ONION WEED CONTROL (CHEMICAL)

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Project Title: Implementation of specific management strategies for Onion Weed under stubble retention – Chemical Control Trial
Project Duration: 2013-2014
Project Delivery Organisation: *Fenceline Consulting on behalf of UNFS*

Key Points:

- **Paraquat Treatments provided 100% control of all sizes of Onion weed.**
- **Ally Treatments (metsulfuron) were slower than paraquat, however provided 100% control.**
- **Double knocks improved the speed of burn off and control.**
- **Glyphosate does not provide complete control of onion weed and recovery can occur.**
- **Glyphosate mixed with Pyresta or Starane Advanced showed reduced glyphosate efficacy.**
- **Glyphosate mixed with Valor and Sharpen showed no increase in control compared to glyphosate applied alone on all sizes of onion weed.**

Project Report:

Aim:

Assessment of the chemical control options for effective control of Onion Weed without cultivation.

Trial Design:

A replicated trial was conducted at Mount Robert, approximately 15km North East of Booleroo Centre in South Australia in 2014.
Design: Randomized Complete Block with 4 Replicates.
Trial Dimensions: Plot Size 3m x 10m

Image 1: Onion Weed Trial Site at Mount Robert at Application of Timing 1.

Introduction:

Onion Weed (*Asphodelus fistulosus*) management options in no till cropping, low-input rangeland grazing systems and other non-cultivated areas are often limited to hygiene practices, reduced total grazing pressure and chipping or spot spraying to prevent or delay new infestations. As part of the Maintaining Profitable Farming Systems with Retained Stubble initiative, funded by the Grains Research and Development Corporation (GRDC), the Upper North Farming Systems Group has investigated a range of onion weed control options to reduce the need for cultivation. To support this the Northern and Yorke NRM Board, through its community Grants Program in 2013, provided funding to undertake a replicated chemical control trial to review the efficacy of the current registered chemistry options for Onion Weed control.

Image 2: onion weed sizes at application t1, (large on the left , medium each side of shovel, small on the right)

Image 3: Other weeds were in high numbers in the trial area and assessed under the trial as well. This included medic and stemless thistle, shown here at application T1.

Treatment List

Treat #	Single Double Knock	Applied at T1	Applied at T2
1	Single	Untreated	
2	Single	Glyphosate450 1.0L + LVEster680 0.35L + Ally 5g + BS1000 0.2%	
3	Single	Glyphosate450 1.5L + LVEster680 0.50L + Ally 5g + BS1000 0.2%	
4	Single	Glyphosate450 1.5L + BS1000 0.2%	
5	Single	Glyphosate450 3.0L + BS1000 0.2%	
6	Single	Paraquat250 1.0L + BS1000 0.2%	
7	Single	Paraquat250 2.0L + BS1000 0.2%	
8	Single	Alliance 3.0L + BS1000 0.2%	
9	Single	SpraySeed 2.0L + BS1000 0.2%	
10	Single	Untreated	
11	Single	Glyphosate450 1.5L + Ally 5g + BS1000 0.2%	
12	Single	Glyphosate450 1.5L + Pyresta 0.5L + BS1000 0.2%	
13	Single	Glyphosate450 1.5L + Sharpen 26g + Hasten 1% + BS1000 0.2%	
14	Single	Glyphosate450 1.5L + Valor 30g + Hasten 1% + BS1000 0.2%	
15	Single	Glyphosate450 1.5L + Starane Advanced 0.2L + BS1000 0.2%	
16	Double Knock	Glyphosate450 1.0L + LVEster680 0.35L + Ally 5g + BS1000 0.2%	Paraquat250 1.0L + BS1000 0.2%
17	Double Knock	Paraquat250 1.0L + BS1000 0.2%	Paraquat250 1.0L + BS1000 0.2%
18	Double Knock	Glyphosate450 1.5L + LVEster680 0.50L + Ally 5g + BS1000 0.2%	Paraquat250 1.0L + BS1000 0.2%
19	Double Knock	Paraquat250 2.0L + BS1000 0.2%	Paraquat250 1.0L + BS1000 0.2%

Application Details

Timing 1 (T1) – Applied 21st May 2014 Timing 2 (T2) – Applied 9th June 2014

Equipment: 3 metre Hand Boom Unit, Application Volume – 100 Litres / Hectare, Nozzles – Lechler IDK120-015, Pressure – 2.1Bar, Speed - 6Kph

