

Management:**Use of glyphosate as a replacement for Frenock® for the control of serrated tussock (*Nassella trichotoma*)**

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The possible demise of Frenock® poses the question as to what herbicide can be used to replace it? Of the many herbicides tested over the past 15 years (Campbell 1998) the most effective replacement has been glyphosate (Roundup® and glyphosate preparations). However glyphosate has a number of disadvantages when compared with Frenock®, that can only be avoided by using the herbicide in specific ways. The most notable disadvantage is that glyphosate is non-selective, and great care must be taken to minimize the damage to useful species growing amongst sprayed tussock.

Rate of application

To simplify presentation in this paper, all rates of glyphosate are expressed as 49% a.i. The most effective rate for killing serrated tussock will vary depending on environment, climatic conditions, time of application and pre-treatment. NSW re-search indicates glyphosate will kill serrated tussock at a rate of 3-12 L/ha. However, where to apply the low and high rates can only be revealed by trials on individual properties. Indications are that a high rate will be needed to kill serrated tussock growing on rocky basalt soil in high-rainfall areas and a low rate when growing on sedimentary soils in low-rainfall areas. Dry conditions after spraying and application in mid to late spring could favour low rates. Indications that low rates will kill the weed in Victoria may be due to a different ecotype of serrated tussock being present there. Burning 12 months before spraying in Victoria has resulted in low rates being successful, but this has not been the case in NSW. Burning has deleterious effects on all plant species growing with the weed.

Time of application

In an early experiment in NSW (Campbell and Gilmour 1979), glyphosate was equally effective in each season of the year. However, later experience in NSW has shown that application of glyphosate in spring could be effective at lower rates than at other times. In South Africa (Viljoen 1981), glyphosate applied monthly at 4.4 L/ha was effective (90% kill) in October and November (spring) and in one month in each other season (*i.e.* February, April, August). It was completely ineffective when applied

in January, July and December and moderately effective in the remaining months. Therefore, the best time to apply glyphosate for reliable results has yet to be determined. To minimize damage to pasture species, it can be applied in winter when they are frosted (*e.g.* red grass, kangaroo grass, kikuyu), or in summer when they are dormant (*e.g.*, subterranean clover, phalaris). Application in autumn before the seasonal break will have no effect on annuals that germinate after the break, but should kill serrated tussock.

Method of application

Aerial. Glyphosate cannot be applied by aircraft at rates of 3 L/ha and above because these rates will severely damage or kill trees. Where no trees are present, the herbicide is best applied after the seasonal break in late autumn or winter before sowing an introduced pasture. A period of 2 to 3 weeks between spraying and sowing is necessary to overcome the residual effects of glyphosate on sown species.

Boom spraying. Glyphosate should be applied in sufficient water (100 to 200 L/ha) to cover the serrated tussock plants thoroughly, because small plants and protected areas of large plants must be covered, otherwise they will not die. Rates to try on your property are 3 to 12 L/ha. If the lowest rate is successful, still lower rates can be tried.

Spot-spraying. Care must be taken when spot-spraying to restrict the spray to the tussock - a guard on the nozzle will reduce the damage to useful plants growing nearby. Spray at 1000 L/ha of mixture (a rate that wets plants thoroughly). Rates to try on your property vary between 3 to 12 L of glyphosate per 1000 L of water per ha. This is equivalent to 0.3 to 1.2 L per 100 L of water.

Wiping. Glyphosate can kill serrated tussock when applied by a wiper without damaging the associated pasture, but a high rate (*e.g.* 1 part glyphosate to 3 parts water) is necessary, and the tussocks have to be wiped two ways. Different rates will be needed for different wipers. This method has great potential on flat, clear land, because valuable pastures can be spared. As wiping will only kill large tussocks, paddocks will have to be wiped on

an annual basis to kill smaller tussocks as they reach wiping height.

Other requirements. The recommended surfactant must be added to glyphosate to obtain the best kill. Also, all other requirements of the herbicide should be taken into account (e.g. use of clean water, avoidance of frosts, a minimum of two hours between spraying and rain, dust-free plants, spraying before noon in winter).

Seedling regeneration

Because glyphosate kills most plant species, massive regeneration of tussock seedlings often occurs after spraying. To try to overcome this, the sprayed area should be sown to introduced pastures or the pasture managed so that there is maximum competition from existing species (e.g. by spelling or applying fertilizer).

Reducing seedhead production

Low rates of glyphosate (0.5 to 1.0 L/ha) will

prevent seedhead production of serrated tussock, provided the herbicide is applied before the seedheads begin to emerge (i.e. in September or October - Campbell *et al.* 1998). If applied after the seedheads begin to emerge, only a small reduction in seedhead production will be achieved.

References

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