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Residual Control of Common Sowthistle in Fallow

Trial ID: LB2116

Location:

Felton

Trial Year: 2022

Investigator:

Linda Bailey

This trial was conducted as part of a series to evaluate the potential of a range of fallow registered residual herbicides and potential new options for management of common sowthistle. Management of common sowthistle in fallow is a major industry challenge with increasing levels of glyphosate resistance or tolerance. Although common sowthistle populations are typically scattered and at low densities, management alternatives including residual control are keenly sought.

Objective:	To evaluate residual control of common sowthistle in fallow
Previous Crop:	Wheat 2021
Situation:	Fallow with 10-20 cm tall wheat stubble and 100% ground cover
Application Date:	12/01/2022
Nozzles:	AIXR110015
Volume:	100 L/ha
Site Maintenance Sprays:	30/12/2021: Glyphosate + 2,4-D + Bonfire 14/2/2022: Glyphosate + Starane + Express 20/2/2022: Gramoxone
Trial Design:	Randomised block of 15 treatments x 4 replicates
Plot Size:	4m x 12m
Keywords:	Common sowthistle, residual, fallow

The trial was initiated in a fallow paddock, ~2 months after wheat harvest in 2021. The crop was harvested leaving stubble at ~10-20 cm height with complete groundcover from high quantities of wheat straw. A commercial fallow spray was conducted ~2 weeks prior to the trial initiation to control volunteer wheat seedlings and low densities of common sowthistle. Site inspection <3 weeks after the residuals were applied showed small numbers of rosette staged common sowthistle (~6-9 leaf). These weeds were too advanced to have emerged after the residuals were applied and are believed to have been emerged but covered by wheat straw at the time of the residual application. A commercial double knock was applied as a 'clean-up' spray 33 and 39 days after the residual application. All subsequent counts were of weeds that emerged after the double knock application.

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The trial was inspected for weed emergence in January, March and April 2022. Common sowthistle was the dominant weed with no useful data generated on other targets. Rainfall levels were well above average in both February and March. A commercial double knock application was applied ~ 5 weeks after the trial was commenced to control weeds that had emerged at trial initiation but were covered by the thick straw groundcover.

During the 10 days following the double knock spray, >220 mm of rain was recorded with a new emergence of common sowthistle assessed at 55 DAA. An additional assessment was conducted in mid-April following an additional 230 mm of rainfall. A total of ~520 mm of rain was recorded between application and the final assessment.

Dual Gold, Balance, Terbyne Xtreme and Valor all have fallow registrations for the residual control of common sowthistle.

Scientific Pest Name			<i>Sonchus oleraceus</i>				
Pest Name			Common sowthistle				
Assessment Date			8/03/2022	13/04/2022			
Assessment Type			COUNT	COUNT			
Assessment Unit			/m ²	/m ²			
Sample Area			10 m x 1 m	10 m x 1 m			
Treatment-Evaluation Interval			55 DAA	91 DAA			
Description			Cotyledon – 2 leaf	Stem Elongation ~25 cm diameter	Rosette 15-20 cm diameter	2-3 leaf 1 cm diameter	All Growth Stages
ARM Action Codes			AA	AA	AL	AL	AA
Trt No.	Treatment						
1	Untreated	-	2.1a	1.0a	3.3a	0.6bcd	5.1a
2	Dual Gold	2000ml/ha	1.5ab	1.0a	3.1ab	0.7bcd	5.1a
3	Dual Gold	2000ml/ha	0.0c	0.1cd	0.7cd	0.2cd	1.1def
	Valor	210g/ha					
4	Impose	150ml/ha	0.8b	0.8a	2.6ab	0.5bcd	4.3ab
5	Impose	150ml/ha	0.0c	0.0cd	0.5cd	0.4bcd	0.9def
	Valor	210g/ha					
6	Balance	100g/ha	1.1ab	0.5ab	4.2a	0.7abc	5.6a
7	Terbyne Xtreme	1200g/ha	0.1c	0.0cd	1.0cd	0.6bcd	1.6cde
8	Valor	210g/ha	0.0c	0.0d	0.3d	0.2cd	0.4ef
9	Valor	280g/ha	0.0c	0.0cd	0.3d	0.1d	0.3f
10	Group 14 R	1500ml/ha	0.0c	0.0d	0.5cd	0.2cd	0.8def
11	Voraxor	200ml/ha	0.0c	0.1cd	1.5bc	1.6a	3.3abc
12	Voraxor	240ml/ha	0.0c	0.0cd	1.1cd	0.9ab	2.1bcd
13	Gesaprim	2000g/ha	1.1ab	0.6ab	3.6a	0.7bcd	5.2a
14	Tordon 75-D	1000ml/ha	0.1c	0.2bc	1.5bc	0.4bcd	2.2bcd
15	Group 27 C	200ml/ha	1.1ab	0.9a	3.6a	0.6bcd	5.4a
LSD P=.05			2.68t	2.00t	0.23t	0.18t	3.645t
Treatment Prob.(F)=			0.0001	0.0001	0.0001	0.0264	0.0001

Means followed by same letter do not significantly differ (P=.05, LSD)

t=Mean descriptions are reported in transformed data units, and are not de-transformed.

Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.

ARM Action Codes

AA = Automatic arcsine square root % transformation

AL = Automatic log transformation of X+1

DAA = Days after Application

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Conclusions:

This trial was established to evaluate residual common sowthistle control in fallow. Treatments were applied in early January 2022 to a paddock cropped to wheat in 2021. The site had ~10-20 cm tall wheat stubble with ~100% ground cover. The site received a commercial fallow knockdown spray ~2 weeks prior to the residual herbicide application.

The site received ~21 mm at 7 days after application (7 DAA) and a total of ~520 mm over the duration of the trial. Weed counts were conducted at 19 DAA, 55 DAA and 91 DAA. Data from the 19 DAA assessment was ignored as there were a small number of 6-9 leaf common sowthistle. These weeds would have been emerged at the time of residual herbicide application but covered by the dense groundcover. A commercial fallow double knock was applied on 33 and 39 DAA to control weeds that had emerged prior to the residual herbicide application. In the two weeks following the double knock application ~230 mm of rainfall was recorded.

Residual control was assessed at 55 DAA with untreated common sowthistle populations of ~2.1/m² at the cotyledon to 2 leaf stage. Residual control >90% was achieved from all treatments containing Valor, both rates of Voraxor, Tordon 75-D, Terbyne Xtreme and an experimental Group 14 herbicide despite ~290 mm of rainfall since application. Common sowthistle counts in the Balance, Dual Gold alone, Gesaprim and experimental Group 27 herbicide treatments were not significantly different to those in the untreated.

In the following five weeks, an additional 230 mm of rainfall was received. Assessment at 91 DAA found common sowthistle at three distinct growth stages. The largest were at stem elongation and expected to be primarily the seedlings assessed at 55 DAA. Similar treatment patterns were observed to the 55 DAA assessment.

Rosette staged common sowthistle at ~15-20 cm diameter were present at ~3.3/m² in the untreated. These weeds are likely to have emerged from rain events between 50-59 DAA when a total of ~95 mm of rainfall was recorded. The most effective control (~80-90%) was obtained from all treatments containing Valor or the experimental Group 14 herbicide.

Seedling staged common sowthistle at 2-3 leaf were present at ~0.6/m² in the untreated. These weeds are likely to have emerged from rain events between 75-82 DAA when a total of ~187 mm of rainfall was recorded. No treatment provided significant control, however the lowest weed counts were present where Valor or the experimental Group 14 herbicide were applied.

In this situation all treatments containing Valor (alone or in mixture), Voraxor, Tordon 75-D, Terbyne Xtreme and an experimental Group 14 herbicide all provided good levels of residual common sowthistle control (90-100%), up to ~55 days after application with ~290 mm of rainfall. Valor, and the experimental Group 14 herbicide provided longer residual control under the high rainfall conditions but did not effectively control an emergence that occurred ~80 days after application following >330 mm of rainfall. Balance and Dual Gold provided poor levels of weed suppression under the high rainfall conditions.

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Application Description	
Application Date:	12/01/2022
Application Start Time:	2:00 PM
Application Stop Time:	4:10 PM
Application Method:	SPRAY
Application Timing:	PRE-EMERGENT
Application Placement:	SOIL
Air Temperature, Unit:	30.1 C
% Relative Humidity:	45.6
Wind Velocity, Unit:	5.3 km/h
Wind Direction:	E
Soil Moisture:	DRY
% Cloud Cover:	40
Next Moisture Occurred On:	19/01/2022

Application Equipment	
Application Equipment:	Polaris
Equipment Type:	BOOM
Operation Pressure, Unit:	300 kPa
Nozzle Type:	AIXR
Nozzle Size:	110015
Nozzle Spacing:	50 cm
Boom Length:	4 m
Boom Height:	0.5 cm
Ground Speed:	7.2 km/h
Spray Volume:	100 L/ha

Monthly Rainfall:

Closest Weather Station:	SILO grid pt 27.80 S, 151.75 E
Distance:	3.3 km

Date	Amount	Unit	Additional Comments
January 2022	35	mm	Post Application on 12/1/2022
February 2022	199	mm	~20 mm prior to clean-up spray on 14/2/2022
March 2022	229	mm	~55 mm prior to 1 st assessment 8/3/2022
April 2022	57	mm	Prior to 2 nd assessment 13/4/2022