Weeds Present at Application; The initial populations on the trial area at application timing 1 (T1) were: Onion Weed - Small Seedlings up to 10 shoots - 64 per square metre

- Medium 15cm to Large Plants - 15 per square metre

Stemless Thistle - Mainly Large Plants - 3 per square metre

Assessments

Plant Counts: These were conducted across the trial area on the day of application timing 1, 56 (37) and 159 (140) days after application timing 1 (Timing 2). Counts were conducted with a 0.25m2
Percent Weed Control: This assessment was a visual assessment conducted at 5 timings during the trials, at 19 (0), 37 (18), 56 (37), 103 (84) and 159 (140) days after application timing 1 (Timing 2).

Results

The greatest level of control of onion weed was achieved by mixes containing either paraquat (Gramoxone250®, Alliance®, Sprayseed250®) or mesulfuron (Ally®) applied alone or in a mixture. The double knock treatments provided rapid burn down and control of onion weed. However, the final percentage control achieved by the double knock was equal to that of the T1 tank mixes containing paraquat or mesulfuron, with 100% control achieved by both treatment types. As a result, in this trial the double knock was not necessary when using paraquat or mesulfuron at T1.

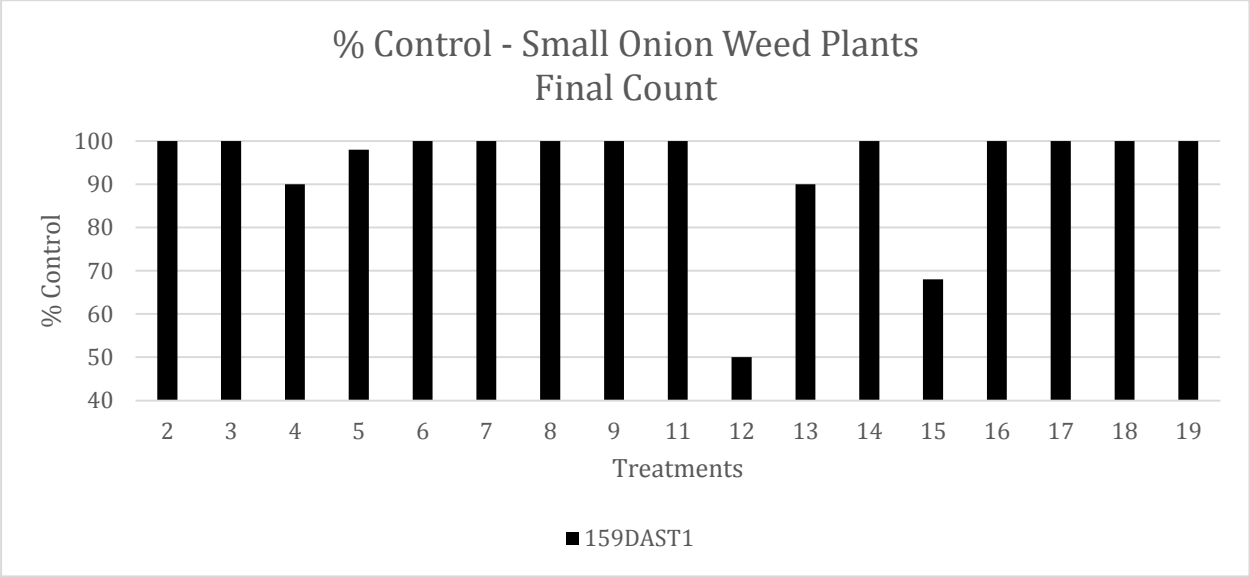

Figure 1: Percent Control of Small Onion Weed Seedlings 159 Days After Spraying Timing 1. See Table 1 for details of the Treatments. Note: 2-15 are single applications at T1, 16-19 are double knocks with applications at T1 and T2.

The control of seedling onion weed was achieved by nearly all treatments in the trial as seen in *Fig 1*. Glyphosate applied alone provided 90-98% control, although not significant this would still allow plant survival and the potential for seed set. Glyphosate mixtures with either Pyresta® or Starane Advanced® appear to have caused significant antagonism to the Glyphosate, resulting in lower levels of control of onion weed than Glyphosate applied alone. The addition of Sharpen® to the Glyphosate did not improve or reduce the level of onion weed control. The addition of Valor® to Glyphosate resulted in 100% control of small onion weed plants. All treatments which included the active ingredient paraquat provided rapid seedling onion weed control and resulted in 100% control. All treatments with Ally® also resulted in 100% control, although results took longer to be achieved. Speed of control may have a significant impact on timing of applications and prevention of seed-set.

