EVALUATION OF THIFENSULFURON FOR CONTROL OF OXEYE DAISY IN PASTURE

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Oxeye daisy (*Chrysanthemum leucanthemum*) is an upright growing perennial weed found throughout New Zealand particularly in areas of high rainfall where it is often seen along roadsides and fencelines. It can become a problem weed on rolling to steep cattle farms where there is little opportunity for either trampling or mowing. Very little has been published about the chemical control of oxeye daisy in pasture. It shows a high resistance to the selective herbicides MCPA and 2,4-D (Taylor 1981) and is not effectively controlled by either metsulfuron or 2,4-D/picloram when applied using a rotary weed wiper (Martin *et al.* 1990). Thifensulfuron is a sulfonylurea herbicide used for post-emergence weed control in cereal crops (Ambach *et al.* 1984). Tolerance of pasture species to thifensulfuron was evaluated by Rahman and Martin (1989), and James *et al.* (1992) reported it to be a promising alternative to phenoxy herbicides for control of docks (*Rumex* spp.) and buttercups (*Ranunculus* spp.) in pasture. The present study reports on the potential of thifensulfuron applied in spring or autumn for the control of oxeye daisy in pasture.

Two trials were conducted (spring and autumn) on a site near Te Awamutu (Waikato) on an established perennial ryegrass (*Lolium perenne*)/white clover (*Trifolium repens*) dairy pasture infested with oxeye daisy. The site was a north facing slope on a clay loam soil. The trials were of a randomised block design with four replicates and a plot size of 4 m x 10 m. The treatments (Table 1) were applied with a hand held CO₂ powered precision sprayer applying 300 litres/ha at 200 kPa, using flat fan nozzles. A non-ionic wetting agent, Citowett, was added to all thifensulfuron (Harmony) treatments at 0.02%v/v. Treatment application was 4 days after grazing (regrowth being very rapid) on 22 October 1991 for Trial 1 and 10 days after grazing on 24 April 1992 for Trial 2. For the spring application weather conditions were sunny, 17°C and no rain fell for 2 days after spraying, and for the autumn application, sunny, 15°C with no rain for 7 days after spraying. Normal dairy farm management was applied, except for June and July 1992 when the stock were taken off. The effects of the treatments on growth suppression and damage to oxeye daisy and pasture species were visually assessed at regular intervals, by at least two observers. Assessments on oxeye daisy were not made between June and September in Trial 2 due to very slow plant growth. The data were subjected to analysis of variance from which least significant differences (LSD) were calculated.

In both spring and autumn the maximum level of oxeye daisy control was achieved by all herbicides at about 4 weeks after treatment (Table 1). Overall in both trials the best control was provided by the 18.8 and 30 g/ha rates of thifensulfuron, 2,4-D and the 2,4-D + clopyralid treatment. In the spring trial the damage to oxeye daisy resulting from the 18.8 g/ha rate of thifensulfuron was higher than the 67% damage 4 weeks after treatment found by M.J. Cornwell (unpublished), in North Auckland. Oxeye daisy control gradually declined over time for all herbicides and the high number of regrowths meant that long term control was unsatisfactory. However in both trials it was observed that flowering was delayed for 2 months by all herbicide treatments, particularly by the 30 g/ha rate of thifensulfuron and the 2,4-D + clopyralid treatments. This meant that over the summer period the access to pasture for grazing stock was substantially increased in these treatments compared to the untreated plots which

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quickly became a solid mass of tall dead standing oxeye daisy plants with live oxeye daisy and Californian fleabane (*Conyza canadensis*) plants also present.

TABLE 1: Visual damage (%) to oxeye daisy after herbicide treatment in spring and autumn.

Treatment	Rate (g ai/ha)	Trial 1 (Spring)			Trial 2 (Autumn)		
		21.11.91 4 WAT*	18.12.91 8 WAT	5.3.92 19 WAT	19.5.92 4 WAT	5.10.92 25 WAT	22.12.92 35 WAT
thifensulfuron	15	79	50	38	60	60	65
thifensulfuron	18.8	85	53	56	70	60	60
thifensulfuron	30	90	78	60	75	60	73
2,4-D	2160	75	73	64	75	68	73
2,4-D + clopyralid	2160 + 30	86	82	69	88	83	78
untreated		0	0	0	0	0	0
LSD(P<0.05)		8	12	17	9	33	11

* WAT = Weeks after treatment

In both trials all rates of thifensulfuron resulted in some perennial ryegrass damage 2 weeks after treatment, with the 30 g/ha rate causing about 55% damage which was worse than that at the 15 and 18.8 g/ha rates (42 and 35% respectively). Visual damage symptoms consisted of both yellowing of leaves and inhibition of growth, but these effects were only short term and by 8 weeks after treatment no damage symptoms were visible. The phenoxy treatments were well tolerated by perennial ryegrass.

Thifensulfuron had a more damaging effect on white clover than on perennial ryegrass, causing reddening and yellowing of leaflets and petioles and greatly reduced growth of new leaves and stolons. Overall the 30 g/ha rate of thifensulfuron was more damaging than the lower rates (Table 2) and caused damage similar to 2,4-D, but significantly less than that caused by 2,4-D + clopyralid. The level of clover damage 4 weeks after thifensulfuron application was similar in both trials, but the clover recovered much faster from the spring application with very little damage being visible 13 weeks after treatment. In contrast, 35 weeks after the autumn application, damage from the highest thifensulfuron rate was still similar to that caused by 2,4-D + clopyralid. The extent and persistence of pasture damage in these trials was similar to that described by Rahman and Martin (1989), James *et al.* (1992) and Rahman *et al.* (1993).

TABLE 2: Visual damage (%) to clover after herbicide treatment of pasture in spring and autumn.

Treatment	Rate (g ai/ha)	Trial 1 (Spring)			Trial 2 (Autumn)		
		21.11.91 4 WAT*	18.12.91 8 WAT	23.1.92 13 WAT	17.6.92 9 WAT	5.10.92 25 WAT	22.12.92 35 WAT
thifensulfuron	15	55	5	0	58	35	15
thifensulfuron	18.8	63	15	5	55	35	10
thifensulfuron	30	70	38	8	75	48	35
2,4-D	2160	38	50	19	57	40	0
2,4-D + clopyralid	2160 + 30	88	89	78	95	88	30
untreated		0	0	0	0	0	0
LSD(P<0.05)		9	17	13	17	16	2

* WAT = Weeks after treatment

In conclusion, thifensulfuron appears to be unsuitable for autumn applications due to the high level of clover damage. When applied in spring at rates between 18.8 and 30 g/ha, it provided oxeye daisy control equal to that achieved by 2,4-D + clopyralid with significantly less clover damage. It could therefore provide a useful alternative in the spring in many situations where a phenoxy herbicide cannot be applied.

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