Herbicide Tolerance of Two Native Grasses

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During 1989-92, the effects of herbicides which may be useful for selective weed control, pasture manipulation or pasture renovation in established native perennial grass pastures were evaluated at several rates.

Methods

The herbicides evaluated were: Roundup CT®, Sprayseed®, Ally®, Simazine and Frenock® which were applied at the rates and times given in Table 1. Unsprayed plots were used as controls against which the effect of the herbicides was measured. Plots were 20 m x 3 m and sprayed with a 2 m gas powered boom spray delivering a spray volume of 100 L/ha. Treatments were replicated three times.

The existing pasture was a variable mixture with an average composition in winter of 38% *Danthonia* (mainly *D.pilosa* and *D.racemosa* with some *D.duttoniana*), 18% *Microlaena stipoides*, 26% subterranean clover, and 16% annual grasses (*Vulpia*, brome and barley grass). There was a small percentage of broadleaf weed (mainly sorrel) and scattered Poa tussock, Yorkshire fog and rush (*Juncus spp*).

Table 1: Herbicides, rates and times of application to native grass pastures.

Herbicide	Application: Rates	Application: Times
Roundup CT®	0.3, 0.8, 1.5 & 2.5 L/ha	Spring & autumn
Sprayseed®	1, 2, 3 & 4 L/ha	Spring & autumn
Simazine	1 & 2 L/ha	Spring & autumn
Frenock®	1 & 2 L/ha	mid-May
Ally®	5 g & 10 g/ha with or without 2 & 4 L/ha Sprayseed®	June

Results and Discussion

Frenock®

Since Frenock® is the recommended herbicide used to control serrated tussock, it is important to assess its potential for selective control of this noxious weed in pastures containing *Danthonia* and *Microlaena*.

Ground cover of *Danthonia* and *Microlaena* was recorded in five $0.25m^2$ quadrants along each plot prior to spraying in mid-May, 1991 (Table 1). The average composition was 24% *Danthonia* and 37% *Microlaena*.

In early February 1992, control (not sprayed) plots contained both native grasses. At this time, however, 1 L/ha plots (50% the registered rate) contained 65% sorrel & 33% bare ground, while 2 L/ha plots had 65% bare ground & 30% sorrel with scattered Poa tussock, rushes and dandelion making up the balance. The useful year-long green perennials were eliminated from the pastures by Frenock®.

Ally® & Simazine

Sorrel and Paterson's curse could be selectively controlled with Ally® and *Vulpia* with Simazine in native grass pastures. In this study, Ally® was tested with and without Sprayseed (Table 1) to achieve green material knockdown.

Table 2: Effect of Roundup CT® on yield and percentage of perennial grass 12 months after spring application.

Parameter	Control (Unsprayed)	Roundup CT® 0.36	0.8	1.5	2.5
Total yield (t/ha)	2.6	1.3	0.9	0.9	0.7
% native grass	65	40	30[1]	20[1]	nil

Note: [1]indicates that native grass was all *Microlaena*

Table 2 gives yield and percentage perennial grass (*Microlaena* and *Danthonia*) 12 months after spring applications.

Sprayseed®

The low rate of 1 L/ha was 20% above the registered rate for spray topping. When oversowing, 3 L/ha would be the lowest effective rate. Autumn sprayings are 20-30% more effective than spring applications. However, as shown in Table 3, the long-term effect on the native grasses is minimal even at 3 L/ha.

Initial work highlighted the improved establishment when herbicides were used to oversow phalaris and cocksfoot into existing pasture (Keys and Simpson, 1990). Table 3 gives an indication of the results that could be expected from various rates of Roundup CT® and Sprayseed®. While there appears to be reasonable levels of *Danthonia* in Roundup CT® treatments (Table 3), this is mainly due to seedling re-establishment from adjacent plots. This would not occur when a whole paddock is sprayed.

Sub clover is killed by Ally® at both rates, but did not appear to effect *Danthonia* or *Microlaena*. The high rate of Simazine applied in autumn caused a 25% depression in total pasture yield, but neither *Microlaena* or *Danthonia* plant numbers nor the percentage ground cover of the perennial grasses were adversely affected.

Roundup CT®

The rates of Roundup CT® applied in both spring and autumn (Table 1) were designed to eliminate all "weeds" prior to re-sowing a new pasture by direct drilling.

The effects of Roundup CT® appear slightly less severe on *Microlaena* when applied in spring. Compared to unsprayed plots after 6 months, yield of *Microlaena* was reduced by 79% with 1.5 L/ha applied in autumn, but only 35% when this rate is applied in spring. However, for *Danthonia*, severe plant loss occurred even at spray topping rates (0.36 L/ha) of Roundup CT®.

Conclusions

Frenock® is unsuitable for selective serrated tussock control in native grass pastures composed of either *Danthonia* or *Microlaena* because both species are intolerant irrespective of time of spraying. Spring application appears to be just as damaging to these native grasses as spraying in May.

Danthonia and *Microlaena* appear tolerant of both Ally® and Simazine.

Annual grass control the previous year is vital if Sprayseed® is to be used successfully for pasture establishment. To preserve *Danthonia*, either winter cleaning with Simazine or spray topping with Gramoxone would be the only safe herbicide options.

Table 3: Effect of Roundup CT® and Sprayseed® on sown and native grasses.

Herbicide	Rate (L/ha)	Sown species	Native grasses *Microlaena*	*Danthonia*	Relative Yield
Roundup CT®	1	52	24	13	98
Roundup CT®	1.5	70	18	5	102
Roundup CT®	2	70	12	3	82
Sprayseed®	2	6	38	60	90
Sprayseed®	3	4	26	60	97
Sprayseed®	4	10	24	29	100
Unsprayed		Nil	30	60	100

Note: Composition was recorded April 1993. Remaining percentage was an even mix of annual grasses and clover with some patches of sorrel. Yield of unsprayed control after two years was 3.9 t/ha.

Acknowledgments

The authors wish to thank John Booth and John Rawle for their technical assistance; and property owners Mike and Dave Crisp for their cooperation.

Reference

Keys, M. and P.C.Simpson (1990). Herbicide sensitivity of year long green native species. *Proceedings of the Fifth Annual Conference, Grassland Society of NSW*. p 111.