Use of glyphosate and paraquat (Gramoxone®) to stop seedhead production of serrated tussock (*Nasella trichotoma*)

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The recommended herbicide for killing serrated tussock, Frenock® (flupropanate), has to be applied in early August to stop flowering in November/December. By adding 7.5 kg/ha of 2,2-DPA to 1.5 L/ha Frenock®, application in early October will stop flowering (Campbell and Murison 1985; Campbell 1987). As 2,2-DPA is rarely used now other additives to Frenock® need to be tested for their ability to stop serrated tussock from flowering when applied late in the year. Gramoxone® (paraquat) has been added to Frenock® (at 2 to 3 ml/L of water mix from August to October and at 5 ml/L after October) to stop flowering on the southern tablelands of NSW (P.C. Simpson, *pers. comm.*). Depending on the volume of water used per hectare, these rates transpose to 2 to 4.5 L/ha of Gramoxone® from August to October and to 7.5 L/ha after October. To further test the use of Gramoxone® and to investigate the effects of glyphosate, when added to Frenock®, in stopping serrated tussock from flowering, experiments were set down near Mandurama in 1994.

Methods

Mixtures of Frenock® + Gramoxone® (20% a.i.) and Frenock® + glyphosate (45% a.i.) (Table 1) were applied by hand-held pneumatic sprayer to serrated tussock on 24 October, 10 November and 1 December 1994 in 500 L of water/ha and 1 L/ha of non-ionic wetting agent (Turbo®). The experiment was a randomised block design, blocked for time of spraying, with 4 replications. At the October and November sprayings the thicker-than-normal flowering tillers were present but seedheads had not emerged. At the December spraying seedheads had emerged 35 cm, which gave the tussocks a typical "fuzzy" purple appearance.

Table 1. Effect of additives to Frenock® on seedhead production of serrated tussock

Herbicide	Rate of product (kg/ha)	Ground cover (%) of seedheads on 20.12.194 after spraying on: October 24	November 10	December 1
Frenock®/	2	100d	100d	100d
Frenock® + glyphosate	2 + 1	9b	2b	42b
Frenock® + glyphosate	2 + 4	0a	0a	22a
Frenock® + Gramoxone®	2 + 1	26c	40c	70c
Frenock® + Gramoxone®	2 + 4	9b	9b	30b
Unsprayed control		100d	100d	100d

Means in columns followed by a common letter do not differ significantly ($P < 0.05$).

Results and Discussion

Both glyphosate and Gramoxone®, when added to Frenock®, reduced ($P < 0.05$) the seedhead production of serrated tussock (Table 1). At the same rate, glyphosate was more effective ($P < 0.05$) than Gramoxone®. Glyphosate at 1 and 4 L/ha and Gramoxone® at 4 L/ha, reduced seedhead production by over 90% from the October and November applications (*i.e.* before the seedheads emerged). Their application on 1 December, after seedhead emergence had started, was much less effective (Table 1). To completely stop seedhead production a rate of glyphosate higher than 1 L/ha and a rate of Gramoxone higher than 4 L/ha will need to be applied before the seedhead emerges. Some seedheads which emerged appeared to contain sterile seeds; these will be tested for viability. The addition of glyphosate at 4 L/ha killed associated useful species whereas the addition of Gramoxone® (1 and 4 L/ha) to Frenock®, or Frenock® alone, had only slight effects on associated species (mainly kangaroo grass, *Themeda australis*). As serrated tussock in this experiment was growing on infertile soil, the efficacy of glyphosate and Gramoxone® in stopping seedhead production needs to be assessed on serrated tussock on fertile soil to cover the range of soils on which the weed grows.

References

Campbell, M.H. (1987). Effect of Frenock® and 2,2-DPA applied in spring on pasture legumes and on seedhead production and kill of serrated tussock. *Australian Weeds Research Newletter*, **36**: 28-31.

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