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Investigating a range of residual herbicides on the effectiveness of control of sow thistle and other weeds in the summer fallow.

Grain Orana Alliance

Trial code:	GGWE7824-1
GRDC code:	GOA2302-001SAX
Season/year:	Summer 2024
Location:	Collie
Trial partners:	Andrew Freeth
Trial establishment date:	30/12/2024

Keywords

- GGWE782, sow thistle, summer fallows, weed control, residual activity, Collie

Take home messages

- Several herbicide or combinations reduced subsequent weed populations.
- Only one herbicide treatment tested achieved 100% reduction in sow thistle populations.
- Although several others achieved good reduction in weed populations the remaining weeds would have required follow up sprays to achieve satisfactory fallow weed control.
- This would limit any savings in fallow management costs using residuals unless the remaining population could be controlled with spot spraying technology whereby overall chemical usage may be reduced.
- Some options showed some effects on the subsequent crop, but the yield impacts were not assessed in this trial.

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Background

- At the 2022 Narromine National Grower Network (NGN) forum, growers identified summer fallow weed control as a significant and escalating input cost.
- Increasing herbicide costs, herbicide resistance and the increasing prevalence of harder to kill weeds have all contributed to this. Several specific weeds in sow thistle, fleabane and windmill grass have arguably had the greatest impact on these rising costs of managing summer fallows.
- Sow thistle is characteristed by an ability to germinate all year around, high seeding rates, quick growth rates and increasing tolerance or resistance to commonly used herbicides. As such, sow thistle is a dominant weed in any cohort of weeds that germinates in fallow and is often a key determinant of both the frequency of fallow sprays as well as the herbicide choice and rates employed.
- Given this, employing soil applied residual herbicides to prevent or limit the frequency of germination as well as the resultant population of sow thistle may offer some potential to reduce fallow management costs.
- To test the validity of this management approach to reduce costs a series of herbicide trials were established under a NGN project over the period of 2023 and 2024.

Aims

- To investigate a range of residual herbicides that could be applied at the first fallow spray timing for control of subsequent germinations of sow thistle and other weeds over the summer fallow period.
- Assess any residual impact these herbicides may have on the establishment of the subsequent crop.

Methodology

- The trials were a randomized and replicated design with the results statistically analysed by ANOVA.
- This site was selected as it was suggested to have a history of sow thistle prominence.
- Trials were established in a commercial fallow with a knockdown herbicide applied before the application of any of the trial treatments to ensure the measured impacts were a result of the residual capability of herbicides rather than any knockdown capacity.
- A knockdown (glyphosate and Garlon) was applied on the site on the 16/12/2024 with a double knock of Sprayseed applied on the 24/12/24. The trial treatments listed in table 1 were then applied on the 31/12/2024.
- Sporadic rainfall fell through the summer fallow. A sufficient rain event was received during January (Table 2). Counts were taken on the 15/4/2025 at 106 days after treatment application (DAA).
- The subsequent wheat crop was assessed for treatment effects on the 11/06/2025

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Table 1 Treatment list.

Description
Balance® 100 g/ha
Balance® 100 g/ha + Dual Gold® 2000 mL/ha
Balance® 100 g/ha + Terbyne® Xtreme® 1200 g/ha
Dual Gold® 2000 mL/ha
FallowBoss® TORDON® 1000 mL/ha
Impose® 200 mL/ha
Overwatch® 1250 mL/ha
Picoflex® 315 mL/ha
Reflex® 1250 mL/ha
Sakura® 118 g/ha
Terbyne® Xtreme® 1200 g/ha
Terbyne® Xtreme® 1200 g/ha + Impose® 200 mL/ha
Trezac® Arylex® 200 mL/ha
Valor® 280 mL/ha
Valor®280 mL/ha + Dual Gold® 2000 mL/ha
Voraxor® 240 mL/ha
UTC

Table 2 Monthly rainfall (mm) and long-term average (LTA).

