THE PROBLEM AND CHEMICAL CONTROL OF OX-EYE DAISY (*CHRYSANTHEMUM LEUCANTHEMUM*)

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Ox-eye daisy, *Chrysanthemum leucanthemum*, is a perennial herbaceous plant with short creeping rootstocks. The flowers, which have white ray florets and yellow disc florets, and are approximately 2 in. (5 cm) in diameter, can produce about 200 seeds per capitulum. The seed germination can be as high as 86%, and some of the seeds may have a period of dormancy. The species has a high seed production rate and counts involving 200 replications in typical pasture infestation in Gippsland have shown an average of 15 flower heads (range 5-34) and 3,000 seeds produced per sq. foot (0.09 m^2). In Victoria flowering occurs from October to December and the seeds mature during January.

The seeds are not spread by wind, as they are devoid of pappus, and fall close to the parent plant. However, when eaten by stock they can pass through the animal and are able to germinate.

The largest infestations of ox-eye daisy are in south Gippsland and in the Otway Ranges where the range of annual rainfall is from 39 to 75 in. (990-1905 mm). Most of the infestations are in permanent pastures on hilly country or on low-lying flats of slightly acid soils low in phosphorus, and on roadsides and waste places. Ox-eye daisy also occurs to an insignificant degree in several other parts of Victoria. In south Gippsland and particularly in the Otway Ranges, the species is regarded as troublesome and its spread is causing concern.

Research work has been carried out in Victoria into the chemical control of ox-eye daisy in grassland. In screening trials it was found that the plant is resistant at the flowering stage to 2,4-D, MCPA, 2,4-DB, MCPB, and Dacamine D at rates of 2 and 4 lb a.i.per acre (2.25-4.5 kg per hectare), although some reduction in plant density and vigour was observed. Promising results were obtained with picloram as Tordon 50-D, dicamba, 2,3,6-TBA, and amitrole T.

In a second series of experiments these promising chemicals and 2,4-D were compared when applied at the full flowering stage.

Germination tests on samples of seeds collected 1 month after treatment have shown (Table 1) that germination was substantially reduced by dicamba and 2,3,6-TBA at 2 and 4 lb per acre (2.25 and 4.5 kg per hectare), by Tordon 50-D at the rates of 0.25 lb of picloram plus 1 lb of 2,4-D per acre (0.3 + 1.125 kg per

hectare), at 0.5 lb of picloram plus 2 lb of 2,4-D per acre (0.6 + 2.25 kg per hectare), and by ester 2,4-D at 4 lb per acre (4.5 kg per hectare).

TABLE 1

The Effects of Herbicides on Plant Density and Seed Germination of *Ch. leucanthemum*

Chemicals	Concentration lb/acre	(kg/ha)	Control* obtained	Germination %
2,4-D ester	4	(4.5)	12	7
	2	(2.25)	13	10
Dicamba	4	(4.5)	57	3
	2	(2.25)	21	1
2,3,6-TBA	4	(4.5)	29	3
	2	(2.25)	12	1
Amitrole-T	8	(9.0)	53	24
	4	(4.5)	42	24
Tordon 50-D	0.5 (picloram)	(0.6)	99	2
	0.25 (picloram)	(0.3)	82	1
	0.125 (picloram)	(0.15)	41	12
Picloram (Potassium salt)	0.5	(0.6)	77	15
	0.25	(0.3)	57	10
	0.125	(0.15)	17	37
Untreated	-		0	62

* 0 = No reduction, 100 = complete control

Twelve months after treatment, evaluation was made by using a scoring system (0 = no reduction, 100 = complete control). Ester 2,4-D at 4 lb a.i. per acre (4.5 kg per hectare) gave very little plant reduction (Table 1). The most outstanding result was obtained with Tordon 50-D at a rate of 0.5 lb of picloram plus 2 lb of 2,4-D per acre (0.6 + 2.25 kg per hectare). The lower rate containing 0.25 lb of picloram plus 1 lb of 2,4-D per acre (0.3 + 1.125 kg per hectare) also gave good

control, but the application of Tordon 50-D at a concentration of 0.125 lb of picloram plus 0.5 lb of 2,4-D per acre (0.15 + 0.56 kg per hectare) was much less effective. Amitrole-T at 8 lb per acre (9 kg per hectare) also gave some reduction. The control obtained with picloram at 0.5 lb (0.6 kg per hectare) and 0.25 lb (0.3 kg per hectare) was also good, but below that given by Tordon 50-D at equivalent picloram concentrations. White clover was completely removed with these chemicals and the growth of grass was also depressed with amitrole-T.

Earlier trial work had indicated that higher rates of dicamba, 2,3,6-TBA (both at 8 lb per acre = 9 kg per hectare), and amitrole-T (16 lb per acre = 18 kg per hectare) could produce outstanding results. However, their use at such rates would appear unpractical on large areas. Tordon 50-D at the rate containing 0.25 lb of picloram plus 1 lb of 2,4-D per acre (0.3 + 1.125 kg per hectare offers reasonable control with more economy.

THE USE OF BIPYRIDYL HERBICIDES TO INCREASE THE CLOVER COMPONENT IN PASTURES

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Considerable evidence exists to suggest that animal production is greatest when pastures contain legumes alone or mixed with grasses than when they contain no legumes. The ability of paraquat to suppress susceptible annual grass species and to manipulate the pasture composition in favour of better subterranean clover (*Trifolium subterraneum*) growth, was therefore examined as a technique of improving pastures.

Successful manipulation of the clover composition of pastures lies in the ability to effectively control or suppress undesirable species, while still maintaining the competitive vigour of clover growth. Effective control of annual grasses with paraquat is dependent on a good chemical cover, and early work suggested that pastures should be well grazed prior to spraying. These investigations on the time and rate of paraquat application on well-grazed pastures indicated that this was best achieved with a rate of 2 oz a.i. per acre (142 g a.i. per hectare) paraquat ion (plus Agral 60 wetting agent) applied just prior to or during the early spring growth of subterranean clover (Table 1).