

## TECHNICAL NOTES

### Rainproofing glyphosate with 'Bondcrete' cement additive for improved Bitou Bush control.

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Bitou bush (*Chrysanthemoides monilifera* (L.) Norlindh subsp. *rotundata*) is a South African shrub which has become a pest of the eastern seaboard of Australia.

In Queensland the infestations are mainly confined to coastal dunes on public lands in the Wide Bay district (Lat. 25 48'; Long. 153 5') and on South Stradbroke Island (Lat. 27 58'; Long. 153 30') (Anderson 1984). Coastal ecosystems are at risk as bitou bush can alter plant communities excluding many native species (Gray 1976). The Queensland Government has demonstrated its firm commitment to the eradication of bitou bush, firstly, by declaring bitou bush as a plant to be eradicated (Category P2) under the Rural Lands Protection Act and, secondly, by carrying out an active spraying program. If successful these actions should provide a stable natural environment and recreational areas for future generations to enjoy.

Glyphosate isopropylamine salt is an effective herbicide for control of bitou bush (Cooney *et al.*, 1981). Aerial application at a rate of 8 L ha<sup>-1</sup> selectively removes bitou bush without damage to the main native species (Anderson and Kay, 1986). Like many foliar applied herbicides, glyphosate is adversely affected by rain (Caseley, 1987). Unfortunately, coastal showers are a common occurrence during the spraying season (December to May), so that wet weather handicaps the control program with a consequent waste of glyphosate, labour and time. This article reports the results of using additives to offset the washing effect of rain. The first trial studied the effect of additives on the selectivity of glyphosate. These results were then incorporated into the 1988 eradication program.

#### Methods

A preliminary trial was conducted to determine whether the following caused injury to native plants when added to the normal glyphosate spray: (1) an organosilicone penetrant (Pulse), (2) a soybean derivative (L1700), (3) a synthetic latex (Bond), (4) a

wetting agent (Activator 90), (5) a petroleum base penetrant (50T) and (6) poly vinyl acetate plus resin (Bondcrete). Glyphosate was diluted 1:100 in sea water before each additive was mixed into this solution. Bondcrete was added at one part to 250 parts spray solution. Other additives were used at label rates. Volpi pneumatic knapsacks were used to apply a spray volume of 1000 L ha<sup>-1</sup>.

Inskip Point peninsula at Wide Bay was chosen as the test site because of the variety of plant species found there. Each treatment included 1000 m<sup>2</sup> of bitou bush, three members of each of the following tree species: (1) coastal sheoak (*Casuarina equisetifolia*), (2) coast banksia (*Banksia integrifolia*), (3) coastal wattle (*Acacia sophorae*), (4) cotton wood (*Hibiscus tiliaceus*), (5) river mangrove (*Aegiceras corniculatum*) and (6) screw pine (*Pandanus* sp.), plus 10 m<sup>2</sup> of guinea flower (*Hibbertia scandens*) and 10 m<sup>2</sup> of beach spinifex (*Spinifex hirsutus*). All plants were sprayed to the point of runoff. This trial was set out in October 1987. Results were recorded six weeks later.

Damage was assessed on a score of 1 (no effect) to 5 (dead) (Table 1). Following this trial, Bondcrete was chosen as an additive and extensively field tested during the 1988

eradication program on South Stradbroke Island.

#### Results and discussion

The results of the initial investigation at Inskip Point are given in Table 1. Glyphosate, with or without Bondcrete gave excellent control of bitou bush with only slight damage to coast banksia and beach spinifex. Other additives did not reduce the efficacy of glyphosate against bitou bush but did cause undesirable glyphosate injury to other species. Coastal sheoaks are normally unaffected by glyphosate but the addition of organosilicone surfactant killed them. Cottonwood trees were killed by glyphosate plus a synthetic latex, while coastal sheoaks were unharmed. Although the soybean derivative was not fatal to coastal sheoak, these trees were still showing glyphosate symptoms 18 months after treatment. These results indicate that there is considerable scope for selecting additives to alter glyphosate selectivity.

The 1988 spraying program on South Stradbroke island lasted 24 working days, during which Cyclone Charlie brought a total of 760 mm of rain to the island and provided drizzle to cloud-burst conditions, ideal for evaluating Bondcrete as a rainproofing agent. Wet weather occurred on 12 spraying days. Often showers fell in the evening sometime after spraying. Each days work was rated on a scale of 1 to 5 as above. When no rain fell, excellent results (rating 5) were achieved with or without Bondcrete. Poor results (average rating of 2) were obtained on four days when Bondcrete was not added and 4 to 6 mm of rain fell 6 to 8 hours after spraying. On 6 days, light or heavy rain (up to 20 mm) during or up to 6 hours after spraying did not reduce the efficacy of glyphosate plus Bondcrete. On another 3 days, 4 to 6 mm of rain while spraying reduced the efficacy rating to four. Heavy rain (10 mm) while spraying adversely affected Bondcrete's performance on 3 days (rating 2). In short, the addition of Bondcrete to glyphosate on 9 wet days ensured optimum results.

**Table 1. The effect of glyphosate plus spray additives on coastal plants 6 weeks after application**

Additive Product	Coastal Sheoak	Coast Banksia	Coastal Wattle	Cotton-wood	Man-grove	Screw Pine	Bitou Bush	Guinea Flower	Beach Spinifex
Glyphosate	1	1.5	1	1	1	1	5	1	1.5
Pulse	5	5	3.5	5	2.5	1	5	3.5	2.5
L1700	2	-	2.5	3.5	4	-	5	2.5	1.5
Bond	1	-	-	5	2	-	5	2.5	2.5
Activator 90	2.5	-	-	5	5	-	5	5	2.5
50T	5	2.5	4	2.5	5	-	5	2.5	3
Bondcrete	1	1.5	-	1	1	1	5	1	1.5

Values indicate degree of damage; 1 = no effect, 5 = dead. Dash (-) indicates that these species were not found again, possibly because they were used by campers for firewood.

