

Summer herbicide trials on prickly lettuce 2015–16

Dr Hanwen Wu, Adam Shephard, Michael Hopwood and Colin Fritsch NSW DPI, Wagga Wagga

Key findings

- » After stem elongation, mature prickly lettuce plants are difficult to control.
- » Controlling mature prickly lettuce plants early achieves better results.
- » No single treatments, except paraquat, achieved 100% control of mature prickly lettuce plants that emerged after a wheat crop was harvested. The paraquat, either used alone or as a follow-up application, was the only outstanding treatment, achieving 100% control.

Introduction

Prickly lettuce (*Lactuca serriola*) has recently become an increasing problem in southern NSW, mostly in cereals and lucerne pastures. It can grow up to two metres tall and is therefore highly competitive with crops or pastures. If left uncontrolled, it uses soil moisture and nutrients during summer. The seed has a white pappus that could be easily spread by wind and through surface water run-off. Prickly lettuce forms a rosette of leaves after emergence and develops a strong taproot. Plants are difficult to control with herbicides once the plants start to elongate. The weed was reported to have evolved resistance to Group B herbicides in both Australia and the United States, to Group I herbicides in the USA in 2007 and, most recently, to glyphosate in Australia in 2015.

Little is known about its emergence patterns in southern NSW. Elongated plants are often cut during harvest operations and regrow with competitive branches after harvest. Limited control options are available for the mature plants.

These two experiments aimed to evaluate a range of herbicides with different modes of action on prickly lettuce control, and to evaluate if a 'double-knockdown' technique is needed to effectively control mature prickly lettuce.

Treatments

Two experiments were established on two properties (one at Lake Cowal and one at Temora), after the wheat harvest in December 2015. Average prickly lettuce density was 9.5 plants/m² at Lake Cowal and 10 plants/m² at Temora.

A randomised complete block design with three replicates was used, with plot size 2 m × 16 m. A total of 17 and 20 treatments were imposed respectively at Lake Cowal and Temora, including an untreated control. After the initial application, each plot was equally divided with half the plot receiving an additional application of paraquat as a double knockdown.

Herbicides were applied using a hand-held boom sprayer, calibrated to deliver 100 L/ha at 2 bar pressure. The first application was applied at the Lake Cowal and Temora sites on 10 and 15 December 2015 respectively, and the double-knockdown paraquat application at the Lake Cowal and Temora sites on 16 and 21 December 2015, respectively. At the time of application, the prickly lettuce plants were at the elongating/re-branching stage (after being cut during wheat-crop harvest) and were not under moisture stress.

Visual rating (% of control) was conducted on 8 January 2016. The number of prickly lettuce plants was recorded in a 1 × 6 m strip within each plot on 2 February 2016.

Results

At the Lake Cowal site, the single-knock application differed significantly in controlling prickly lettuce (Table 1). Five treatments, Amicide® Advance 700 + Weedmaster® Argo, Weedmaster® Argo, Ally® + Weedmaster® Argo, Basta® and Starane™ Advanced had a control rating of more than 90%, while the remaining 11 treatments only controlled prickly lettuce from 30% to 87%.

The single knock herbicide application at the Temora site was generally less effective than at the Lake Cowal site. Only four treatments had control efficacy slightly over 80%, including Amicide®

Advance 700 + Weedmaster® Argo, Tordon™ 75-D + Weedmaster® Argo, Basta® and Amitrole T. The other 15 treatments had poor control of prickly lettuce from 7% to 72% (Table 2).

At both trial sites, it was very encouraging to find that the follow-up treatment with paraquat provided 100% control of prickly lettuce, even in the untreated plots that did not have the first knock of herbicide applications.

In general, no single treatments except paraquat achieved 100% control of mature prickly lettuce plants after crop harvest. Many plants, even though severely damaged, managed to survive and re-branch. The paraquat application was the only outstanding treatment, achieving complete control of the mature prickly lettuce plants. The distinct difference with and without the follow-up paraquat is shown in Figure 1.

