

**PROCEEDINGS OF THE AUSTRALIAN RANGELAND SOCIETY
BIENNIAL CONFERENCE**

Official publication of The Australian Rangeland Society

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Form of Reference

The reference for this article should be in this general form;
Author family name, initials (year). Title. *In*: Proceedings of the nth Australian Rangeland Society Biennial Conference. Pages. (Australian Rangeland Society: Australia).

For example:

Anderson, L., van Klinken, R. D., and Shepherd, D. (2008). Aerially surveying Mesquite (*Prosopis* spp.) in the Pilbara. *In*: 'A Climate of Change in the Rangelands. Proceedings of the 15th Australian Rangeland Society Biennial Conference'. (Ed. D. Orr) 4 pages. (Australian Rangeland Society: Australia).

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The Australian Rangeland Society

THE CROP KING* GRIDBALL™ - A TOOL TO AID MANAGEMENT OF WOODY WEED
ENCROACHMENT IN SEMI-ARID AND ARID AREAS OF AUSTRALIA

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ABSTRACT

Both exotic and native species of woody plants, as a result of their increase in distribution and stand density, have caused land degradation and reduced pasture and rangeland productivity. In the case of native species, problems have arisen through the natural spread of species due to change in the ecological balance such as over-grazing or reduced fire intensity and incidence, or regrowth from species which have been cleared by mechanical means.

A series of experiments conducted in western New South Wales and Queensland have demonstrated the efficacy of a pelleted formulation of hexazinone, the Crop King Gridball, to control a number of problem native and exotic species. It is envisaged that this product will be valuable in an integrated management system which will involve the use of controlled grazing, fire and mechanical disturbance as well as the judicious use of herbicides to reduce the problem of woody weed encroachment. This paper gives an indication of the problem, and a summary of the results of three experiments in western New South Wales.

INTRODUCTION

(i) The Problem

The encroachment of shrubs or woody plants and the consequent reduction in pasture productivity and carrying capacity, is the most serious long-term problem facing western New South Wales graziers. It has been estimated that in excess of 20 million hectares had an existing or potentially serious problem, which is approximately 70% of the western division of New South Wales (Alchin 1983). The most widespread of the native woody weeds in western New South Wales belong to the Eucalyptus, Eremophila, Dodonaea and Cassia genera. Of the shrub species, Booth (1985) listed the 5 most important as being turpentine (*Eremophila sturtii*), budda (*E.mitchellii*), narrowleaf hophbush (*Dodonaea attenuata*), broadleaf hophbush (*D.viscosa* var. *angustifolia*) and pumty bush (*Cassia eremophila*). Saplings and suckers of trees such as poplar box (*Eucalyptus populnea*) and coolabah (*E. microtheca*) also result in widespread reduction of productivity. As well as a direct reduction in productivity, a number of other significant related problems have arisen from woody weed encroachment. Increased soil erosion has resulted from the depletion of ground cover, and from increased grazing pressure on adjacent scrub-free areas. The management of livestock and property improvements is made more difficult where scrub is present. Vermin such as pigs and rabbits use the scrub as a protective refuge.

(ii) Control Methods

Current methods for control of both native and exotic woody weeds include: biological, grazing manipulation, fire, mechanical and use of herbicides. The most appropriate method or combination of methods will depend on the species to be controlled and the environment in which the species are growing. Discussion of methods other than by the use of herbicides is beyond the scope of this paper. However, it is clear that an integrated approach to the control of woody weeds is more likely to be successful than the concentration on any one method.

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Gridball is a trademark of E.I. du Pont de Nemours & Co. Ltd

²Velpar and spotgun are registered trademarks of E.I. du Pont de Nemours & Co. Inc.

The use of herbicides may be classified into the six main methods (Scanlan and Pressland 1984), which are :-

- (a) overall spraying, using high and low volume
- (b) basal bark treatment
- (c) cut stump treatment
- (d) frill ringing
- (e) stem injection
- (f) soil treatment

The major disadvantage of most of these techniques is the high labour input required, which make them uneconomic in many cases, because of the low return per unit area in extensive rangeland situations.

This paper summarises the results of several experiments conducted in the Western Division of New South Wales investigating the use of the Crop King Gridball, a dry pelleted formulation of hexazinone, for control of woody weed species.

METHODS

During the winter period of 1986, three trials were established in the Western Division in New South Wales. Trial locations were an alkaline sand on Para Station via Wentworth, and acid red earths at Kewell East via Ivanhoe, and Double Gates via Cobar.

In all three trials, various rates of soil-applied herbicide treatments were investigated on three size categories of narrow-leaf hopbush and turpentine.

Individual pellets of the Crop King Gridball were placed at approximately equal distances apart in a circular pattern about midway between the base and the drip line of each bush. Velpar* L treatments were applied by 2 ml undiluted spots in similar positions to the pellet treatments by use of the Velpar Spotgun*.