## References

- Anderson, T. (1984). Bitou bush control in the Wide Bay District Queensland. Proceedings of the 7<sup>th</sup> Australian Weeds Conference, pp. 200-4.
- Anderson, T., and Kay, K. (1986). Bitou bush control - South Stradbroke Island. Proceedings of the 10<sup>th</sup> National Noxious Plants and Animals Conference, pp.152-7.
- Caseley, J.C. (1987). Effects of weather on herbicide activity. Proceedings of the 8<sup>th</sup> Australian Weeds Conference, pp. 386-94.

- Cooney, P.A., Gibbs, D.G. and Golinski, K. (1981). Evaluation of the herbicide Roundup for control of Bitou bush. *Journal of the N.S.W. Soil Conservation Service*.
- Gray, M. (1976). Miscellaneous notes on Australian plants. 2 Chrysanthemoides: *Australian Journal of Botany Contributions to Herbarium Australiense* No. 16, pp. 1-5.

## 1989 Brighton Crop Protection Conference - Weeds

Brighton, Sussex, England, 20-23 November 1989.

The conference will open with the sixteenth Bawden Lecture, given by Dr. I.J. Graham-Bryce. The programme consists of a wide variety of sessions, some running concurrently. The subjects to be covered, although not yet final, will include new herbicide and plant growth regulator molecules, integration of cereal crop management with weed control, mode of action and basis of the selectivity of graminicides, crop and weed resistance to herbicides, tree crops and implications for weed control of new production systems, crop tolerance, herbicidal action and selectivity, land use strategies, cropping with reduced inputs, herbicide application techniques, novel aspects of weed control, habitat management for weed control, weed control in horticulture, costs and benefits of weed control, biological and biotechnological approaches to weed control and herbicide residues in soil and water. For further information write to Mrs. R.A. Bishop, (Conference Planners) Limited, 20 Bridport Road, Thornton Heath, Surrey CR4 7QG, UK.

This year the BCPC has announced that it will grant up to three bursaries for overseas delegates to attend the conference. The bursaries will provide free registration, an Apex air ticket to the UK, a seven day subsistence grant while in the UK and a local travel grant for travel to other UK research institutes. The awards are principally intended for senior scientists who would not otherwise be able to attend the conference. Those wishing to apply for bursaries should write to Mr. B. Baldwin, BCPC General Manager, 49 Downing Street, Farnham, Surrey GU9 7PH, UK.

## 11th Long Ashton International Symposium

### Herbicide Resistance in Weeds and Crops

Long Ashton, UK, 12-14 September 1989

The weed flora has evolved continuously in response to herbicide use and changing husbandry systems, due mostly to the introduction of new species or change in the status of long established species. More recently, herbicide-resistant biotypes have evolved within some of our important weed species. Early cases of resistance were to single herbicide groups; however, more recently multiple resistance has developed in

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## FORTHCOMING CONFERENCES

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### Fifth Australian Soil Conservation Conference

Perth, 14-15 September 1989

The overall conference has as its theme 'Land Degradation - Its Solution and the Community Role'. The conference is to address the constraints to achieving soil conservation. These may be limiting the adoption of currently available solutions or the development of better soil conservation technology.

There are ten concurrent specialist workshops preceding the central conference. These vary in duration and differ in location throughout Perth and the Western Australian countryside. The topics include Land Capability Assessment; Erosion/Productivity and Erosion Predictions; Stable Cropping Systems; Dryland Salinity Management; Retention and Replacement of Vegetation; Range Monitoring; Group Extension - Successes and Failures and Community Awareness and Education. Each of the specialist workshops has been designed to examine the constraints to the advancement and adoption of specific aspects of soil conservation activity and/or technology.

The central conference is to examine the policy-type constraints that may influence the general community's attitudes to and activities in the soil conservation area. For further information contact Mr. Greg Hamilton, Department of Agriculture, 3 Baron-Hay Court, South Perth, WA 6151.

### Ninth Australian Weeds Conference

Adelaide, 6-10 August 1990

The Ninth Australian Weeds conference will provide an excellent opportunity for

people interested in all aspects of weed science to meet and discuss recent and current advances in the field.

Papers will be invited on a wide range of topics including: Weeds in Agronomic Crops; Weeds in Horticultural Areas; Weeds in Forestry; Weeds in Pasture and Rangeland; Weeds in Industrial and Rights-of-Way Areas; Weeds in Aquatic Environments; Weeds in Amenity Situations; New Developments from Industry; Weed Biology and Ecology; Biological Control; Herbicide Resistance; Herbicide Residues; Herbicide Application; Regulatory Aspects; Teaching and Extension; Equipment and Machinery and Weed Economics.

For further information contact J.W. Heap or D.W. Stephenson, S.A. Department of Agriculture, Northfield Laboratories, G.P.O. Box 1671, Adelaide, SA 5001.

### Alternatives to the Chemical Control of Weeds

Rotorua, New Zealand, July 1989

The objectives of this conference are:- (1) to provide a forum for the exchange of views on research into the control of weeds by non-chemical means; (2) to provide a perspective and direction for alternative vegetation management in New Zealand; (3) to identify areas of research that can be most readily adapted to current problems and (4) to speculate constructively on what could and should be done in this research area.

The conference will cover areas of weed control using insects; alternative options such as macro and micro-organisms, live mulch techniques, animal grazing, mycoherbicides and allelopathy; and will assess problems and options with non-chemical weed control.