible eradication of terrestrial alligator weed (*Alternanthera philoxeroides*), *Proceedings of the 16th Australian Weeds Conference*, 2008, Cairns.

Storrie, A. and Cook, T. (2006), 2006 Research Update: Herbicides and alligator weed, NSW Department of Primary Industries, Tamworth.

Bhatta, R. and Das, T.K. (1995), Utility of alligator weed in the ration of growing calves, *Indian Journal of Animal Nutrition*, 12(4):237–240.

Further reading

Alligator weed control manual: Eradication and suppression of alligator weed (*Alternanthera philoxeroides*) in Australia, (2008), NSW DPI, Orange. Available from DPI Bookshop, phone 1800 028 374, or www.dpi.nsw.gov.au/weeds

Alligator weed – Don't let it drag you under: An early detection guide for farmers (2008), Brochure, NSW DPI, Orange. Available from DPI Bookshop, phone 1800 028 374, or www.dpi.nsw.gov.au/weeds

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Warnings: Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

Legislation covering conservation of native vegetation may regulate some pasture improvement practices where existing pasture contains native species. Contact your Catchment Management Authority office for further information.

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