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Comparing tank mixes of herbicides for post-emergence control of common sowthistle (NSW pot experiment 2015)

Tony Cook, Bill Davidson and Rebecca Miller

NSW DPI, Tamworth

Research questions

1. How effective are a range of herbicides applied as single treatments on the control of common sowthistle compared to tank mixing with paraquat?
2. Do any of these herbicide options provide equivalent common sowthistle control to a standard treatment of Tordon® 75-D (Group I)?

Aims

The principal aim was to determine whether a range of herbicides by themselves or in a tank mix with paraquat are a viable option for the control of established common sowthistle plants.

Methods

Site

- Tamworth: Tamworth Agricultural Institute glasshouse

Treatments

- 12 (11 Herbicide treatments + one untreated control)

Growth stages

- Early flowering (50 cm tall).

Pot size and design

- 8 cm square pots; one plant per pot, thinned down from two plants
- Randomised complete block design of 12 treatments × six replicates (72 pots)
- Pots moved outside for two weeks before spraying to simulate plants grown under field conditions.

Spraying

- Herbicides applied using a hand-held boom sprayer; water volume 100 L/ha for all herbicides. Uptake™ spray oil (0.5% v/v) used with all treatments.

Herbicide timing

- Herbicide treatments applied 11/09/2015; temperature 16 °C; relative humidity 46%; wind 3 km/h.

Measurements

- Brownout score three days after treatment (DAT) (rating system 0–10; where 0 = healthy and green and 10 = brown and completely dead)
- Biomass control % (visual estimate) compared with untreated control at 14, 28 and 56 DAT
- Plant counts of survivors 56 DAT
- Destructive sampling of green biomass 56 DAT (dry weight; g).

Key findings

All of the herbicides examined appear to work well when tank mixed with paraquat to control early flowering common sowthistle.

However, paraquat alone also provided excellent control of early flowering common sowthistle which questions the value of tank mixes with other herbicides.

Treatments

Trt. No.	Herbicides and rates per hectare	Herbicide group	Tank mix or single application
1	Untreated		
2	Balance® 100 g	H	Single
3	Balance® 100 g + Paraquat (250 g/L) 2 L	H + L	Tank mix
4	Tordon® 75-D 700 mL	I	Single
5	Tordon® 75-D 700 mL + Paraquat (250 g/L) 2 L	I + L	Tank mix
6	Velocity® 500 mL	H/C	Single
7	Velocity® 500 mL + Paraquat (250 g/L) 2 L	H/C + L	Tank mix
8	Precept® 1 L	H/I	Single
9	Precept® 1 L + Paraquat (250 g/L) 2 L	H/I + L	Tank mix
10	Experimental BCP 250 mL	H	Single
11	Experimental BCP 250 mL + Paraquat (250 g/L) 2 L	H + L	Tank mix
12	Paraquat (250 g/L) 2 L	L	Single
Note: All treatments applied at 100L/ha with TT 110-01 nozzles. All treatments had Uptake™ added at 0.5% v/v			

Results

Paraquat (Group L) was the only herbicide which provided significant brownout of common sowthistle when applied as a single herbicide treatment (Figure 1). There appeared to be early antagonism of the herbicides when mixed with paraquat with significantly lower brownout scores 3 DAT compared to paraquat alone (Trt 12). However, this early antagonism had no consequence on the longer-term control achieved with these herbicide combinations when assessed 28 DAT (Figure 2).

Paraquat applied on its own at 2 L/ha (Trt 12) provided 100% control of common sowthistle at 28 DAT (Figure 2). Velocity® had the highest level of efficacy out of the Group H containing herbicides examined when applied as a single application with 81% control 28 DAT (Figure 2). The remaining group H and group I herbicide treatments did not result in commercially acceptable levels of control when applied as single applications.

Tank mixes with each of the herbicides examined and paraquat provided good levels of control of early flowering common sowthistle with all combinations in the range of 95–100% control at 28 DAT (Figure 2).