Table 1. Herbicide control efficacy on mature prickly lettuce plants at the Lake Cowal trial site.

Treatment	Herbicide	Group	Active	Rate (mL or g/ha)	Adjuvant	Visual rating (%) ^a	Density (plants/m ²)	
							Single ^b	Double-knock ^c
1	Amicide® Advance 700	I	700 g/L 2,4-D amine	1150 mL	Liase at 2%	30.0	3.7	0.0
2	Amicide® Advance 700 + Weedmaster® Argo	I, M	700 g/L 2,4-D amine + 540 g/L glyphosate	515 mL + 1300 mL	LI 700® at 0.3%	93.3	0.6	0.0
3	Weedmaster® Argo	M	540 g/L glyphosate	1300 mL	LI 700® at 0.3%	90.0	2.0	0.0
4	Starane™ Advance	I	333 g/L fluroxypyr	600 mL	Uptake™ at 0.5%	95.0	0.8	0.0
5	Starane™ Advance + Weedmaster® Argo	I, M	333 g/L fluroxypyr + 540 g/L glyphosate	600 mL + 1300 mL	–	88.3	2.4	0.0
6	Ally® + Weedmaster® Argo	B,I	600 g/kg metsulfuron-methyl + 540 g/L glyphosate	7 g + 1300 mL	–	95.0	1.6	0.0
7	Goal™ + Weedmaster® Argo	G, M	240 g/L oxyfluorfen + 540 g/L glyphosate	75 mL + 1300 mL	BS1000 at 1%	86.7	2.1	0.0
8	Kamba® 500 + Weedmaster® Argo	I, M	500 g/L dicamba + 540 g/L glyphosate	240 mL + 1300 mL	–	85.0	4.5	0.0
9	Basta®	N	200 g/L glufosinate ammonium	4000 mL	–	91.7	1.8	0.0
10	Amitrole T	Q	250 g/L Amitrole + 220 g/L ammonium thiocyanate	5600 mL	LI 700® at 0.3%	85.0	1.6	0.0
11	Tordon™ 75-D	I	300 g/L 2,4-D amine + 75 g/L picloram	700 mL	–	53.3	3.9	0.0
12	Tigrex®	F, I	250 g/L MCPA and 25 g/L diflufenican	1000 mL	–	81.7	3.7	0.0
13	Affinity Force + Agritone® 750	G, I	240 g/L carfentrazone-ethyl + 750 g/L MCPA amine	100 mL + 333 mL	–	76.7	2.5	0.0
14	Lontrel™ + L.V.E. Agritone®	I	300 g/L cropyralid + 570 g/L LVE MCPA	150 mL + 1000 mL	–	63.3	2.4	0.0
15	L.V.E. Agritone®	I	570 g/L LVE MCPA	1000 mL	–	40.0	4.3	0.0
16	Hotshot™ + L.V.E. Agritone®	I	10 g/L aminopyralid and 140 g/L fluroxypyr + 570 g/L LVE MCPA	750 mL + 1000 mL	–	86.7	3.5	0.0
17	Control	–	–	–	–	0.0	6.2	0.0
	I.s.d. (P = 0.05)					17.93	1.89	NA

^a Visual rating was conducted on 8/01/2016 in the single treatments (no double knock) and plant counts on 4/02/2016.

^b Single application of the respective herbicide on 10/12/2015.

^c Paraquat at 2.4 L/ha was used as a second knock and applied across all treatments on 16/12/2015.



Figure 1. Contrasting the difference between the single knockdown (without a follow-up paraquat application, left) and the double knockdown (with a follow-up paraquat application, right) at the Lake Cowal trial site.

Table 2. Herbicide control efficacy on mature prickly lettuce plants at the Temora trial site.

