GOA trial site report

Residual herbicides applied in wheat crops to reduce the incidence of fleabane and other weeds in subsequent summer fallows.

Grain Orana Alliance

Trial Code:	GGWE07724-1
Season/Year:	Winter 2024
Farm:	Winnabri
Location:	Warren
Trial Establishment Date:	5/07/2024

Keywords

GGWE077, Fleabane, sowthistle, caltrop, fleabane, summer fallows, resistance, in-crop herbicides, residual activity, application timing, Warren

Take home messages.

- Weed burdens in well managed fallows may not always justify the cost of residual herbicides.
- Even in these low populations' weeds, escapes still occur and require follow up treatment
- The use of camera sprayers would be advisable with such low populations, but it is unlikely that the use of residuals to reduce the percentage of the area required to be treated would be any different in this circumstance.

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 ST, FB and windmill grass have arguably had the greatest impact on these rising costs of managing summer fallows.
- FB (*Conzya bonariensis*) often germinates during the spring period. Often not controlled by earlier in crop applications. Following crop harvest FB is already established and coupled with increased

tolerances and/or resistances to a range of typically used fallow management herbicides, reliable control is often difficult and expensive. As such contributing significantly to the costs of managing summer fallows.

- Given the timing of the weeds germination and establishment it is hypothesised that being able to apply residual herbicides within the winter crop may prevent FB establishing and being present post-harvest, and if possible, indirectly reducing the higher fallow management costs associated with the weed.
- This approach has been previously identified utilising Lontrel Advance (Clopyralid) and has been widely adopted by industry. However, an improved understanding of how to finesse the use of this product, including the timing of application, could be very beneficial. There is also suite of other products that could also be utilised in this approach but have not been benchmarked to inform practices but also offer some alternate herbicide mode of action choice to growers.
- To test the validity of this management approach and compare products to reduce costs in managing fallows a series of herbicide trials were established under an NGN project over the period of 2023 and 2024.

Aims

- To investigate a range of residual herbicides that could be applied in wheat crops during the growing season for their impact on-
    - on FB germinations, establishment and growth in the subsequent fallow period
    - any other weeds over the summer fallow period.
- Assess if any of these residual herbicides may impacts on the establishment of the subsequent crop.

Methodology

- The trials were established as, randomised and replicated small plot trials.
- Potential herbicide treatments were applied to a commercially sown Hellfire wheat crop, in a paddock predicted to have a high FB seed bank.
- Herbicides were applied at predetermined growth stages of the crop. This was done as-
    - Some herbicides are only labelled to be applied within certain crop growth stages.
    - Increasing crop canopies may intercept herbicide spray, preventing the product reaching the ground or resulting in uneven coverage of the ground thus potentially limiting the residual effectiveness to control emerging weeds.
- At the timing of each herbicide timing, plots receiving residual treatments at that time were also treated with non-residual knockdown herbicides to control any preexisting germinations of FB as detailed below.
- Following each assessment during the fallow period all plots were intended to be sprayed out with a non-residual knockdown so that any subsequent count was a function of any ongoing residual effectiveness of the original treatments applied.
- Specific herbicides timing and the non-residual knockdowns used are detailed below-
    - Early timing applied 5/7/2024:
        - Crop at Z14-20 growth stage

- MCPA Amine® or Amicide Advance applied to remove plants present so residual effectiveness can be assessed.

- Mid-timing applied 30/7/2024:
  - Crop at Z25-27 growth stage
  - Amicide Advance applied to remove plants present so residual effectiveness can be assessed.
- Late-timing applied 28/8/2024:
  - Crop >Z32 stage
  - Amicide Advance applied to remove plants present so residual effectiveness can be assessed.

Table 1 Herbicide treatments and rates applied/ha

Product and rates (mL/ha)	**Application timing**	**Target Zadok stage**
Amicide® Advance @ 1400	Early	Z14-Z20
Aptitude® @ 200 + MCPA Amine 750 @ 300	Early	Z14-Z20
Diuron WDG @ 280 + MCPA Amine 750 @ 330	Early	Z14-Z20
Mateno® Complete @ 1000	Early	Z14-Z20
Rexade® @ 100 + MCPA LVE 570 @ 400	Early	Z14-Z20
Amicide® Advance @ 1400 + Grindstone® @ 32	Mid	Z25-Z27
Amicide® Advance @ 1400 + Lontrel® Advanced @ 150	Mid	Z25-Z27
Amicide® Advance @ 1400 + Lontrel® Advanced @ 75	Mid	Z25-Z27
Amicide® Advance @1400 + Picoflex® @110	Mid	Z25-Z27
Amicide® Advance @ 1400 + Trezac® @ 200	Mid	Z25-Z27
Amicide® Advance @1400	Very late	>Z32
Amicide® Advance @1400 + Lontrel® Advanced @ 150	Very late	>Z32
Lontrel® Advanced @ 150	Very late	>Z32
UTC		

The trial site was to be sown to cotton the following year by the grower. It was not possible to monitor the subsequent crop for crop establishment or growth.

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	53	62	42	53	78	36	37	41	6	29	86	65	**588**
2025	59	37	79	29	38	39							**281**
LTA	51	51	44	37	37	39	35	33	34	40	45	44	**490**

Results

The site was assessed on the 13/12/2024, and a second cohort of weeds was assessed on 12/01/2025. The grower then cultivated the site in preparation for a cotton crop in the following summer. No further assessments were made.

Throughout the period of observation low populations of sow thistle, fleabane, caltrop and melons were all assessed at both assessment times. The reader should be aware that at both assessment timings the populations present were extremely low the results should be treated with some caution. The full results are detailed in the appendix at the end of the document.

