THE CONTROL OF STINKING MAYWEED IN PASTURES

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Summary

Control of stinking mayweed (*Anthemis cotula*) by 4-CPA (2.0 kg/ha) was generally satisfactory but white clover (*Trifolium repens*) was severely reduced. Asulam (1.0 kg/ha) gave inadequate control and pasture species were depressed. Control by diquat (0.25 kg/ha) varied from satisfactory to inadequate with sometimes severe reduction in grass growth. Bentazon (1.0 to 2.0 kg/ha) gave good control with possibly some temporary depression of pasture growth.

INTRODUCTION

LITTLE research into the control of stinking mayweed (*Anthemis cotula*) has been reported in New Zealand. Matthews (1960) recorded that it is highly resistant to MCPA and 2,4-D, but noted that it and related species may be controlled in cereal crops by MCPA/TBA mixtures. Dicamba is also used in cereals and paraquat in lucerne to control these weeds but none of these materials can be recommended for use in pasture situations. For some years 4-CPA has been marketed as suitable for the control of stinking mayweed in pasture, and low rates of diquat have also been recommended for use against seedlings of the weed in these situations. Asulam is also known to have activity against some of the compositae, particularly daisies, and has had limited commercial use on mayweeds and related species in pasture.

When bentazon was shown by Jury and May (1970) to be highly effective against mayweed species and reported to be well tolerated by cereals and legumes, it was decided to compare it with asulam, diquat and 4-CPA for the control of stinking mayweed in pasture.

Four trials were laid down at Milson Experimental Area, near Palmerston North and five on sites near Otorohanga in northern King Country. Two of the Milson trials and two at Otorohanga compared the herbicides for stinking mayweed control while two at Milson examined the tolerance of ryegrass (*Lolium perenne*)/white clover (*Trifolium repens*) pasture to the herbicides. In two of the Otorohanga trials herbicides were compared on a mixed pasture containing some stinking mayweed, and in the final trial the effects of pasture competition and grazing on the species were measured.

EXPERIMENTAL

Herbicide treatments applied in the Milson trials were (kg/ha) bentazon 1.0, 2.0, 4.0; asulam 1.0; diquat 0.25 and 4-CPA 2.0. At Otorohanga

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the herbicide treatments were similar except that bentazon rates were reduced to 0.5, 1.0 and 2.0 kg/ha. Herbicides were applied in water at 250 litres/ha at Milson and 300 litres/ha at Otorohanga and treatments in all trials were replicated 4 times. No significant rain fell in the 2 days after treatment application to any trial.

Details of the weed control trials are given in Table 1.

TABLE 1: STINKING MAYWEED CONTROL TRIALS

<i>Trial:</i>	A	B	C	D
<i>Location:</i>	Milson	Milson	Otorohanga	Otorohanga
<i>Treatment date:</i>	6/6/72	4/9/72	22/9/72	18/11/72
<i>Weed growth stage:</i>	Young plants up to 5 leaf	Regrowth after trimming	Young plants 6 to 10 leaves	Near flowering up to 30 cm high
<i>Data obtained:</i>	Plant counts point analyses	Plant counts and observations	Plant counts and observations	Plant counts and observations

In trials A and B treatments were applied to a heavy infestation of stinking mayweed in a new pasture sown in April 1972, while C and D were on an almost pure infestation which had established after pasture desiccation.

Details of trials laid down primarily or exclusively to determine the tolerance of pasture species are given in Table 2.

TABLE 2: PASTURE TOLERANCE TRIALS

<i>Trial:</i>	E	F	G	H
<i>Location:</i>	Milson	Milson	Otorohanga	Otorohanga
<i>Treatment date:</i>	6/6/72	4/9/72	10/5/72	5/10/72
<i>Type of pasture:</i>	Established near pure ryegrass/white clover		Established ryegrass, goose grass, <i>Poa</i> spp., white clover	
<i>Stinking mayweed:</i>	Not present	Not present	Seedling to 6 leaf	Young plants up to 7 cm high
<i>Data obtained:</i>	Ryegrass and clover D.M. yields		Observations	Herbage yields and point analyses

On trial H half of each plot was fenced to obtain yield data while the other half was left open to observe effects under sheep grazing and was point analysed on 9/11/72.

In trial I at Otorohanga the survival of stinking mayweed was compared in pastures set stocked or rotationally grazed at 3 week and 6 week

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intervals from 1/8/72 until 23/1/73 when results were assessed by point analyses. Pasture enclosure frames were used to exclude stock from the rotationally grazed plots between grazings.

RESULTS

Counts of surviving stinking mayweed plants were made several months after treatment on each of the weed control trials, and results are summarised in Table 3.