Plant response to treatment was assessed at each site at 6 monthly intervals for a period of 2 years. A visual rating between 1 and 5 was assigned to each bush where 1 = no effect and 5 = plant death.

RESULTS

The results for all three sites are summarised in Fig. 1 for turpentine.

The rates of application of the Crop King Gridball which provided acceptable control of the two species within each of the three bush size categories, over the three sites are shown in Table 1.

Table 1. Rates of application of the Crop King Gridball for control of individual bushes of narrow-leaf hopbush and turpentine. (g.a.i. = grams active ingredient).

Bush Height m	Narrow-leaf Hopbush		Turpentine	
	g a.i./bush	pellets/bush	g a.i./bush	pellets/bush
< 1	0.375	1	0.750	2
> 1-2	1.125	3	1.125	3
> 2	1.500-2.250	4-6*	2.250-3.000	6-8*

*On larger bushes over 2 m high the higher rates of application should be used.

DISCUSSION

It was found that the response to all treatments in these trials was slower than that which occurred in some other trials conducted by Alchin (1988). This was thought to be due to the dry seasonal conditions prevailing during the early part of the trials.

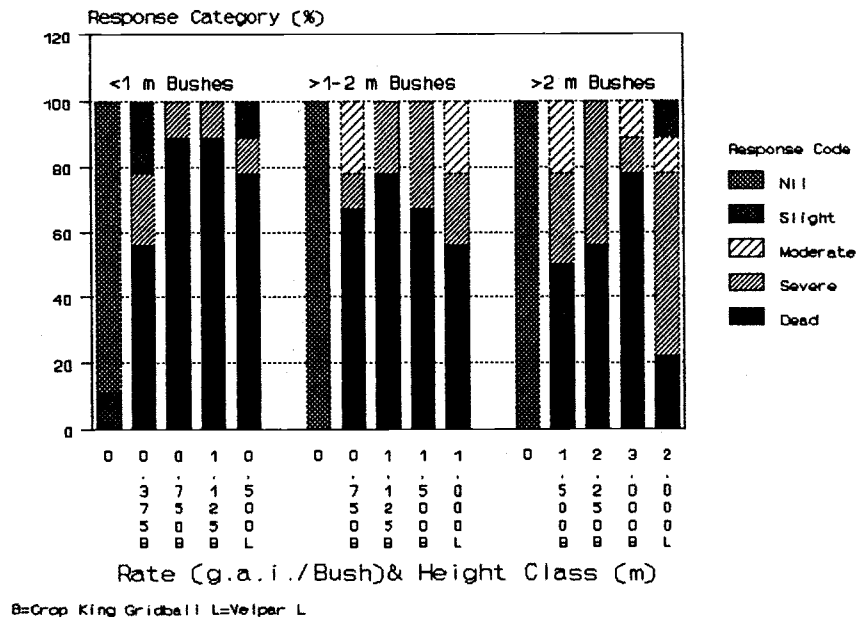


Figure 1. Turpentine response 100 weeks after treatment (g.a.i. - grams active ingredient)

Results from these rates of application were at least as good and sometimes better than that achieved with similar rates of the liquid formulation of hexazinone used in the trials. The liquid formulation Velpar L is currently recommended under a New South Wales Agriculture Pesticide Order for control of these species in New South Wales.

Pasture response to control of these species with the Crop King Gridball was dependent on seasonal conditions. However, bare areas caused by the hexazinone were being colonized by annual forbs by the last assessment, 2 years after application. Pasture response in the vicinity of the dead or severely affected bushes was very good after significant rainfall compared with that around untreated bushes.

A practical advantage of the pellet formulation is that no application equipment is required for ground application, and so the pellets are more likely to be carried and applied to woody weeds on a regular basis, while conducting other management tasks such as mustering.

Because of economic, regulatory and environmental constraints, it is considered that the use of the Crop King Gridball will not be recommended or practiced on a wide scale over large areas of rangeland. The most appropriate uses of the product will be :

- (1) on a routine basis for treatment of low-density infestations of woody weeds, which are usually the first stages of encroachment
- (2) to treat small isolated areas of woody weeds which act as a seed source for adjacent areas, and/or are located in strategic areas such as stock watering points or fence lines
- (3) to remove survivors after the use of other methods of woody weed control such as management burns, or, alternatively, to reduce bush density so that sufficient fuel can be generated to produce a management burn.

ACKNOWLEDGEMENTS

The assistance of Warwick Date and Mike Lucy, formerly district agronomists at Cobar and Wentworth, and Andrew Spinks, owner of Kewell East, in helping to establish and assess the trials referred to in this paper is gratefully acknowledged.

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