Fleabane

- On the 13/12/2024 there were no significant treatment differences when compared to the UTC.
- On the 2/01/2025 all treatments were lower than the UTC.

Caltrop (Tribulus terrestris):

- The Caltrop population was very low and was not observed in the untreated at either of the assessment timings.

Sow thistle

- On 13/12/2024 the untreated had an average of 0.25 sow thistle plants/m^2. There was no impact of any of the treatments.
- On 2/01/2025 a low population of sow thistle was observed across a range of treatment however they were equal to, or higher than that in the UTC.

Discussion

As typical of summer fallow in central NSW, a mixed and low population of broadleaf weeds germinated following rain during the period of observation for this trial.

No clear or consistent outcome was able to be drawn from this trial but highlights one of the issues with the use of in-crop residual herbicides, in that there is a chance that the targeted weeds either are not present or did not

germinate (regardless of the herbicide program), or that enough 'escape' the residual and require herbicide control anyway.

Following all treatments investigated in this trial, all would have required follow up weed control to manage the low populations present. In this case no saving in costs or efforts would have been achieved through the use of the residual herbicides tested. Quite the opposite- more costs would have been incurred for no benefit.

If Optical Spot Spraying Technology could have been utilized to control the low-level populations some savings in products could be made. However, due to such low populations the use of residual herbicides would have had little impact on the herbicide usage.

Establishment and phytotoxicity were not assessed at this site, as it has been left fallow in the winter of 2025, for a summer crop in the following summer.

Conclusions

The very low weed burden observed at this site could not show any discernible benefit using the residual herbicides tested. In this case there would be little cost savings with these products and if fact it costs growers more.

Weed populations present in previously well managed fallows where the weed burden is already low may not always justify the cost of residual herbicides. Even if they do any 'escapes' residual herbicides and still require control.

The use of camera sprayers would be advisable with such low populations, but it is unlikely that the use of residuals to reduce the percentage of the area required to be treated would be any different in this circumstance.

Acknowledgements

The research undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC. The authors would like to thank them for their continued support. Special thanks go out to NA who hosted this trial.

DISCLAIMER — TECHNICAL

GOA trial site report

Products may be identified by proprietary or trade names to help readers identify particular types of products, but this is not, and is not intended to be, an endorsement or recommendation of any product or manufacturer referred to. Other products may perform as well or better than those specifically referred to.

GOA trial site report

Appendix

Weed control results

Timing	Product (rate)	Fleabane 13/12/2024		Fleabane 2/01/2025		Caltrop 13/12/2024		Caltrop 2/01/2025		Sowthistle 13/12/2024		Sowthistle 2/01/2025	
		(plants/m2)											
Early	MCPA Amine 750@300 + Aptitude®@200	0.00	a	0.00	c	0.00	a	0.00	b	0.00	a	0.03	b
Early	MCPA Amine 750@330 + Diuron WDG@280	0.00	a	0.00	c	0.00	a	0.03	b	0.00	a	0.10	ab
Early	MCPA LVE 570@400 + Rexade®@100	0.00	a	0.00	c	0.13	a	0.00	b	0.00	a	0.28	a
Early	MCPA LVE 570@440	0.00	a	0.00	c	0.00	a	0.00	b	0.17	a	0.04	ab
Early	MCPA LVE 570@440 + Lontrel® Advanced@150	0.00	a	0.00	c	0.13	a	0.05	ab	0.25	a	0.12	ab
Early	MCPA LVE 570@440 + Mateno® Complete@1000	0.00	a	0.00	c	0.00	a	0.00	b	0.00	a	0.00	b
Mid	Amicide® Advance@1400	0.25	a	0.02	b	0.00	a	0.00	b	0.38	a	0.02	b
Mid	Amicide® Advance@1400 + Grindstone®@32	0.25	a	0.00	c	0.00	a	0.00	b	0.12	a	0.05	ab
Mid	Amicide® Advance@1400 + Lontrel® Advanced@150	0.00	a	0.00	c	0.00	a	0.05	ab	0.25	a	0.00	b
Mid	Amicide® Advance@1400 + Lontrel® Advanced@75	0.12	a	0.00	c	0.00	a	0.05	ab	0.25	a	0.08	ab
Mid	Amicide® Advance@1400 + Picoflex® (Picloram)@110	0.00	a	0.00	c	0.00	a	0.00	b	0.00	a	0.00	b
Mid	Amicide® Advance@1400 + Trezac®@200	0.00	a	0.00	c	0.00	a	0.00	b	0.37	a	0.00	b
Late	Amicide® Advance@1400	0.00	a	0.00	c	0.00	a	0.13	a	0.00	a	0.07	ab
Late	Amicide® Advance@1400 + Lontrel® Advanced@150	0.00	a	0.00	c	0.13	a	0.05	ab	0.00	a	0.05	ab
na	UTC@	0.00	a	0.15	a	0.00	a	0.00	b	0.25	a	0.00	b

Spray application details

Spray Application	Early	Mid (Z25)	Late (Z32)
Date applied	5/07/2024	30/07/2024	28/08/2024
Start time	11am	1:00 pm	11:45am
Finish time	12:00	1:45 pm	12:00
Water rate (l/ha)	100	100	100
Speed (km/hr)	5	5	5
Pressure (bar)	2	2	2
Equipment	Brolga hand boom	Brolga hand boom	Brolga hand boom
Nozzle	Airmix 01	Airmix 01	Airmix 01
Boom height (cm)	50	50	100
Temp (oC)	14	19.4	20.6
Wind velocity (km/hr)	15	3.3	9.6999999999999993
Wind direction	E	SW	WSW
Humidity (%)	67	39.7	60
Δt	3	7	5
Cloud cover (%)	0	10	0