

TERBUTRYNE PLUS MCPA FOR SEEDLING SAFFRON THISTLE (*CARTHAMUS LANATUS*) CONTROL IN WINTER CEREALS

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Summary. A proprietary mixture of terbutryne (275 g/L) plus MCPA (160 g/L as potassium salt) was evaluated for the control of seedling saffron thistle (*Carthamus lanatus*) when applied 6 weeks after sowing wheat and barley. During 1991 and 1992 one replicated logarithmic dose trial and two replicated fixed dose trials were conducted in farmer established crops. At 1.5 L/ha of the proprietary mixture, saffron thistle at the 2-7 true leaf stage was well controlled. The 1.0 L/ha rate of the proprietary mixture required the addition of 12 g/ha clopyralid for similar control of saffron thistle. Both treatments resulted in a significant grain yield increase.

INTRODUCTION

Saffron thistle (*Carthamus lanatus*) is an erect annual which germinates from autumn to early spring. Saffron thistle competes with cereal seedlings for moisture and nutrients early in the growing crop. If not controlled, dense stands may present problems at harvest and the seeds can contaminate grain. The Australian Wheat Board and Australian Barley Board both have receival standards for saffron thistle seed contamination. Wheat or barley exceeding these standards is downgraded.

Herbicides registered for use in wheat and barley for early post-emergent control of saffron thistle include diuron and bromoxynil/MCPA mixtures. Phenoxy herbicides are registered for saffron thistle control once cereals commence tillering and are effective for the control of later germinations of saffron thistle.

In 1986, research conducted in South Australia found that a tank mixture of terbutryne (425 g/ha) + MCPA amine (150 g/ha) applied to saffron thistle seedlings at the 10cm rosette stage provided 67% control in wheat (2). In the same trial, clopyralid (150 g/ha) alone or mixed with MCPA amine (150 g/ha) resulted in 93% & 98% control respectively (2).

In 1987, MCPA amine (250 g/ha) plus clopyralid (15 g/ha) applied as a tank mixture provided 99% control of saffron thistle in a medic based pasture. The medic tolerance to this treatment was unacceptable (1).

METHODS

Logarithmic Dose Trial. The trial site in Spear wheat had a uniform distribution of saffron thistle (3 - 5 true leaves), stemless thistle (*Onopordum acualon*) (2-4 true leaves), medic and a range of other broad-leaved weeds. Herbicides were applied using a Chesterford Mini-Log Sprayer. The trial design was a randomised complete block with 3 replicates. The proprietary mixture was applied as either a peak dose with reducing rates or as the proprietary mixture at a fixed rate and clopyralid at a peak dose with reducing rates. The distance required to halve the dosage was 7 meters. Plots (1x28 m) were assessed for the herbicide dose required for complete control of each weed species as determined from the half dosage distance.

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Fixed Dose Trials. The trial design was a randomised complete block with 5 treatments and 4 replications of plots (3x10 m). Herbicides were applied 6 weeks after sowing in 100 L/ha at 220 kPa pressure using a hand held spray boom.

The trial site in Yagan barley had a low pre-spray density (11 plants/m²) of saffron thistle seedlings (4-7 true leaves) and a range of other broad-leaved weeds. Weed counts were recorded at 65 days after spraying (Table 2). Due to poor crop growth, no grain yields were obtained from this trial.

The trial site in Schooner barley had a high pre-spray density (39 plants/m²) of saffron thistle seedlings (cotyledon - 7 true leaves) and a range of other broad-leaved weeds. Weed counts were recorded at 176 days after spraying (Table 2). Grain yield was obtained by harvesting the entire plot.

RESULTS AND DISCUSSION

The logarithmic dose trial indicated that complete seedling saffron and stemless thistle control could be obtained with 1.5 L/ha of the proprietary mixture (412 g/ha terbutryne + 240 g/ha MCPA K salt) (Tmt 1., Table 1). When the 1.0 L/ha rate of the proprietary mixture was fixed (Tmt 2. Table 1) the addition of 9 g/ha clopyralid provided complete control of saffron thistle and stemless thistle. Medics tolerated 1.5 L/ha of the proprietary mixture alone, but were very sensitive to low rates of clopyralid.

Table 1. Herbicide rates (grams a.i./ha) required for complete control of saffron thistle, stemless thistle and Medicago spp. in Spear wheat.

Herbicide Treatment	Saffron thistle (g/ha)	Stemless thistle (g/ha)	Medics (g/ha)
1. Terbutryne + MCPA (K salt) (Rate reducing from 1100+640 g/ha)	412 +240	412 + 240	688 + 400
2. Terbutryne + MCPA (K salt) (Rate fixed at 275+160 g/ha)	275 + 160	275 + 160	275 + 160
+ Clopyralid (Rate reducing from 30 g/ha)	+6	+9	+3

In the two fixed dose trials (Table 2), 1.5 L/ha (Tmt 4) of the proprietary mixture (412 g/ha terbutryne + 240 g/ha MCPA K salt) provided 94% and 85% control of saffron thistle respectively. Under heavy weed pressure in Schooner barley, the 1.0 L/ha rate (Tmt 2) resulted in unacceptable control (68%). In this case the addition of 12 g/ha of clopyralid (Tmt 3) markedly improved saffron thistle control. The tank mixture (Tmt 5) recommended but not registered for saffron thistle control in South Australia provided (95%) control in Schooner barley.

Significant grain yield increases were recorded in all herbicide treatments. Although a range of other broad-leaved weeds were also controlled, grain yield increases can be mainly attributed to saffron thistle control. Saffron thistle plants that did survive herbicide treatment were

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suppressed with no visible flower heads at harvest. Grain from untreated plots contained a high level of saffron thistle seed contamination.

Table 2. The effect of herbicide treatments on saffron thistle density and grain yield in barley

Treatment	Yagan Barley Saffron Density (% Control) [plants/m ²]	Schooner Barley Saffron Density (% Control) [plants/m ²]	Schooner Barley Grain Yield (% of Untreated) [tonne/ha]
1. Untreated	0 [11]	0 [39]	100 [0.64]
2. Terbutryne + MCPA (K salt) (275 g/ha) + (160 g/ha)	82	68	140
3. Terbutryne + MCPA (K salt) (275 g/ha) + (160 g/ha) plus + clopyralid (12 g/ha)	88	95	133
4. Terbutryne + MCPA (K salt) (412 g/ha) + (240 g/ha).	94	85	139
5. MCPA (amine) + clopyralid (500 g/ha) + (15 g/ha)	73	95	141

These results indicate that 1.5 L/ha of this proprietary mixture is effective for saffron thistle control in wheat and barley. At the 1.0 L/ha rate, the addition of a low rate of clopyralid is needed for effective saffron thistle control in cereals.

REFERENCES

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