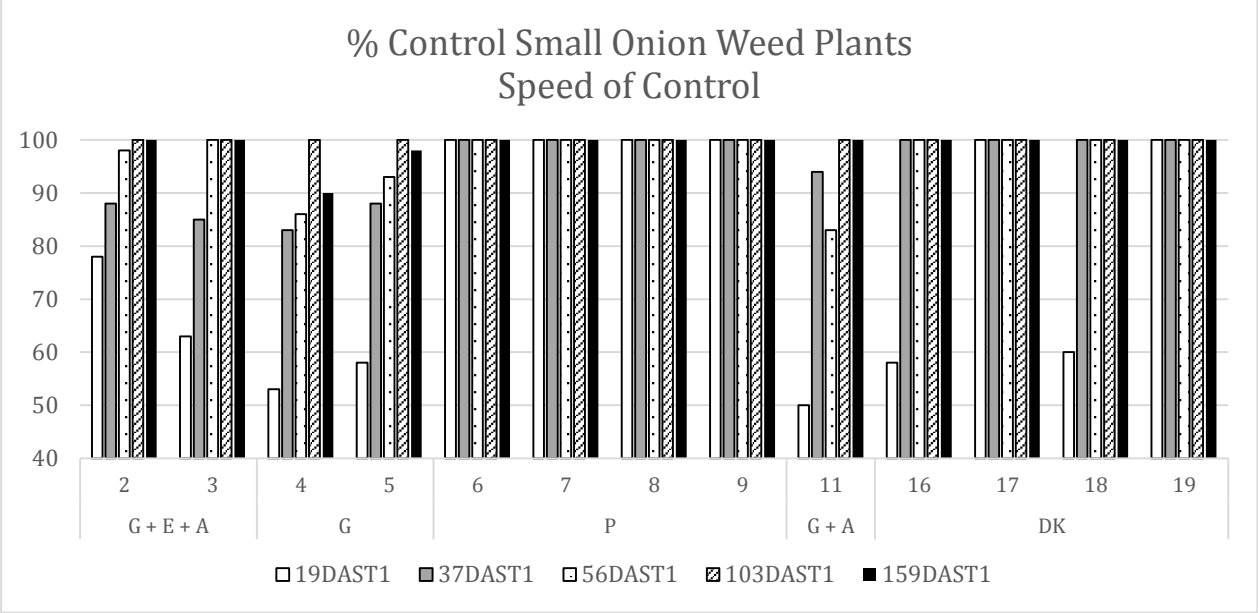

Figure 2: Percent Control of Small Onion Weed Plants: Speed of Control and level of regeneration was affected by the tank mixes. Glyphosate + Ally +/- LVE Ester resulted in 100% control, however Paraquat as a single knock or a Double Knock application resulted in faster knock-down. Note: G = Glyphosate, E = LVE Ester, A = Ally, P = Paraquat, DK = Double Knock.

