Residual Control of Common Sowthistle in Fallow

Trial ID: **LB2215** **Location:** **Felton** **Trial Year:** **2023**
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 2022**
Situation:	**Fallow with ~14 cm tall wheat stubble and ~58% ground cover**
Application Date:	**23/02/2023**
Application Timing:	**Pre-emergent**
Nozzles:	**AIXR 11002**
Volume:	**100 L/ha**
Trial Design:	**Randomised complete block of 14 treatments x 4 replicates**
Plot Size:	**4 m x 12 m**
Keywords:	**Common sowthistle, bladder ketmia, residual, fallow**

The trial was initiated in a fallow paddock near Felton on the southern downs in QLD, ~3 months after wheat harvest in 2022. A commercial fallow spray was conducted ~1 week prior to the trial initiation to control volunteer wheat seedlings and low densities of common sowthistle.

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Product Common Sowthistle Registrations

- Dual Gold, Balance, Terbyne Xtreme and Valor all have registrations for residual control of common sowthistle in fallow
- Two Group 14 herbicides were included that have registrations for residual control of common sowthistle but only in winter legumes and cereals
- Picoflex, Trezac and FallowBoss Tordon all have registrations for use in fallow but only for knockdown control
- The Group 13 herbicide only has a registration in winter cereals for knockdown control

Pest Scientific Name			***Sonchus oleraceus***	***Hibiscus trionum***	***Rhynchosia minima***
Pest Name			**Common sowthistle**	**Bladder ketmia**	**Rhynchosia**
Pest Stage			**Cotyledon - 3 leaf**	**Cotyledon - 1 leaf**	**Cotyledon - 1 leaf**
Assessment Date			**20/03/2023**	**20/03/2023**	**20/03/2023**
Assessment Type			**COUNT**	**COUNT**	**COUNT**
Assessment Unit			**/m²**	**/m²**	**/m²**
Assessment Area			**1 m x 10 m**	**1 m x 10 m**	**1 m x 10 m**
Treatment-Evaluation Interval			**25 DAA**	**25 DAA**	**25 DAA**
ARM Action Codes			**AA**	**AA**	**AA**
Trt No.	**Treatment**	**Product Rate**			
1	Untreated	-	0.09a	0.32a	0.77a
2	Dual Gold	2000ml/ha	0.01bc	0.05a-d	0.33ab
3	Balance	100g/ha	0c	0.01cd	0.06bc
4	Terbyne Xtreme	1200g/ha	0c	0.01cd	0.38ab
5	Valor	140g/ha	0.01bc	0.01cd	0.35ab
6	Valor	280g/ha	0c	0.01cd	0.22abc
7	Group 14 R	750ml/ha	0c	0.03bcd	0.07bc
8	Group 14 R	1500ml/ha	0c	0.01cd	0c
9	Group 14 V	120ml/ha	0c	0d	0.11bc
10	Group 14 V	240ml/ha	0c	0d	0.26ab
11	Picoflex	315ml/ha	0c	0.02cd	0c
12	Trezac	200ml/ha	0.06ab	0.15abc	0.03bc
13	Group 13	1250ml/ha	0.01bc	0.26ab	0.30ab
14	Fallowboss Tordon	1000ml/ha	0c	0.02cd	0c
		LSD P=.05	0.059 - 0.073	0.186 - 0.280	0.375 - 0.604
		Treatment Prob.(F)=	0.0171	0.0449	0.0090

Means followed by same letter or symbol (-) do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.
NB: A weed count of 0 = no surviving weeds were found in any plot

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NB: Due to muddy conditions, a knockdown spray could not be applied after assessment 1. Common sowthistle counts were classified according to growth stage with the large rosette weeds likely to have emerged from rainfall at 7-20 DAA, small rosettes likely to have emerged from rainfall at 31-35 DAA and seedlings likely to have emerged from rainfall at 45 DAA.

Pest Scientific Name			***Sonchus oleraceus***			
Pest Name			**Common sowthistle**			
Assessment Date			**24/04/2023**			
Assessment Type			**COUNT**			
Assessment Unit			**/m²**			
Assessment Area			**1 m x 10 m**			
Treatment-Evaluation Interval			**60 DAA**			
ARM Action Codes			**AA**			
Pest Stage			**Up to 3 leaf (≤ 2 cm diameter)**	**4 – 7 leaf small rosette (≤10 cm diameter)**	**Large rosette (11 - 20 cm diameter)**	**Combined Growth Stages**
Trt No.	**Treatment**	**Product Rate**				
1	Untreated	-	0.38ab	2.79ab	0.79a	4.00ab
2	Dual Gold	2000ml/ha	0.53a	2.93ab	0.05b	3.63ab
3	Balance	100g/ha	0.54a	1.86bc	0b	2.45bc
4	Terbyne Xtreme	1200g/ha	0.06cd	0f	0b	0.06f
5	Valor	140g/ha	0.14bc	0.10ef	0.02b	0.30ef
6	Valor	280g/ha	0.06cd	0.01f	0.01b	0.12ef
7	Group 14 R	750ml/ha	0d	0.06f	0.01b	0.07f
8	Group 14 R	1500ml/ha	0d	0f	0.01b	0.01f
9	Group 14 V	120ml/ha	0.06cd	0.25ef	0.01b	0.44def
10	Group 14 V	240ml/ha	0d	0.01f	0b	0.01f
11	Picoflex	315ml/ha	0.42ab	1.05cd	0.01b	1.53cd
12	Trezac	200ml/ha	0.79a	4.35a	0.61a	5.95a
13	Group 13	1250ml/ha	0.05cd	0.16ef	0b	0.22ef
14	Fallowboss Tordon	1000ml/ha	0.11bcd	0.62de	0.01b	0.79de
		LSD P=.05	0.272 - 0.497	0.370 - 1.830	0.141 - 0.448	0.453 - 2.512
		Treatment Prob.(F)=	0.0001	0.0001	0.0001	0.0001

