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ATRAZINE FORMULATIONS FOR WEED CONTROL IN ESTABLISHED LUCERNE

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Summary

Results are reported of 6 trials comparing atrazine with simazine as wettable powders in combination with paraquat for annual broadleaf control in established lucerne. Atrazine (0.8 kg/ha) gave at least equal weed control to simazine when applied at the same rate. Results are also presented of 4 trials comparing 2 liquid suspension formulations of atrazine with the standard wettable powder. All 3 formulations of atrazine gave a similar degree of weed control and lucerne tolerance when used in combination with paraquat or diquat.

INTRODUCTION

ATRAZINE has been widely used, in combination with other herbicides, for post emergence grass and broadleaf weed control in lucerne.

Cassels and Upritchard (1968) noted that atrazine was more active than simazine or diuron when mixed with 2,2-DPA. Mid winter applications of atrazine plus 2,2-DPA (0.8+0.75 kg/ha) gave good control of most annual broadleaf and grass weeds in lucerne.

Although previous studies have reported on mixtures of simazine and paraquat (Meeklah 1964; Cassels 1966) no published data are available on the use of the mixture of atrazine and paraquat. Wide farmer acceptance has been gained by a tank mixture of atrazine plus paraquat (0.8+0.3 kg/ha) for weed control in established lucerne.

The advantages of liquid over wettable powder formulations are greater ease of measurement for tank filling and ease of handling and mixing.

This paper presents a comparison between atrazine and simazine in combination with paraquat for weed control. In addition an evaluation for crop tolerance and weed control is made with two recently developed liquid formulations of atrazine in comparison with the standard wettable powder.

EXPERIMENTAL

Materials:

The formulations of atrazine used in the trials were:

- (a) atrazine Aq—an aqueous suspension containing 40% w/v atrazine.
- (b) atrazine Oil—an oil emulsifiable suspension containing 40% w/v atrazine.
- (c) atrazine WP.—a wettable powder containing 80% w/v atrazine.

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The 6 trials comparing atrazine with simazine in combination with paraquat were applied between June and August 1971 on a randomised plot layout with 2 to 5 replications. The 4 trials evaluating formulations of atrazine were applied between June and August 1972. All trials were situated in Canterbury. All treatments were applied in 250 litres of water/ha. Sites were selected in established lucerne primarily for their storksbill (*Erodium cicutarium*) infestation as this species is one of the major problem broadleaf weeds. None of the sites were grazed for the full term of the trials.

Trial 127 which was yielded was laid in a randomised block design with 6 replications and a plot size of 2 m x 10 m. Yield data was obtained by mowing a strip 0.5 m wide down the centre of each plot. Sub-samples were collected for dissection and dry matter determination.

Weed control ratings for all trials were based on control of storksbill. Assessments were made by 2 or more independent observers on a 0 to 10 scale (0 = no effect, 10 = maximum effect).

RESULTS

Mean visual ratings for control of storksbill in 6 trials laid in the winter of 1971 are presented in Table 1. Ratings were made 2 to 3 months after application.

The mixture of atrazine and paraquat gave very acceptable control of storksbill in these trials being at least equal in activity to the mixture of simazine and paraquat.

TABLE 1: CONTROL OF STORKSBILL

Treatment	kg/ha	Mean Visual Ratings						Average
		*02	03	04	08	11	15	
paraquat/atrazine WP	0.3/0.8	9.5	10	9.3	8.2	8.2	9.8	9.2
paraquat/simazine WP	0.3/0.8	8.5	8.5	8.0	9.0	7.0	10	8.5
paraquat	0.6	—	—	7.0	7.2	6.8	10	7.5
untreated control	—	0	0	0	0	0	0	0

* Trial numbers

Mean visual ratings for control of storksbill in 4 trials laid in the winter of 1972 are presented in Table 2. Ratings were made 2 to 3 months after application.

The atrazine Aq. and atrazine oil combinations with both paraquat and diquat gave at least equal control of storksbill to the wettable powder formulation of atrazine.

The yields of lucerne (1 cut) from the treatments of the 3 formulations of atrazine in combination with paraquat or diquat in trial 127 are presented in Table 3.

There was no significant difference in crop tolerance between the 3 formulations of atrazine when applied with paraquat or diquat. Vigorous storksbill growth severely reduced the production of lucerne in the untreated control.

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TABLE 2: CONTROL OF STORKSBILL

Treatment	kg/ha	Mean Visual Ratings					Average
		*125	126a	126b	128	129	
paraquat/atrazine WP	0.3/0.8	10	9.8	7.5	9.7	5.6	8.5
paraquat/atrazine Aq.	0.3/0.8	10	—	8.0	—	7.1	8.0
paraquat/atrazine oil	0.3/0.8	10	10	—	—	—	10
diquat/atrazine WP	0.4/0.8	10	9.9	8.0	9.9	4.5	8.4
diquat/atrazine Aq.	0.4/0.8	—	—	8.0	—	7.7	7.9
diquat/atrazine oil	0.4/0.8	10	9.4	7.6	9.8	—	9.2
untreated control	—	0	0	0	0	0	0

* Trial numbers.

TABLE 3: YIELDS OF LUCERNE

	kg/ha	Yield Lucerne DM kg/ha
<i>a Treated 9/6/72</i>		
paraquat/atrazine WP	0.3/0.8	2280 b
diquat/atrazine oil	0.5/0.8	2320 ab
diquat/atrazine oil	0.5/1.6	2660 a
<i>b Treated 1/8/72</i>		
paraquat/atrazine Aq.	0.3/0.8	1760 b
diquat/atrazine WP	0.4/0.8	1840 b
diquat/atrazine Aq.	0.4/0.8	1760 b
untreated control	*	880 c
CV 15.2%		

DISCUSSION

Some temporary leaf burn and necrosis was observed on lucerne up to 6 weeks after application with all treatments. The degree and duration of this leaf burn were affected by two factors. Phytotoxicity was minimised where lucerne was closely cropped at the time of treatment and the duration of noticeable leaf symptoms was shorter with later (August) application due to its closer proximity to the spring flush of growth.

Excellent results have been achieved in commercial field scale applications using atrazine wettable powder plus paraquat (0.8+0.3 kg/ha) for the control of annual grass and broadleaf weeds in established lucerne when applied during the mid to late winter period.

CONCLUSIONS

Atrazine gave at least an equal degree of storksbill control to simazine when applied at the same rate in mixture with paraquat.

An aqueous and an oil emulsifiable suspension of atrazine gave similar weed control and crop tolerance to the standard wettable powder when applied in mixture with paraquat or diquat.

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Although applications over two seasons have been reported in these trials, repeat treatments on the same site in established lucerne are warranted. By the use of the present highly effective combination, low dosages of each herbicide can be used. However, any effects from repeated use of the residual atrazine component should be evaluated by measuring sustained yield from the lucerne stand.

ACKNOWLEDGEMENTS

The assistance of staff of the Research Division of Ivon Watkins-Dow Ltd. is acknowledged.

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