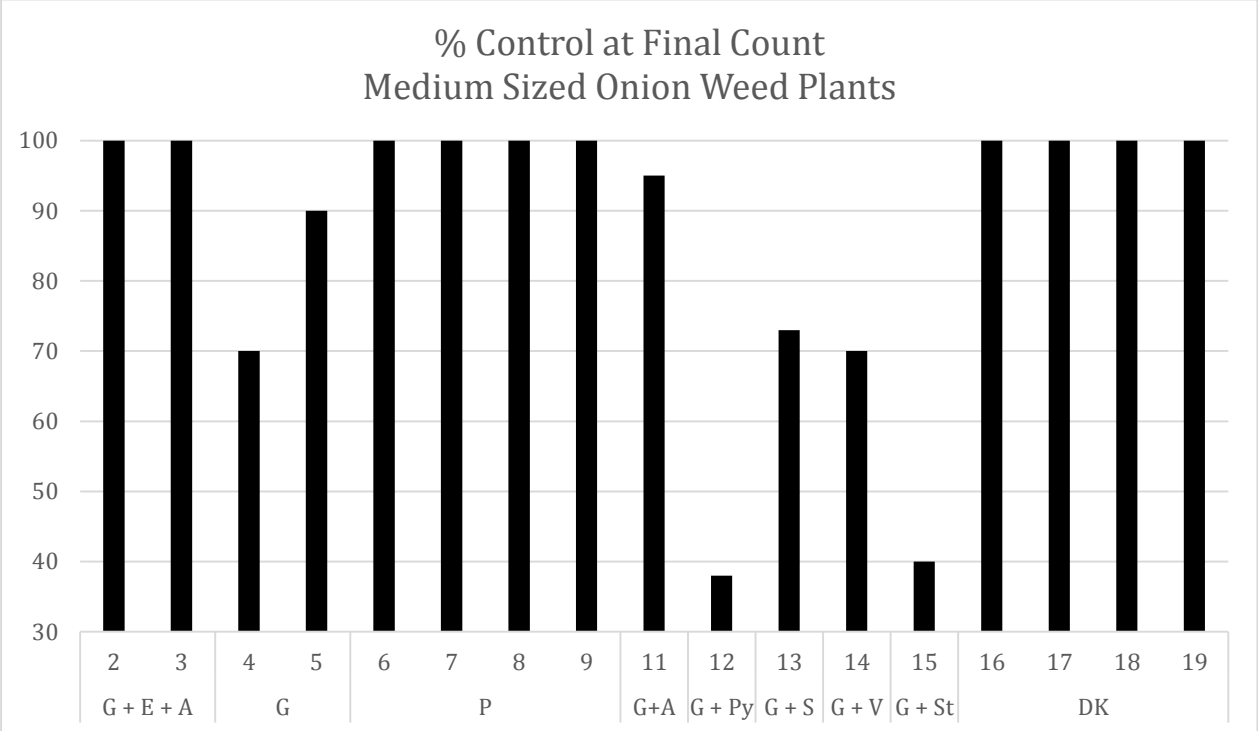

Figure 3: Percent Control of Medium Sized Onion Weed 159 Days After Spraying Timing 1. See Table 1 for Treatment Details. Note: G = Glyphosate, E = LVE Ester, A = Ally, P = Paraquat, Py = Pyresta, S = Sharpen, V = Valor, St = Starane DK = Double Knock.

As the size of the onion weed increases the treatments that included paraquat or Ally, continued to provide 100 percent control and were significantly better than any other treatment, Figures 3 and 4. As the onion weed size increased the glyphosate applied alone resulted in lower rates of control at both 1.5 and 3.0 litres/ha. Although not significantly less than the best results, it would still be

considered a less than desirable outcome to manage seed set. The addition of either Pyresta or Starane Advanced to glyphosate has continued to be an antagonist resulting in significant reductions in control as the onion weed plant size increases. The addition of Valor® to glyphosate has not improved efficacy on the larger onion weed plants, but no reduction in efficacy has occurred. The addition of Sharpen may have added a slight improvement to the glyphosate treatment on larger weeds but efficacy improvements were not significant.