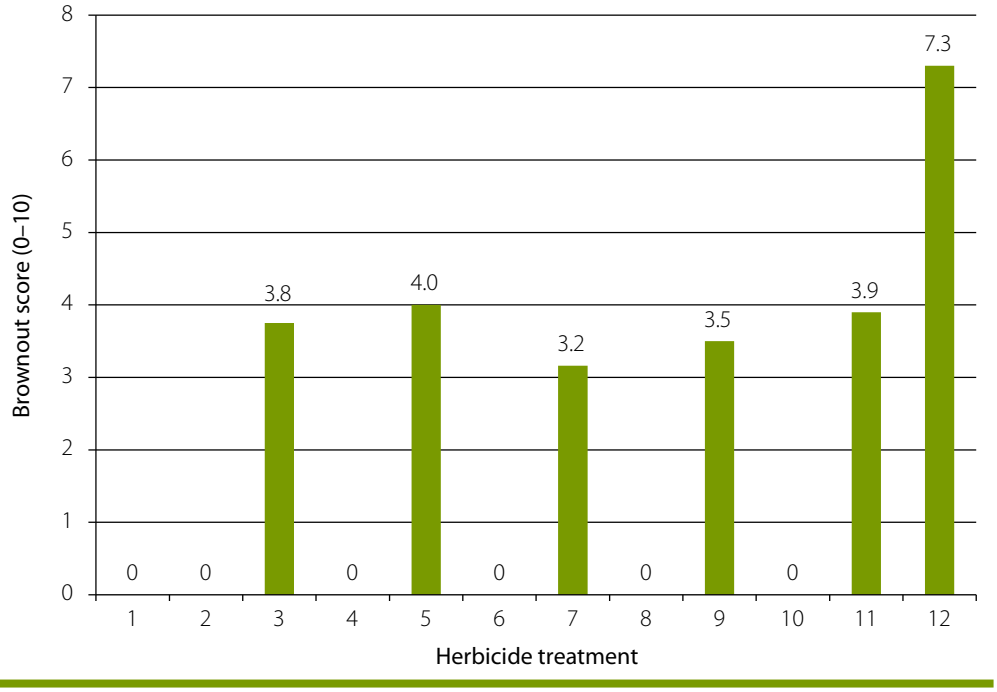

Figure 1. *Brownout score (0–10) three days after application of single herbicides or tank mixes with paraquat on common sowthistle*
LSD (0.05) = 0.4

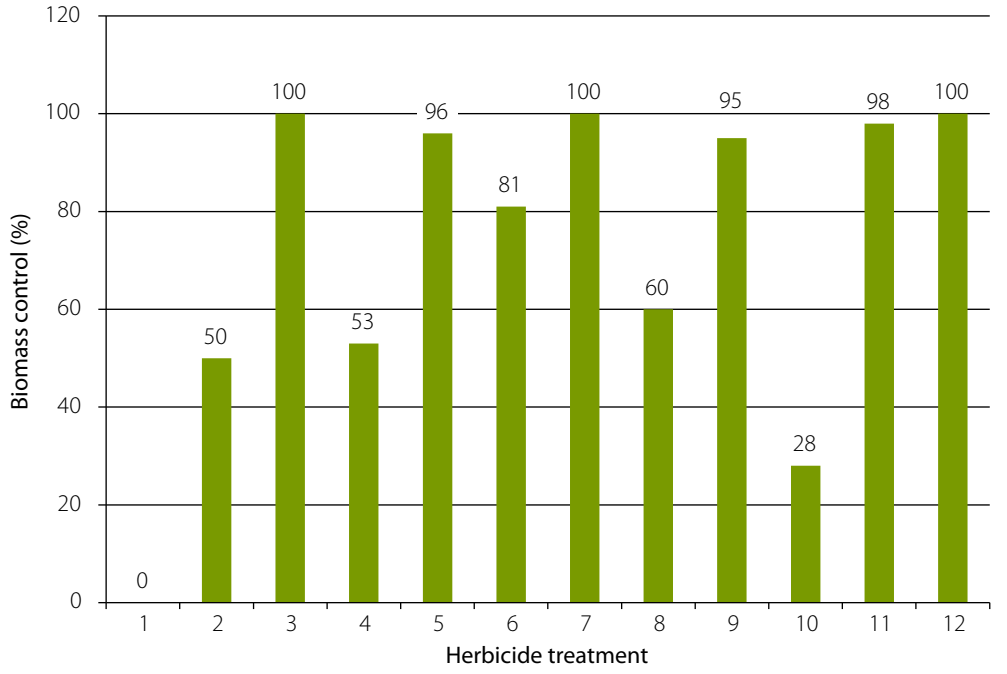

Figure 2. *Biomass control score (%) 28 days after application of single herbicides or tank mixes with paraquat on common sowthistle*
LSD (0.05) = 6

Summary

Tank mixing group H and group I herbicides with paraquat provided excellent control of early flowering common sowthistle under glasshouse conditions. However, paraquat provided 100% efficacy as a standalone single application. This questions whether it is worth the extra cost of tank mixing group H and group I herbicides with paraquat (Group L) to control common sowthistle in commercial paddock situations.

Further research is required under field conditions to obtain a clearer picture of how effective paraquat is on its own in controlling sowthistle across a range of different growth stages and how group H and group I herbicides may contribute to improved control when tank mixed with paraquat.

Plate 1. *Balance® 100 g/ha compared with Balance® 100 g/ha + Paraquat 2 L/ha tank mix 28 days after application*

Acknowledgements

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