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2024	72	50	42	70	74	36	38	41	7	29	96	71	**626**
2025	58	25	93	34	37	30	-	-	-	-	-	-	**277**
LTA	53	49	44	37	39	40	37	34	36	43	49	46	**507**

Results

- Sow thistle was the primary weed observed at this site. No other weeds were in sufficient quantities to be assessed.
- The first flush of weeds emerging from a March rain that was assessed in mid-April, 106 DAA.
- The untreated had an average of over 6 plants/m^2 of sow thistle as illustrated in Figure 1.
- Voraxor®, Balance® + Dual Gold®, Balance + Terbyne® and Impose® resulted in lower sow thistle populations than the UTC however still contained > 3 plants/m^2, equating to ~50% reduction in population.
- There was nil sow thistle observed in the Reflex® treatment, while the following treatments had very low numbers and high levels of control (when compared to the untreated); Fallow Boss® TORDON®, Picoflex®, Valor® + Dual Gold® and Overwatch, all of which were not different to each other in their control.

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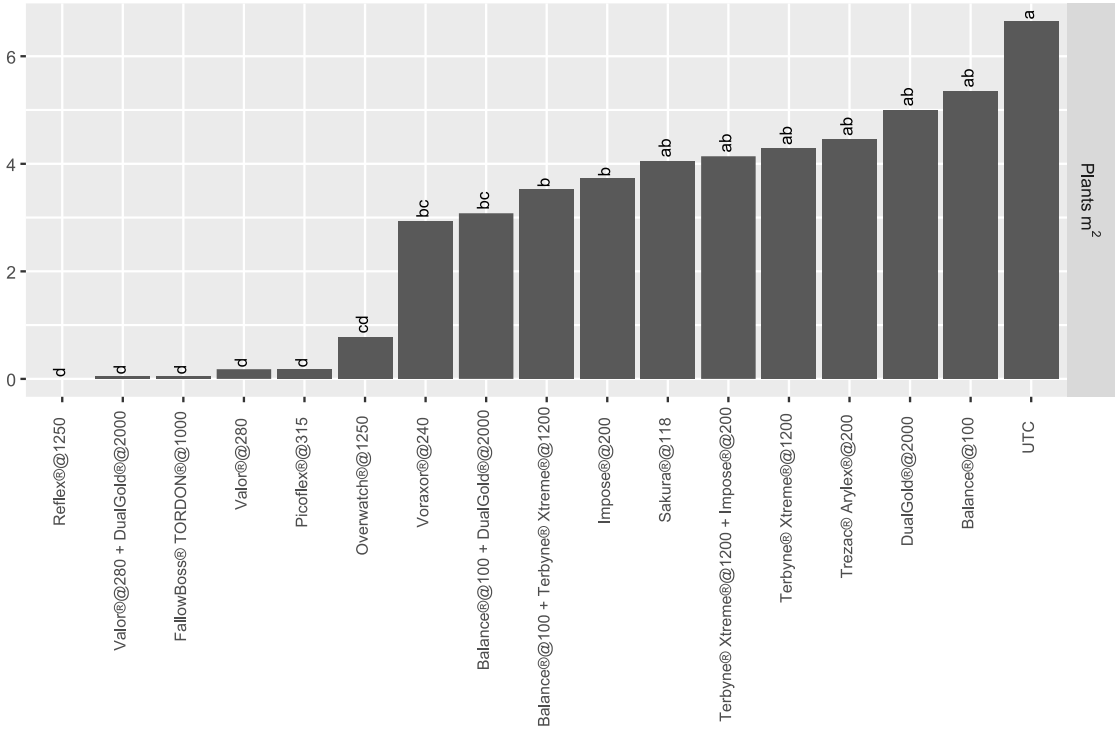

Figure 1 Weed counts and control of sow thistle assessed 106 days after herbicide application.

Establishment:

- There was no negative treatment effect on the various herbicides on establishment of the subsequent wheat crop as illustrated in Figure 2.
- There were some phytotoxicity effects where treatments such as Balance and Picoflex had a higher phytotoxicity score than the untreated.