TABLE 3: NUMBERS OF SURVIVING STINKING MAYWEED PLANTS
(plants per 0.5 m², mean of 4 replicates)

Treatment	(kg/ha)	Trial:			
		A	B	C	D
bentazon	0.5	NA	NA	3	18
bentazon	1.0	0	3	1	10
bentazon	2.0	0	2	0	6
bentazon	4.0	1	1	NA	NA
asulam	1.0	10	16	22	18
diquat	0.25	28	10	2	7
4-CPA	2.0	1	0	2	11
control		50	30	60	63

NA = treatment not applied.

Point analyses of trial A (26/7/72) indicated treatment effects which were in good agreement with the later plant counts, except that control by diquat was shown to be better than by asulam, while pointing data in the grazed section of trial H broadly confirmed the results of counts in trial C.

Relative yields of perennial ryegrass and white clover from 4 herbage cuts from 2 of the pasture tolerance trials are given in Table 4.

TABLE 4: RELATIVE DM YIELDS OF PERENNIAL RYEGRASS AND WHITE CLOVER

Treatment	(kg/ha)	Trial E		Trial F	
		Ryegrass	Clover	Ryegrass	Clover
bentazon	1.0	103 aA	92 bB	105	95
bentazon	2.0	85 cdAB	97 bAB	98	96
bentazon	4.0	75 dB	114 abAB	115	71
asulam	1.0	93 abcAB	92 bB	108	62
diquat	0.25	54 eC	134 aA	77	75
4-CPA	2.0	88 bcdAB	100 bAB	122	27
control		100 abA	100bAB	100	100
control yields	(kg/ha)	2690	1180	2190	1670
	CV %	10.8	16.8	10.9	14.8

Analysed data from 3 cuts from trial H showed that asulam caused a highly significant reduction in total herbage yield and was particularly severe on clovers. Diquat initially reduced all pasture growth, especially grasses, while 4-CPA caused a highly significant decline in clover content,

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but neither material had a significant effect on total yields. At none of the rates used did bentazon have a significant effect on grasses or clovers, either at individual cuts or in total production. These effects were generally confirmed by pointing data from the grazed section of the trial.

In trial G shading of small stinking mayweed plants by pasture growth, which was up to 10 cm high at treatment, considerably reduced herbicide effects, particularly by bentazon, on the weed. Heavy grazing 4 weeks after treatment almost eliminated surviving plants and opened up the sward to permit the germination of large numbers of new seedlings on all treatments. The trial was abandoned. Observations prior to grazing were similar to those reported in trial H.

DISCUSSION

Observations made at Otorohanga showed that stinking mayweed seed will germinate equally readily at any time from soon after being shed in late summer through until the beginning of the following summer, the main limiting factor being inadequate soil surface moisture to promote germination during the warmer months. Seedlings are weak and initially slow growing and not well adapted to survival where pasture competition is reasonably vigorous. In trial I where the plants were subjected to the moderate competition of pastures rotationally grazed at 3 week intervals only about 20% survived compared with set stocked pasture and where the grazing interval was increased to 6 weeks stinking mayweed survival was nil.

It is generally considered that stinking mayweed is highly unpalatable to all stock. Observations at the Otorohanga sites confirm that cattle whether set stocked or rotationally grazed, avoid the weed even when feed is limited. Although sheep reject the plant if sufficient other feed is available, they readily eat it at higher grazing pressures. When prevented from flowering the stinking mayweed was forced into an almost perennial habit, with little evidence of senescence well into the following autumn.

The 1.0 kg/ha rate of asulam used in these trials was inadequate to give acceptable control and effects on pasture species were severe. Although in the Otorohanga trials diquat gave generally good control of young plants, results from the Milson trials indicate that this material is too unreliable for general use. The initial desiccation of pasture by diquat can facilitate the germination of further seedlings, an effect which possibly accounted for the difference on trial A between point analysis and counting results.

Control by 4-CPA, was good when applied to smaller plants but less effective on more advanced growth. It has no effect on grasses but can dramatically reduce clover growth when applied in the spring, although the winter treatment showed no effect on total white clover yield.

In its herbicidal action bentazon is essentially a contact material, although manufacturers' literature indicates the possibility of some translocation effect. In these trials it has given consistently good control of stinking mayweed at all stages of growth provided the weed was fully exposed so that good bentazon cover could be achieved. The weed tolerance trials have demonstrated that seedlings and small plants can be adequately controlled by 1.0 kg/ha or less but that advanced growth requires up to 2 kg/ha or more. Results with bentazon in the pasture tolerance studies were rather conflicting; trial E showing significant reductions in ryegrass content, with no adverse effect on white clover, as bentazon rates increased,

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while trial F indicated the opposite effect of no decline in ryegrass but reduced clover content at the highest rate of bentazon. Results from the Otorohanga trials seem to confirm that little adverse effect on grasses and white clover may be expected at the rates of 1.0 to 2.0 kg/ha bentazon likely to be used in practice.

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