Treatment	Herbicide	Group	Active	Rate (mL or g/ha)	Adjuvant	Visual rating (%) ^a	Density (plants/m ²)	
							Single ^b	Double-knock ^c
1	Amicide® Advance 700	I	700 g/L 2,4-D amine	1150 mL	Liase at 2%	51.7	4.6	0.0
2	Amicide® Advance 700 + Weedmaster® Argo	I, M	700 g/L 2,4-D amine + 540 g/L glyphosate	515 mL + 1300 mL	LI 700® at 0.3%	80.0	1.2	0.1
3	Weedmaster® Argo	M	540 g/L glyphosate	1300 mL	LI 700® at 0.3%	78.3	4.2	0.0
4	Ally® + Weedmaster® Argo	B, I	600 g/kg metsulfuron-methyl + 540 g/L glyphosate	7 g + 1300 mL	–	28.3	5.5	0.0
5	Goal™ + Weedmaster® Argo	G, M	240 g/L OXYFLUORFEN + 540 g/L glyphosate	75 mL + 1300 mL	BS1000 at 1%	60.0	8.7	0.0
6	Kamba® 500 + Weedmaster® Argo	I, M	500 g/L dicamba + 540 g/L glyphosate	240 mL+ 1300 mL	–	71.7	2.6	0.0
7	Starane™ Advance	I	333 g/L fluroxypyr	600 mL	Uptake™ at 0.5%	53.3	6.8	0.1
8	Starane™ Advance + Weedmaster® argo	I, M	333 g/L fluroxypyr + 540 g/L glyphosate	600 mL + 1300 mL	–	63.3	5.7	0.1
9	Tordon 75D + Weedmaster® Argo	I, M	300 g/L 2,4-D amine and 75 g/L picloram + 540 g/L glyphosate	700 mL + 1300 mL	–	81.7	2.6	0.1
10	Garlon™ 600 + Weedmaster® Argo	I, M	600 g/L triclopyr + 540 g/L glyphosate	700 mL + 1300 mL	Uptake™ 0.5%	53.3	5.8	0.1
11	Sharpen® WG + Weedmaster® Argo	G, M	700 g/kg saflufenacil + 540 g/L glyphosate	34 g + 1300 mL	Bonza® at 1%	53.3	5.0	0.1
12	GF-2688	I, M	fluroxypyr + arylex	400 mL	Uptake™ at 0.5%	55.0	6.3	0.6
13	Basta®	N	200 g/L Glufosinate ammonium	4000 mL		83.3	1.3	0.1
14	Amitrole T	Q	250 g/L amitrole 220 g/L ammonium thiocyanate	5600 mL	LI 700® at 0.3%	81.7	4.9	0.1
15	Tordon™ 75-D	I	300 g/L 2,4-D amine and 75 g/L picloram	700 mL	–	30.0	6.1	0.1
16	Affinity Force + Agritone® 750	G, I	240 g/L carfentrazone-ethyl + 750 MCPA amine	100 mL + 333 mL	–	6.7	5.4	0.1
17	Lontrel™ + L.V.E. Agritone®	I	300 g/L clopyralid + 570 g/L LVE MCPA	150 mL + 1000 mL	Uptake™ at 0.5%	30.0	6.3	0.0
18	L.V.E. Agritone®	I	570 g/L LVE MCPA	1000 mL	–	28.3	5.7	0.0
19	Hotshot™ + L.V.E. Agritone®	I	10 g/L aminopyralid and 140 g/L fluroxypyr +570 g/L LVE MCPA	750 mL + 1000 mL	–	58.3	5.8	0.0
20	Control	–	–	–	–	0.0	7.4	0.0
	I.s.d. 0.05	21.6	3.9	0.3				

a: Visual rating was conducted on 8/01/2016 in the single treatments (no double knock) and plant counts on 4/02/2016.

b: Single application of the respective herbicide on 10/12/2015.

c: Paraquat at 2.4 L/ha was used as a second knock and applied across all the treatments on 16/12/2015.

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