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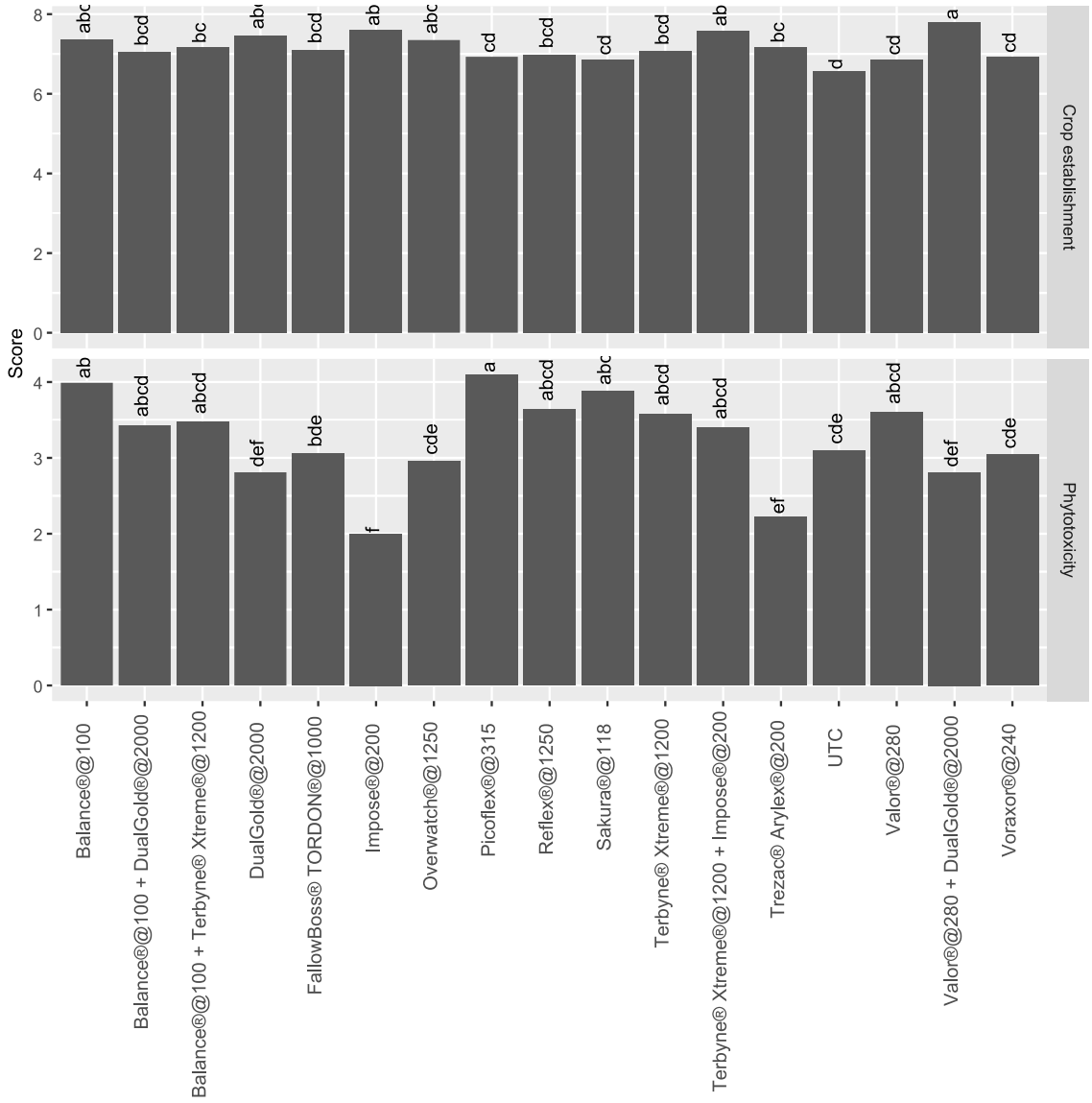

Figure 2 Crop establishment (0 = no crop, 10 = excellent), and phytotoxicity scores, (0 = no damage, 10 = crop failure) assessed 12/06/2024.

Discussion

- Several of the treatments tested resulted in very sow thistle populations out to 106 DAA.
- Reflex resulted in 100% control and would not have required any follow-up treatment if sow thistle was the only weed present in the fallow. Reflex also did not demonstrate any phytotoxic effects on the subsequent crop.
- Valor® + Dual Gold®, FallowBoss® TORDON®, Valor®, Picoflex® resulting in populations no more than 1 plant/5m^2. These population may require follow up treatment in the fallow to meet commercial expectations, meaning there would be limited ability to save on fallow management costs. The use of optical spot spray technology to control these very low populations could result in significant chemical usage.
- Both Valor® and Picoflex® despite providing good levels of control exhibited some evidence of increased wheat phytotoxicity in these treatments when compared to the untreated.
- There was no evidence of reduced establishment from any of the herbicides tested.

Conclusions

Several herbicide options showed some ability to reduce summer fallow weed numbers.

