HERBICIDES FOR CONTROL OF CREEPING BUTTERCUP (*RANUNCULUS REPENS*) IN ASPARAGUS

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Control of the complete spectrum of weeds in asparagus (*Asparagus officinalis*) for the duration of the growing season is difficult in the mild, high rainfall regions of the North Island. Soil applied herbicides with a long residual life are generally used to achieve this at present (Rahman 1986). Cultural measures for weed control are usually confined to the closeup stage (at the end of the harvest season) or to the winter season after the ferns have been cut down (Rahman and Sanders 1990). The reliance on chemical weed control results in an increase of some perennial weeds that are tolerant to the herbicides or whose growth habits are similar to those of asparagus.

Creeping buttercup (*Ranunculus repens*) is normally associated with wet soils or high rainfall areas and can be troublesome in horticultural crops. Because it is tolerant of bromacil and triazines, herbicides commonly used in asparagus (Matthews 1975), some crops have suffered serious infestations. Taylor (1979) suggests that creeping buttercup is very difficult to kill but can be kept low by spraying with MCPA at 2 kg/ha in orchards. The aim of this study was to evaluate several herbicides with potential to control creeping buttercup and to observe their effects on the asparagus crop.

The field trial reported here was on a grower's property at Ngahinapouri (Waikato), which had a fairly dense and even infestation of creeping buttercup when the asparagus ferns were removed by mulching on 25.7.92. Buttercup was low growing, of moderate vigour and had reached 70 - 95% ground cover. Plots were 11.2 m wide (7 rows) and 6 m long. There were four replicates laid out as a randomised block design. The treatments (Table 1) were sprayed on 27.7.92 in overcast weather using a precision sprayer delivering 200 litres/ha at 210 kPa. A light shower followed an hour after the last treatment was applied and 5 mm of rain fell during the night. After the first assessment at 4 weeks after treatment (WAT), the asparagus block was surface cultivated with asparagus discs and a fortnight later with a tined cultivator. Regular assessments were made of weed damage, onset of flowering and ground cover of the buttercup. Asparagus spears were counted weekly between 7.10.92 and 6.11.92 to ascertain whether the herbicides were damaging to the crop.

A further application of some treatments was made on 12.11.92 to check their activity in spring and effects were assessed for 6 weeks until closeup in December. The MCPA treatment was adjacent to, but not in, the trial area and was therefore not included in the statistical analyses.

Paraquat gave the best immediate desiccation (100% damage at 4 WAT) of the buttercup. The mixture of dicamba + paraquat/diquat was a little slower and imazapyr very much slower to reach the full effect. These treatments gave the best overall control of buttercup, with less than 5% ground cover re-establishing 21 WAT (Table 1).

Glyphosate (+Pulse 0.2% v/v), picloram + 2,4-D, and dicamba caused between 35-60% damage and thifensulfuron had very little effect at 4 WAT. These chemicals did slow down the growth of buttercup for up to 13 WAT, but by 21 WAT they were no different from the untreated control plots. All treatments except glyphosate and dicamba delayed flowering by several weeks.

The November spraying confirmed the effectiveness of paraquat on buttercup, and the 0.4 kg/ha rate appeared sufficient to give acceptable control. MCPA and glufosinate-ammonium reduced ground cover to 5 and 17% respectively by 4 WAT, but regrowth was evident and ground cover increasing by the last assessment (6 WAT). Thifensulfuron

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at both rates continued to be active against the buttercup at the last assessment (Table 1). Spear counts showed that the herbicide treatments caused no apparent damage to the asparagus plants.

Activity of phenoxy herbicides against creeping buttercup in pasture is known to be inadequate (James *et al.* 1992; Matthews 1975). For the asparagus crop, a wider range of herbicides can be used in winter and at closeup. This trial has shown that paraquat was effective as a broadcast treatment in both winter and spring. It is likely that a rate of 0.4 kg/ha may be sufficient for effective control of the weed as indicated by the November treatment. Imazapyr would be useful if other weeds such as the bindweeds were also present. Thifensulfuron may be a potential treatment in the spring but needs further evaluation.

TABLE 1: Effects of different herbicide treatments applied in winter or spring on creeping buttercup and asparagus.

Treatment	Rate (g ai/ha)	% Weed damage 4 WAT ^a	Weed ground cover (%)				Asparagus spears ^b (No./48m ²)
Winter treatments applied 29.7.92			10 WAT	13 WAT	17 WAT	21 WAT	
dicamba	400	35	30	58	50	70	345
dicamba	600	38	24	48	80	90	320
glyphosate	2160	60	29	45	40	80	451
paraquat/diquat + dicamba	750+450 +400	100	0.8	1.8	1.8	5	578
imazapyr	250	3	1.0	0.8	0.8	3	450
imazapyr	500	6	1.5	1.8	0.8	2	406
thifensulfuron	15	5	10	53	85	90	366
thifensulfuron	22.5	1	10	43	75	85	388
paraquat	1200	100	1.4	0.8	0.8	4	416
picloram +2,4-D	100+390	45	13	38	55	68	466
untreated		0	48	75	70	70	341
SED			0.4	0.8	0.7	2.0	57
Spring treatments applied 12.11.92			2 WAT	4 WAT	6 WAT		
thifensulfuron	15	80	63	25	28		
thifensulfuron	22.5	75	63	29	25		
paraquat	400	100	0.7	1	0.3		
paraquat	1200	87	10	7	10		
glufosinate- ammonium	1500	80	23	17	24		
MCPA	2250	(70)	(20)	(5)	(15)		
SED ^c		13	18	17	16		

^a WAT = weeks after treatment.

^b Summation of 6 weekly counts of asparagus spears between 7.10.92 and 6.11.92.

^c Excluding the MCPA treatment which was not randomised within the trial area.

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