

Some Effects and Risks of Manipulating a Native Pasture on the Central Tablelands of NSW

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There is a resurgent interest in native pastures for both agricultural production and for the prevention and mitigation of land degradation. However, in comparison with introduced species, little is known of the management of such pastures nor of their response to commonly-used methods of pasture manipulation - particularly on the Central Tablelands.

The original aim of the experiment reported below was to evaluate the usefulness of three pasture treatments on the establishment of aerially-sown grass seed. This proved to be unsuccessful except where seed was raked into a cultivated seedbed. However, as the effects of the other treatments have implications for management of native pastures, it was considered desirable to report them.

METHODS

The 0.06 ha trial site is located at Kerrs Creek, some 40 km north of Orange and has a mean annual rainfall of approximately 710 mm. Red stringybark (*Eucalyptus macrorhyncha*) and scribbly gum (*E. rossii*) were cleared from the site many years ago and it now supports a pasture dominated by redleg grass (*Bothriochloa macra*) and wallaby grasses (principally *Danthonia eriantha*).

The trial comprised four treatments: rotary hoeing, spraying glyphosate (360 g/L a.i. from a knapsack at a product concentration of 10 ml/L), burning (with a burner attached to a propane gas cylinder) and nil. Experimental design was a randomised complete block, replicated 8 times. Each plot measured 2.8 x 5 m with the longest side following the slope (about 10%). The pasture had been uniformly heavily grazed to a height of about 2 cm when the treatments were imposed on 16 September 1991. Seed of two exotic summer-growing grass species and superphosphate (100 kg/ha) were broadcast on 20 September and the site later exclosed from grazing animals, including rabbits and kangaroos.

Although some rain had occurred prior to treatment, little germinating rain occurred in the following two months (55 mm). Regular rain, including some high falls, occurred from December 1991 to February 1992 (333 mm).

nel (*Anagallis arvensis*). Little regeneration of the dominant natives occurred despite only one cultivation.

Compared to the nil treatment, burning had little effect on the cover contributed by either of the dominant grasses. As would be expected, the amount of litter was reduced, though not to a point where bare ground increased significantly or erosion occurred.

In contrast, the herbicide treatment reduced the cover of redleg grass and almost eliminated wallaby grasses. The effect was visually obvious and could be used to distinguish the burnt from the herbicide treatments. Bare ground was similar in both, but litter's contribution to vegetative cover was higher in the plots treated with herbicide.

Plots treated with herbicide and burnt could be visually differentiated from untreated plots by the uniform ripening of the seed heads of redleg grass.

DISCUSSION AND CONCLUSION

- Six months exclosure (and summer rains) permitted good growth and seeding of the dominant and less common native grasses. This may have been influenced by the application of superphosphate; however unfertilised plot borders also had similar growth suggesting that exclosure was a major contributor.
- The detrimental effect of glyphosate on *Danthonia pilosa* and *D. racemosa* has been observed by P. Simpson (*pers. comm.*). In this trial *Danthonia* spp., predominantly *D. eriantha*, were similarly affected.

• Vegetative cover of all species present was assessed on 4 March 1992 using an 100 point grid frame. Two frames were counted in all plots except cultivated plots where, because of non-uniform ground cover, four frames were counted. Data were recorded as percent ground cover *ie.* the number of times each category of cover was recorded for each 100 points.

RESULTS

Within the exclosure a dense growth of redleg grass with seeding culms 70 to 80 cm high was present. Wallaby grasses and a number of less common grasses (*Panicum effusum*, *Chloris truncata*, *Cynodon dactylon*) also seeded. In contrast, a low height of pasture with few seeding culms was maintained by grazing outside the exclosure.

Response of the native pasture to the treatments is presented in Table 1.

Sufficient vegetative cover to prevent erosion was present on all plots except those cultivated, where rilling was evident. Most of the vegetative cover in the cultivated plots comprised litter, the introduced grasses and scarlet pimper-

Table 1: Comparison of vegetative cover following pasture manipulation and 6 months exclosure

Treatment	Vegetative cover (%)				
	Redleg grass	Wallaby grass	Other herbage	Litter	Bare ground
Cultivation	2.9c ^A	0.5b	27.7a	14.2a	54.7a
Herbicide	64.3b	0.1b	6.2b	16.1a	13.3b
Burn	77.7a	6.0a	0.7b	3.5b	12.1b
Nil	75.6ab	6.2a	3.4b	6.8ab	8.0b
Mean	55.1	3.2	9.5	10.2	22.0
Significance	**	**	**	*	**
CV %	11.8	1.2	6.9	10.6	11.8

^A Numbers in each column followed by the same letter are not significantly different at $P < 0.05$; * and ** indicate significance at $P < 0.05$ and $P < 0.01$, respectively.

- Redleg grass, which was green in early spring when the glyphosate was applied, was not severely affected. Monsanto's label recommendation for a related species, *Bothriochloa ambigua*, is to spray glyphosate at the early head stage.
- Cultivation - even only one cultivation - of this type of country is risky. During the first summer, native grasses failed to re-establish and rilling occurred.
- Redleg grass was the main species responsible for the stability of this site over the summer period when high intensity rains were most likely. The production of this grass (not only of flowering culms, but of leaf as well), as illustrated by exclosure vs. grazing, suggests that it was also providing much of the forage during the summer.
- The uniform seed ripening of redleg grass, promoted by either burning or glyphosate in early spring, could be of use to those wishing to harvest seed of this species.
- Of future interest will be the length of time it takes the native grasses to re-colonise the cultivated plots and in particular, how long wallaby grasses will remain absent from the herbicide plots.

ACKNOWLEDGMENTS

Our thanks to Peter Wykes of "Day Dawn", Kerrs Creek, without whose assistance and encouragement, this trial would not have been possible.