

PRELIMINARY RESULTS OF BRACKEN CONTROL USING A WIPER APPLICATOR

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Summary. A felt wiper applicator was used to apply metsulfuron methyl and/or glyphosate on bracken fern. Spraying treatments were also included for comparison. All treatments gave at least a 96% brownout one year after application. The wiping treatments produced brownout within six weeks after application, twice as quickly as the best spraying treatment

INTRODUCTION

Bracken fern, *Pteridium esculentum* (Forester) Cockayne, occurs in Tasmania, the southeast coast of Western Australia, on the eastern slopes of the Dividing Range from northern Queensland through New South Wales to Central Victoria (25) and in the southern part of South Australia including the Mount Lofty Ranges (2). In its distribution, bracken is found on a wide range of soil types, but it is usually on light textured, acid soils of low natural nutrient status that bracken is a major problem (1,25,28,30).

Bracken fern reduces pasture productivity through shading, competition for moisture and nutrients and through reducing access of grazing animals. In addition, bracken has been recorded as the cause of stock poisoning in cattle, sheep, pigs and horses (1,3,4,5,9,12,14,16).

Control measures have included crushing, burning, fertilising, mob stocking, slashing and rolling (14,30). Various chemical treatments have also been used such as 4-CPA (14,30); asulam (7,8,10,13,14,17,18,21,22,23,24,26,38,31); dicamba (7), amitrole (7); imazapyr (16,32); diclobenil (8); hexazinone (8); glyphosate (7,21,22,26) and sulfonyl-urea herbicides (17,18,19,26,29,31).

The application of herbicides has generally been by foliar spray. However, there has been studies into the use of wiper applicators (6,15,33). These have used either asulam (6,33) and/or glyphosate (15,33) with ropewicks (6,15,33) and a carpet wiper (33). Optimum results were achieved by double wiping (15,33) using a multistrand ropewick or carpet wiper (15,33). These studies produced a decrease of bracken fronds by 90% compared to the controls 18 weeks (15) to 12 months (33) after application.

Since the registration of metsulfuron methyl ('Brushoff^R') there has been an interest in the use of this product for bracken control. As metsulfuron methyl is phytotoxic to clover (20,27) the use of a wiper applicator could be preferable to spray application in maintaining existing pasture legumes, if present, and in the earlier establishment of clover based pastures due to the absence of herbicide soil residues.

This study was set up to evaluate rates of metsulfuron methyl applied through a felt wiper to control bracken.

METHODS

A randomised block experiment with three replicates was conducted at Flowery Gully (approximately 50 km north east of Launceston). Plot size was 2 m x 20 m. Treatments (Table 1) were applied by either a felt wiper (Weedswiper^R) on 7 February 1989 or a small plot sprayer on 1 March 1989.

The sprayer was calibrated, to give 232 L/ha at 250 kpa through Spraying Systems^R XR 11002 nozzle tips.

The Weedswiper uses an electronic sensor to keep the felt pads saturated. Felt pads were changed between treatments. All wiping treatments were double wiped.

Table 1 : Treatment details for Experiment 1 (Flowery Gully).

Treat. No.	Active ingredient	Application Rates*	Additive	Applicator	Application Date
1	metsulfuron methyl	6.0 g/L	Pulse 2 ml/L	Wiper	7/02/89
2	metsulfuron methyl	3.0 g/L	Pulse 2 ml/L	Wiper	7/02/89
3	metsulfuron methyl + glyphosate	1.5 g/L 120 g/L	Pulse 2 ml/L	Wiper	7/02/89
4	glyphosate	120 g/L	Pulse 2 ml/L	Wiper	7/02/89
5	metsulfuron methyl	36 g/ha	Pulse 2 ml/L	Sprayer	1/03/89
6	metsulfuron methyl	24 g/ha	Pulse 2 ml/L	Sprayer	1/03/89
7	metsulfuron methyl	24 g/ha 10 ml/L	Ulvapron	Sprayer	1/03/89

* g a.i./ha or g a.i./L in the herbicide solution

Data presented in this paper is for assessments to January 1990, though monthly counts are continuing.

Assessments of live bracken frond numbers were recorded on 21 January 1989 prior to application, then on 23 March 1989, 2 May 1989, and monthly from September 1989. Counts on ten 0.25m² permanent quadrats were bulked for each plot at each assessment time. A live frond was any frond with some green on it.

Brownout percentage is :

$$100 - \frac{(\text{live bracken frond count at each assessment} \times 100)}{\text{original live bracken frond count}}$$

Live bracken frond counts were transformed using a log (x + 1) transformation before doing an analysis of variance on each assessment.

RESULTS AND DISCUSSION

In Figure 1, data points for the wiping treatments in February were extrapolated from the natural decrease in frond number in the control over the first month. The data point in early March for the spraying treatment 24 g/ha metsulfuron methyl also was extrapolated from the control. The other spraying treatments did not differ from the control in the percentage decrease in frond number between the first and second assessment.