Relex in this trial offered complete control of sow thistle for a period of 106 days after its application. This would result in significant reductions in money and effort to maintain fallows if sow thistle was the only weed present. In this trial however there was too few other weeds to assess its efficacy on other weeds.

Most other products tested failed to achieve high levels of control over all the species observed and most would have required follow up herbicide sprays to control survivors. This would limit their ability to reduce fallow management costs significantly.

However, if growers were able to control survivors following the use of these residual products with spot spray technologies such as Weed-it, or Weed Seekers, the proportion of the paddock requiring spraying would be much less and overall herbicide usage for their control would be lower than where residual herbicides were not used.

There are also exhibited crop impacts following the use of these products. The effects were variable, but the yield impacts were not measured. This highlights to growers they should be conscious of label plants backs and potential implications for future crop performance.

Acknowledgements

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Appendix

Results

Product (rate)	Sowthistle 106DAA				Plant establishment		Phytotoxicity	
	(plants/m2)		(control %)		(score)		(score)	
Balance®@100	5.35	ab	28	c	7.36	abc	3.99	ab
Balance®@100 + DualGold®@2000	3.08	bc	56	bc	7.05	bcd	3.43	abcd
Balance®@100 + Terbyne® Xtreme®@1200	3.53	b	50	c	7.17	bc	3.47	abcd
DualGold®@2000	5.00	ab	30	c	7.47	abc	2.81	def
FallowBoss® TORDON®@1000	0.05	d	99	a	7.11	bcd	3.06	bde
Impose®@200	3.73	b	37	c	7.60	ab	2.00	f
Overwatch®@1250	0.78	cd	87	ab	7.35	abc	2.96	cde
Picoflex®@315	0.18	d	97	a	6.93	cd	4.10	a
Reflex®@1250	0.00	d	100	a	6.99	bcd	3.64	abcd
Sakura®@118	4.05	ab	36	c	6.87	cd	3.88	abc
Terbyne® Xtreme®@1200	4.28	ab	43	c	7.07	bcd	3.58	abcd
Terbyne® Xtreme®@1200 + Impose®@200	4.14	ab	32	c	7.59	ab	3.40	abcd
Trezac® Arylex®@200	4.45	ab	39	c	7.18	bc	2.22	ef
Valor®@280	0.18	d	97	a	6.87	cd	3.60	abcd
Valor®@280 + Dual Gold®@2000	0.05	d	99	a	7.81	a	2.81	def
Voraxor®@240	2.93	bc	47	c	6.93	cd	3.04	cde
UTC	6.65	a	0	d	6.56	d	3.10	cde

Herbicide details

Trade name	Active	Rate (mL or g/ha)	Registered for use in fallow	Registered for sowthistle control	Comment
Balance®	750g/kg Isoxaflutole	100	Yes	Residual	
Dual Gold®	960g/L S-Metolachlo	2,000	Yes	Residual	
FallowBoss® TORDON®	300g/L 2,4-D, 75g/L Picloram, 7.5g/L Aminopyralid	1,000	Yes	No	
Impose®	240g/L Imazapic	200	Yes	No	
Overwatch®	400g/L Bixozone	1,250	No	Residual	
Picoflex®	240g/L Picloram	315	Yes	Knockdown	
Reflex®	240g/L Fomesafen	1,250	Yes	Residual	
Sakura®	850g/kg Pyroxasulfone	118	No	Residual	
Terbyne® Xtreme®	875g/kg Terbuthylazine	1,200	Yes	Residual	
Trezac® Arylex®	25g/L Aminopyralid, 30g/L Halauxifen	200	Yes	Knockdown	
Valor®	500g/kg Flumioxazin	280	Yes	Residual + knockdown	
Voraxor®	250g/L Saflufenacil, 125g/L Trifludimoxazin	240	Yes	Residual + knockdown	wetter required (Hasten)

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Spray application details

Spray application	Collie
Date applied	30/12/2024
Start time	10:15 AM
Finish time	11:20 AM
Water rate (l/ha)	100
Speed (km/hr)	6
Pressure (bar)	2
Equipment	Hand boom
Nozzle	Airmix 11001
Boom height (cm)	50
Temp (oC)	31
Wind velocity (km/hr)	4
Wind direction	N
Humidity (%)	35
Δt	17
Cloud cover (%)	5