Means followed by same letter or symbol (-) do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.
NB: A weed count of 0 = no surviving weeds were found in any plot

ARM Action Codes
AA = Automatic arcsine square root % transformation

DAA = Days after Application A

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Conclusions:

This trial was designed to evaluate residual control of common sowthistle in fallow. Treatments were applied in the third week of February 2023 in a paddock that produced wheat in 2022. The paddock had ~60% ground cover, with the cereal stubble ~15 cm in height. The trial received ~13 mm rainfall at 7 days after application (7DAA).

Common sowthistle counts were conducted at 25 DAA and 60 DAA with no knockdown spray possible after the first assessment due to wet conditions. Over the duration of the trial, ~225 mm of rainfall was received.

Trace levels of seedling common sowthistle (<0.1/m^2) were present in the untreated at 25 DAA. All treatments except Trezac significantly reduced sowthistle counts with ~90-100% control.

Three distinct common sowthistle cohorts were present when assessed at 60 DAA. Large rosettes (> 8 leaves and ~15 cm diameter), small rosettes (4-7 leaves and ~8-10 cm diameter) and seedlings (<3 leaf and 1-2 cm diameter). The majority of sowthistle were small rosettes. All treatments except Trezac had significantly reduced counts of large rosette staged sowthistle compared to the untreated (~93-100% control). Both rates of Valor, Group 14 R and Group 14 V together with Terbyne Xtreme and the Group 13 herbicide had reduced numbers of small rosette sowthistle by >90%. In contrast, Balance, Picoflex and FallowBoss Tordon only provided moderate levels of suppression of the small rosette sowthistle numbers. Similar results were seen in seedling sowthistle counts with both rates of Group 14 R and Group 14 V together with Valor 280 g/ha, Terbyne Xtreme and the Group 13 herbicide having significantly reduced sowthistle seedlings (85-100%). No sowthistle seedlings were found in either rate of Group 14 R or in Group 14 V at 240 mL/ha.

Low populations of seedling bladder ketmia (~0.3/m^2) and Rynchosia (~0.8/m^2) were present in the untreated at the 25 DAA assessment. Both rates of Valor, Group 14 R and Group 14 V together with Balance, Terbyne Xtreme, Picoflex and FallowBoss Tordon significantly reduced bladder ketmia counts (90-100%). Both rates of Group 14 R together with Balance, Group 14 V at 120 mL/ha, Picoflex, Trezac and FallowBoss Tordon significantly reduced rhynchosia counts (85-100%). There were no new flushes of these weeds at the 60 DAA assessment.

Under these conditions, with ~225 mm of rainfall, both rates of Group 14 R, Terbyne Xtreme and Group 14 V at 240 mL/ha provided effective common sowthistle control up to ~7 weeks after application (>98%). Both rates of Valor and the Group 13 herbicide provided good levels of control (~92-97%) but trended to slightly reduced activity. All these treatments provided significantly increased common sowthistle control compared to Balance. Registrations of Group 14 R or Group 14 V in fallow may provide useful benefits as both products showed good activity against bladder ketmia.

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Application Description	
Application Date:	23/02/2023
Application Start Time:	12:45 PM
Application Stop Time:	3:40 PM
Air Temperature Start, Stop:	28.1, 26.4 °C
% Relative Humidity Start, Stop:	41.3, 52.7
Wind Velocity & Direction Start:	12.2 km/h, NE
Wind Velocity & Direction Stop:	8.7 km/h, NE
Soil Moisture:	DRY
% Cloud Cover:	90
First Moisture Occurred On:	2/03/2023

Application Equipment	
Application Equipment:	Polaris
Equipment Type:	BOOM
Operation Pressure:	300 kPa
Nozzle Model:	AIXR11002
Nozzle Spacing:	50 cm
Boom Length:	4 m
Boom Height:	60 cm
Ground Speed:	9.5 km/h
Application Amount:	100 L/ha

Rainfall:

Closest Weather Station:	SILO grid pt 27.80 S, 151.75 E
Distance:	3.4 km

Date	Amount (mm)	Additional Comments
3/02/2023	6.2	
15/02/2023	13.6	
17/02/2023	-	Commercial knockdown spray (glyphosate + dicamba)
23/02/2023	-	Application A
2/03/2023	12.8	
11/03/2023	3.2	
12/03/2023	8.9	
13/03/2023	24.0	
15/03/2023	7.2	
20/03/2023	-	Assessment 1 - weed counts
26/03/2023	7.4	
29/03/2023	23.5	
30/03/2023	13.0	
9/04/2023	59.1	
24/04/2023	-	Assessment 2 - weed counts
01/05/23	-	Commercial knockdown spray
16/05/23	56.2	
23/05/23	-	No further weed emergence. Trial terminated.