Keeping the Northern Territory free of alligator weed

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Summary Alligator weed is a Weed of National Significance. The vigorous growth habit of alligator weed, the ability to invade pastoral and agricultural land, choke waterways and the cost involved in controlling it (particularly on land) has earned it the title of one of the world's worst weeds. It has been recommended that all occurrences of alligator weed should be identified and eradicated due to the particular vulnerability of the Northern Territory's waterways and floodplains.

Three isolated infestations of alligator weed were found in the Northern Territory during 8–12 September 1997, with the assistance of Agriculture Victoria, Keith Turnbull Research Institute. Occurrences of the vegetable commonly known as mukunuwenna were also found. The alligator weed sites were controlled and occurrences have been reduced to zero by January 2000. Continued surveys ensure there is no regrowth of alligator weed.

The feasibility of controlling new infestations of weeds, before they become too widespread, is high, compared to dealing with established infestations. Early detection is the key to effective weed control. The public awareness campaign assisted in early detection. The right methods of detection ensure complete control through finding all existing infestations. Alligator weed is mistaken for the Sri Lankan vegetable mukunuwenna and passed on between families. Thus, finding all infestations depends on reaching all people possessing the weed.

In practice, identifying and understanding the methods of spread of a weed is vital for its control. An understanding of the mechanisms of spread of potential weeds will produce methods to prevent introduction of new weeds.

Keywords Alligator weed, *Alternanthera philoxeroides*, extension, awareness, education.

INTRODUCTION

Alligator weed (*Alternanthera philoxeroides* (Martius) Grisebach) originated in South America (Julien 1995). It was first reported growing in Australia at areas where ships dump their ballast in Newcastle during the 1940s (Hockley in Julien 1995).

The Northern Territory Department of Primary Industry and Fisheries initiated a program to investigate and eradicate alligator weed from the Northern Territory in 1997. This paper describes the program that was executed to investigate the distribution of alligator weed in the Northern Territory, involving targeted public awareness of the plant, its impact on the environment, eradicate the species and investigate an alternative vegetable plant for consumption by Sri Lankan people in the Northern Territory. Alligator weed is a Class C noxious weed in the Northern Territory, categorising it as, 'not to be introduced'.

Alligator weed has a similar appearance to *Alternanthera sessilis* (L.) R.Br. ex DC. (mukunuwenna), a leafy vegetable that is very popular in Sri Lanka. The confusion of alligator weed for mukunuwenna has resulted in the spread of the weed around Australia.

The ability of alligator weed compete successfully with other aquatic plants with the exception of water hyacinth (Spencer and Coulson 1976, Coulson 1977 in Julien 1995) indicates its potential in the aquatic systems of the Northern Territory highlighting the importance of preventing its spread to the natural systems.

Although difficult, manual removal of alligator weed was determined to be the most efficient method of eradicating it due to the small size of the infestations. It was felt that, given the size and early stage of the weed, that it would be suitable for eradication program.

MATERIALS AND METHODS

The method of investigation was to use Sri Lankan contacts made through the Tamil and Singhalese societies in Darwin. A search through the telephone book for Sri Lankan names also yielded several leads. During home visits further addresses were obtained.

Two radio interviews were broadcast on the Singhalese and Tamil radio programs. These sessions included contact numbers of the Weeds Branch. The Weeds Branch's contact numbers were also given to Community Leaders and key contacts. Approximately 100 Sri Lankan families (Singhalese, Tamil and Burger) were identified, fifty percent of these were contacted in the first week. The remainder were contacted over the following four months. Market stalls in Darwin were also inspected.

RESULTS

During the week 8–12 September two alligator weed infestations were located in suburban Darwin and a third in the North-East Arnhemland town of Nhulunbuy. There were nine mukunuwenna infestations found in suburban Darwin and a tenth in the Darwin rural area. All of these were contained in back-yards or planting pots. In the three alligator weed cases there was some attempt at control after it was discovered that it was not mukunuwenna. In one case the owner had identified the alligator weed as a result of extension material and had attempted to remove it manually, prior to our visit. Owners were advised of the correct disposal techniques. In the Nhulunbuy case the weed, contained in a pot, was incinerated. Most people had been informed of the difference between the two species by a program screened by the SBS television station, or told by those who had seen the program.

No evidence of alligator weed or mukunuwenna being sold, at the markets in Darwin, was found. One person had attempted to sell mukunuwenna at the markets but abandoned this due to a total lack of interest in his variety.

Weeds Branch officers will continue to monitor and control, by manual removal, the two infestations in Darwin. The roots of alligator weed in these terrestrial situations were thick and rhizome-like, as described in Julien (1995) and penetrated as deep as 30 cm. The leaves were reduced in size due to the dry conditions. Particular care with identification and removal was needed, to ensure fragments did not remain, from which new shoots may regrow.

DISCUSSION

The extension program carried out had clearly made the Sri Lankan community aware of the problem. Dr. Gunasekera, being Sri Lankan, was able to gain the confidence of the community and gave us much greater access than we would have otherwise had.

People who had alligator weed were happy to assist but were also eager to acquire the real mukunuwenna. It may not be wise to use *A. sessilis* as a replacement as it also shows potential to be a problem weed. Further investigation of the status of *A. sessilis* in the Northern Territory is required.

Two species that are native to the Northern Territory have been identified as possible substitutes *for A. sessilis.* These natives are *Alternanthera denticulata* and *A. nodiflora*. In Victoria *A. denticulata* has been substituted with satisfactory results (Gunasekera and Adair 1999), however, Northern Territory herbarium samples of *A. denticulata* do not possess leaves as large as those in the Southern States, thus may not be a satisfactory replacement. A search for *A. denticulata* is being conducted to gather specimens and determine how it responds to cultivation. *A. nodiflora* has large seed size and production in addition to small leaves. The characteristics of *A. nodiflora* may also need to be assessed in a domestic situation.

This prompt action gives us a high probability of successful eradication. Eradication programs are usually only feasible where weed infestations are in their early stages and not extensive (Carter 2000).

Early detection was the first phase of the eradication program and through the targeted public awareness campaign the chance of detection was increased.

Once the current distribution was assessed, the strategy and method of eradication was determined. Given that the infestations were in terrestrial situations, thus slow growing (Julien 1995), in a small area, the best strategy was to remove the plants. Removal of the plants prevented vegetative reproduction as seed production in alligator weed has not been observed in Australia (Julien 1995).

The targeted awareness campaign was instrumental in finding the full extent of the weed. The success of the program depended on working in cooperation with local community groups to achieve an acceptable outcome for all parties. Consideration of the cross cultural nature of the program proved beneficial to the response from the targeted community groups (Gonion *et al.* 1999).

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REFERENCES

Carter, R.J. (2000). Principles of regional weed management, legislation and quarantine. *In* 'Australian weed management systems,' ed. B.M. Sindel, pp. 83-104. (R.G. and F.J. Richardson, Melbourne).

Gonion, C., Bishop, A. and Welsh, S. (1999). A cooperative approach to weed management: keeping Tasmania free from the grip of alligator weed. Proceedings of the Twelfth Australian Weeds Conference, Hobart, p. 555.

Gunasekera, L. and Adair, R. (1999). The alligator weed battle in Victoria. Proceedings of the Twelfth Australian Weeds Conference, Hobart, pp. 547-50.

Julien, M.H. (1995). *Alternanthera philoxeroides* (Mart.) Griseb. *In* 'The biology of Australian weeds,' eds R.H. Groves, R.C.H. Shepherd and R.G. Richardson, pp. 1-12. (R.G. and F.J. Richardson, Melbourne).