FALLOW WEED CONTROL WITH OUT-OF-PATENT HERBICIDES

V.A. Pope
Department of Primary Industries, PO Box 81
Emerald Qld. 4720

Summary. Fifteen out-of-patent herbicides have been screened at three rates on summer and winter fallow weeds. Control information has been generated on thirty-six weeds; pre-emergence activity has been noted on thirty-one weeds; and post-emergence activity on twenty-eight weeds. Post-emergence activity has also been noted for at least one growth stage for each species. Most weeds have been effectively controlled by at least one herbicide. General trends in results are discussed.

INTRODUCTION

Research has been carried out to test the suitability of out-of-patent herbicides for fallow weed control. The initial objective of the study was to determine which weed species at various growth stages are or are not effectively controlled by these herbicides at three rates of application.

In the past, much reliance has been placed on cultivation and more recently the use of patented herbicides as methods of fallow weed management. Lack of chemical registrations reflects that minimal data exists on the use of out-of-patent herbicides for these situations. The intention of this research is to provide valuable information which will lead to more cost-effective alternatives for fallow weed control in conservation tillage systems.

METHODS

The programme was initiated in April 1985 and has involved 15 completed field trials located across the Darling and south-western Downs region. Both pre and post-emergence herbicides were studied on summer and winter fallow weeds. Fifteen herbicides (Table 1) have been screened at three rates.

Pre-emergence herbicides were applied to bare fallow and assessments were made over a period of six months. Assessment consisted of presence/absence recordings for individual weed species.

Post-emergence treatments were applied to emerged weeds at particular growth stages. Visual assessment using 0-5 scale (0 = no control; 5 = 100% kill) were carried out 7, 14, 28 and >50 days after treatment (DAT).

All herbicides were applied in 60 L ha^{-1} water using a three nozzle boom mounted on vehicle providing an effective spray width of 1.25 m.

Table 1. Herbicides and rates used in experiments

Time of application							
Pre-emergence activity				Post-emergence activity			
Herbicides	Rates (kg a.i. ha^{-1})			Herbicides	Rates (kg a.i. ha^{-1})		
Atrazine	1	2	4	2,4-D dimethylamine	0.5	1	2
Diuron	1	2	4	2,4-D isopropylamine	0.5	1	2
Linuron	0.5	1	2	2,4-D ethyl ester	0.5	1	2
Terbutryne	1	2	4	2,4-D acid	0.5	1	2
Metribuzin	0.25	0.5	1	MCPA amine	0.5	1	2
Ametryn	1	2	4	Dichlorprop acid	0.5	1	2
Prometryn	0.5	1	2	Dichlorprop k^+ salt	0.5	1	2
MCPA amine	1	2	4	Ametryn	0.5	1	2
				Amitrole	0.5	1	2
				Atrazine	0.5	1	2
				Diuron	0.5	1	2
				Linuron	0.5	1	2

RESULTS AND DISCUSSION

Pre-emergence studies. Irrespective of the weed flora similar results were obtained in all trials with the herbicides atrazine, metribuzin and terbutryne providing the most effective control in the short and intermediate terms (0-70 DAT). For long-term weed control, atrazine at 2 and 4 kg ha^{-1} has proven very effective on most weeds. MCPA amine at 4 kg ha^{-1} had effective control (>90%) of all broad-leaved weeds but its residual life was restricted to approximately four weeks. Differences in degree of control were noticed between rates of each herbicide and this was manifested in the density of new seedlings at subsequent emergences. The duration of total weed control for each herbicide was governed by the rate and the weed flora present, and lasted until the most tolerant weed species emerged through the respective treatments.

Post-emergence studies. Much information has been generated on the twenty-eight weeds studied in these experiments. All species have been treated with each herbicide at one or more growth stages (small, medium, large).

Most of the out-of-patent herbicides which have little residual activity (e.g. 2,4-D) were ineffective on grass weeds. However, herbicides with residual activity, generally gave effective control of both grass and broad-leaved weeds. In all experiments, each broad-leaved species was controlled by at least one herbicide at one or more rates for a particular stage of growth. Degree of sensitivity to the range of herbicides varied between weed species; for example, the Brassicaceae weeds were controlled by most herbicides at rates of 0.5, 1 and 2 kg ha^{-1} while New Zealand spinach, *Tetragonia tetragonoides*, was only controlled with 2 kg ha^{-1} amitrole. Generally, most species became more difficult to control as they increased in size.

Table 2 compares the spectrum of weeds controlled by atrazine and 2,4-D applied pre and post-emergence.

Table 2. Weeds controlled (100% kill) by pre and post-emergence atrazine and 2,4-D dimethylamine

Herbicide	Rate (kg a.i. ha^{-1})	Weeds Controlled
Atrazine	1	Mintweed, *Salvia reflexa* 170 DAT[a]
(pre-emergence)	2	Bladder ketmia, *Hibiscus trionum*, pigweed, *Portulaca oleracea* 170 DAT
	4	Liverseed grass, *Urochloa panicoides*, caltrop, *Tribulus terrestris*, milk thistle, *Sonchus oleraceus*, awnless barnyard grass, *Echinochloa colona*, wild canary grass, *Phalaris paradoxa* 80 DAT
(post-emergence)	0.5	Deadnettle, *Lamium amplexicaule*, medic, *Medicago* sp.
	1	Pigweed, bladder ketmia, turnip weed, *Rapistrum rugosum*
	2	Green amaranth, *Amaranthus viridis*, milk thistle, caltrop, Indian hedge mustard, *Sisymbrium orientale*
2,4-D dimethylamine (pre-emergence)	1	Deadnettle, climbing buckweat, *Polygonum convolvulus*, wireweed, *Polygonum aviculare*, Mexican poppy, *Argemone mexicana*, milk thistle, turnip weed, Indian hedge mustard 30 DAT
		Rainfall was recorded 14 DAT
(post-emergence)	0.5	Green amaranth, turnip weed, Indian hedge mustard
	1	African turnip weed, *Sisymbrium thellungi*
	2	Deadnettle, bladder ketnia, Mexican poppy

[a] DAT = days after treatment

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