

Effect of broad-leaf herbicides on production of annual legumes

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There is uncertainty regarding the safety of herbicides for controlling broad-leaf weeds in annual legumes. The effects of bromoxynil and 2,4-DB were tested at recommended rates for this purpose. Estimates at 21 and 44 days post spraying indicated reductions in dry matter production from herbicides ranging from 3 to 58 percent, with significant differences between varieties. Visual estimates were not a satisfactory method of assessing production loss. The results highlight the need for research on the tolerance of annual legume species to herbicides.

Methods

Seventeen varieties of annual legumes were sown in March on replicate plots of 0.1 ha. Excellent establishment and vigorous, uniform growth was achieved on all plots. Broad-leaved weeds, mainly capeweed and shepherd's purse, were controlled at the correct growth stage of the weeds and pasture by applying bromoxynil (200 g/L) at 1.5L/ha in 100L of water by boomspray to all varieties except the medics, which were treated with 2,4-DB (400 g/L as the sodium and potassium salts) at 3.0L/ha in 100L water. On each replicate a representative 1 m² area of pasture was protected from the herbicide. Plots were sprayed on the 13 May and visual estimates of damage (0-nil; 5-severe) were made on the 26 May and 16 June. Dry matter production on the sprayed and unsprayed areas were measured on the 3 June by cutting quadrats and on the 29 June with a capacitance meter.

Results and discussion

There was no interaction between the effect of each herbicide on yield and time of assessment so pooled values are shown in the table.

Species/ Cultivar	Yield reduction kg/ha	%	Visual Score (n=6)	Species/ Cultivar	Yield reduction kg/ha	%	Visual Score (n=6)
<u>T.subterraneum</u>							
Dalkeith	527	51	1.6	Marral	524	36	2.7
Esperance	545	26	1.8	Kyambro	631	34	1.9
Trikkala	391	33	2.0	<u>Ornithopus spp</u>			
Woogenellup	456	26	1.7	Avila	418	26	1.0
Karridale	1190	49	1.6	<u>Medicago spp</u>			
Clare	684	30	1.1	Sephi	373	3	1.0
<u>Trifolium spp</u>				Sava	1398	41	1.3
Balansa	621	42	1.6	Circle Valley	1750	58	1.6
Arrowleaf	533	40	2.4	Harbinger	588	20	1.7
<u>Berseem</u>							

Both bromoxynil and 2,4-DB significantly depressed yields of the respective cultivars ($P(0.05)$). The effect of 2,4-DB was much larger at the second assessment, the mean reductions in yield for the first and second assessments being 259 and 1759 kg dry matter/ha ($P<.001$). The values for bromoxynil were 402 and 811 ($P(.001)$). Bromoxynil caused the same yield depression in all varieties while 2,4-DB had a greater effect on Sava, Circle Valley and Murex. Herbicide damage was apparent soon after spraying but the visual estimates of damage were poorly correlated with estimates of yield reductions (Table).

The sub clovers, Balansa and Murex had visually recovered by day 34 while the remaining Trifoliums and particularly the medics, were still showing signs of appreciable damage. The results highlight the need for further research on the sensitivity of annual legume species to herbicides.