After nine months, all treatments had significantly reduced (P=0.05) live bracken frond numbers (Figure 1). A year after application there was no differences (P=0.05) between herbicides or application treatments, with all treatments achieving at least 96% brownout. Wiping treatments had reduced (P=0.05) bracken frond numbers significantly from the control 6 weeks after application. Spraying treatments, using the additive 'Pulse^R' reached significant (P=0.05) brownout levels 12 to 30 weeks after application. The spraying treatment using 'Ulvapron^R' took the longest time to brownout, not being significantly different (P=0.05) from the control until nine months after treatment.

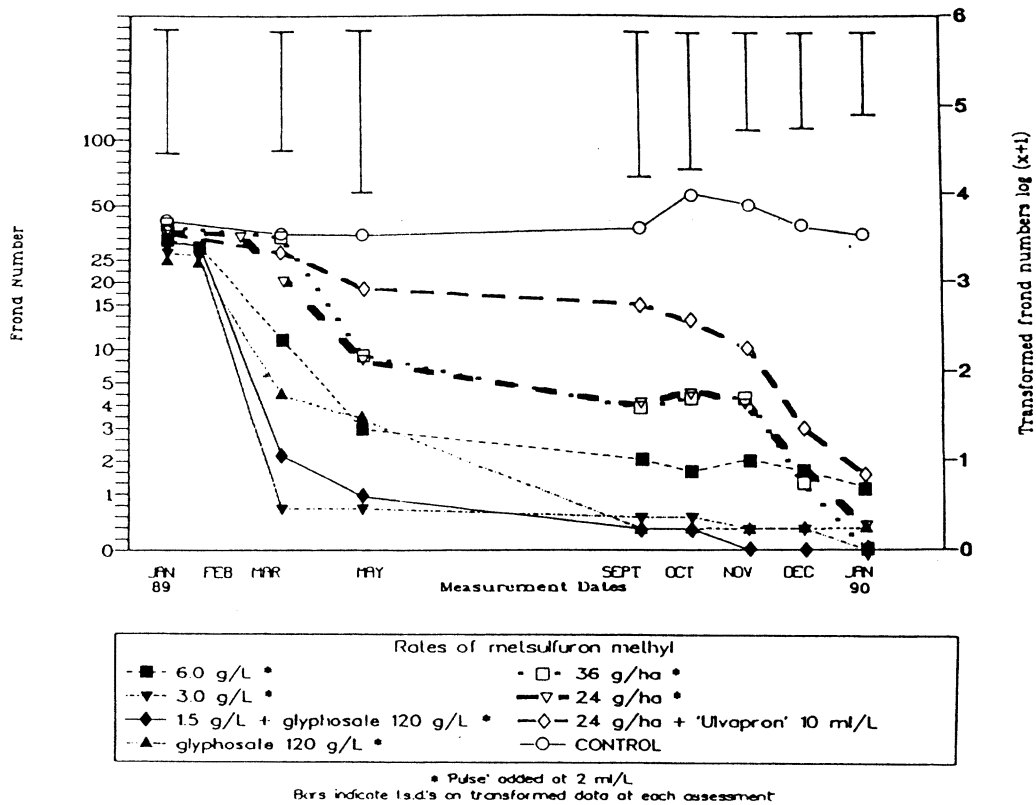


Figure 1. The effect of metsulfuron methyl and/or glyphosate applied by a wiper applicator or sprayer on bracken frond numbers (per 2.5 m²).

The higher rates of metsulfuron methyl, in both the spraying and wiping treatments, took longer to brownout than lower rates. Whether this was due to initial localised phytotoxicity preventing translocation of metsulfuron methyl is uncertain.

The treatments using metsulfuron methyl at 3 g/L and metsulfuron methyl at 1.5 g/L plus 120 g/L glyphosate both had almost 100% brownout after one month and have maintained this level of control for twelve months.

The increase in bracken frond numbers in the control in October was due to the seasonal spring flush of young bracken fronds. Due to competition between fronds, young and old, this increase in fronds reverts back to levels existing prior to the spring flush.

Both the spraying treatments using 'Pulse' also had a spring frond increase mirroring the control but at a much lower level. The rapid decrease after this rise indicates the possibility of residual metsulfuron methyl in the soil affecting the emerging young fronds. There also was a rapid decrease in the frond number in the 'Ulvapron' treatment. This residue could be either in the soil or in the bracken plant. By using a wiper applicator no soil residue occurs.

The rapid brownout by the wiping treatments could be due to the wiper tending to apply the herbicides on the underside of the bracken fronds, where uptake of herbicide is likely to be greater than on the tough waxy upper surface.

Although treatments eventually reached the same level of control the rapid brownout by the wiping treatments may have several beneficial results. Firstly, having brownout as soon as possible after application will create greater confidence in the use of metsulfuron methyl by the operator than having to wait 6 to 12 months for brownout to occur. Secondly, the extra time without any active photosynthetic material may improve long-term results as less photosynthate is translocated into storage systems. The opposite is also feasible in that a fast brownout may

decrease the translocation of metsulfuron methyl to dormant rhizomes hence reducing long-term control.

As bracken is a formidable foe, results of just a year may not hold true for the next year. The real test will be to see the performance of these treatments in spring and summer 1990-91, the second season after application.

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