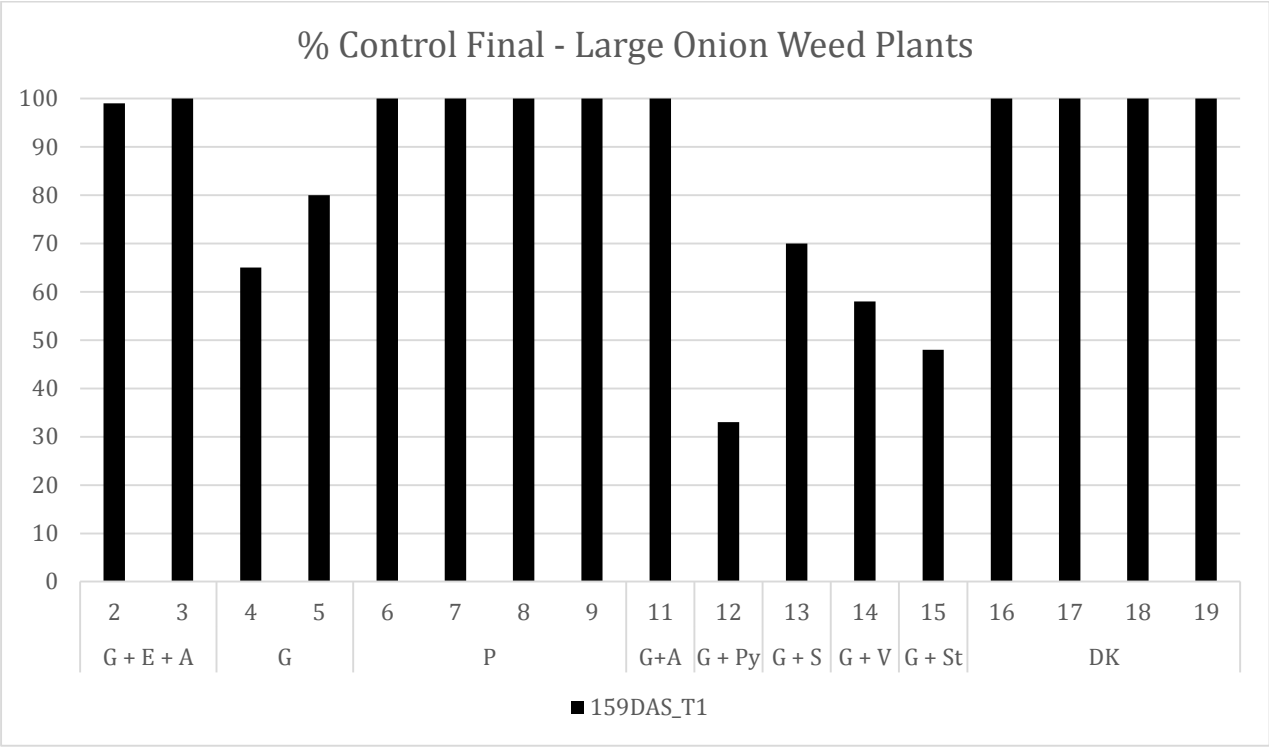

Figure 4: Percent Control of Large Established Onion Weed 159 Days After Spraying Timing 1. See Table 1 for Treatment Details. Note: G = Glyphosate, E = LVE Ester, A = Ally, P = Paraquat, Py = Pyresta, S = Sharpen, V = Valor, St = Starane DK = Double Knock.

The trial area had a good even coverage of medic pasture. All of the treatments in the trial have shown no safety to medic with only the Paraquat250 at 1L/hectare applied at timing 1 showing some plant survival at levels less than 5% of the initial population. A non-replicated strip of paraquat at 1L/ha was sprayed at T2 outside of the trial area. It was observed of this treatment that the medic has survived quite well with some biomass reduction and reasonable onion weed results (see image 4). It may be that delaying the timing of chemical application may be of some benefit in retaining a medic pasture cover and getting a seed set (Note: this was an observation and not a recommendation, further evaluation in to this observation is required). The trial also had stemless thistle *(onopordum acaulon)* through out the trial area and all treatments resulted in 100% control at 56 days after application.

Image 4: Demonstration strip of paraquat250 at 1l/ha applied only at Timing 2.

Product Details

Trade Name	Manufacturer	Herbicide Group	Active Ingredient
Various	*Various*	M	450g/L glyphosate (present as the isopropylamine salt)
Gramoxone250	Syngenta	L	250g/L Paraquat (present as paraquat dichloride)
Sprayseed250	Syngenta	L	135g/L Paraquat (present as paraquat dichloride) 115g/L Diquat (present as Diquat Dibromide)
Alliance	Crop Care	L Q	250g/L amitrole 125g/L paraquat (present as paraquat dichloride)
LVEster680	Crop Care	I	680g/L 2,4-D (present as the 2-ethyl hexyl ester)
Ally	DuPont	B	600g/kg Metsulfuron
Pyresta LV	Sipcam	G I	2.1g/L Pyraflufen-ethyl 421g/L 2,4-D (present as 2-ethyl hexyl ester)
Starane Advanced	DOW	I	333g/L Fluroxypyr (present as meptyl ester)
Sharpen WG	Nufarm	G	700g/kg Saflufenacil
Valor 500WG	Sumitomo	G	500g/kg Flumioxazin

Acknowledgements

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Supply of Chemical Sommerville Spraying, Northern Ag and DOW AgroSciences

Supply of Equipment DOW AgroSciences

SELECTION OF ONION WEED PHOTOS FROM KEY RESULTS AT 103 DAYS AFTER APPLICATION TIMING 1

PARAQUAT 1L/HA_T1

GLYPHOSATE 1.5L, LVESTER 0.5L, ALLY 5G_T1

GLYPHOSATE 1.5L _T1

GLYPHOSATE 1.5L & PYRESTA 0.5L_T1

UNTREATED 103DAS_T1

GLYPHOSATE 1.5L & SHARPEN 26G_T1