GOA Trial Site Report

Testing pre and post emergent herbicide options for the control of wild oats (*Avena spp.*)

Trial code:	GAWE06921
Season/year:	Winter 2021
Location:	Dubbo
Trial partner:	Withheld

Keywords

GAWE069, wild oats, pre-emergent herbicides, resistance, Dubbo

Take home messages

Against a wild oat population with high level of resistance to multiple herbicide groups-

- Of 23 herbicide or herbicide combinations tested only one achieved commercially acceptable control
- Only another 4 options tested could be claimed to supress the wild oats
- The balance of the treatments failed to achieve any useful control.

Treatments with multiple herbicides were 4 of the five best performing options and might suggest tank mixing may be more effective in control wild oats.

Background

Wild oats is the third ranked weed in Australia in terms of the area it effects and the yield and revenue loss. In the Northern region, it is top ranked in terms of area (Llewellyn RS, 2016), and its control has become more complex as the levels of herbicide resistance increase.

In the Orana region ryegrass is arguably the number one problem weed, however with recent research, release of new products and increased use of integrated control measures the questions being asked of research has lessened. At the same time some questions have been asked about what now can be done to improve wild oat control.

This trial seeks to test a range of pre and post emergent herbicide options for control of wild oats.

Aim

To test the efficacy of a range of pre and post herbicide options for the control of wild oats.

Methods

- The trial was established in a linseed crop
    - It should be noted that not all treatments are registered for use in linseed and the reader should check the label

- Trial design was a randomised, replicated small plot design.
- Herbicides were applied using a hand boom applying 100L/ha of spray mixture as a medium spray quality.
- Incorporated by sowing (IBS) Herbicides were incorporated by sowing on 23 June, using a knife point press wheel setup on 27.5 cm spacing within a few hours of application. Post Sowing Pre-Emergent (PSPE) application were made immediately following sowing
- The Early Post Emergent (EPE) applications were applied on the 26 July and the post-emergent (PE) on the 4 August.
- Soil type was a silty clay loam.

Results were analysed by ANOVA and results compared by using a LSD method with a 90% confidence interval. Any references to differences between treatments should be assumed to be statistically different unless otherwise stated. For analysis and discussion unless otherwise stated, treatments and their effects will be compared to the UTC.

Results

The full set of results are in the attached annex.

The untreated Control (UTC) plots had 8.3 wild oats plants/m^2 and 73 panicles/m^2. The application of Avadex® Xtra (IBS) + Mateno® Complete (IBS) resulted in the lowest population of wild oats and the second lowest panicle count. There were 9 products that did not perform any better than the untreated control, all but one were single product treatments. Sakura was the best performing single product treatment resulting in an average of 1.6 plants/m2.

Of the top 10 performing treatments 7 were mixes, with Avadex® Xtra a component in 6 of these mixes.

GOA Trial Site Report

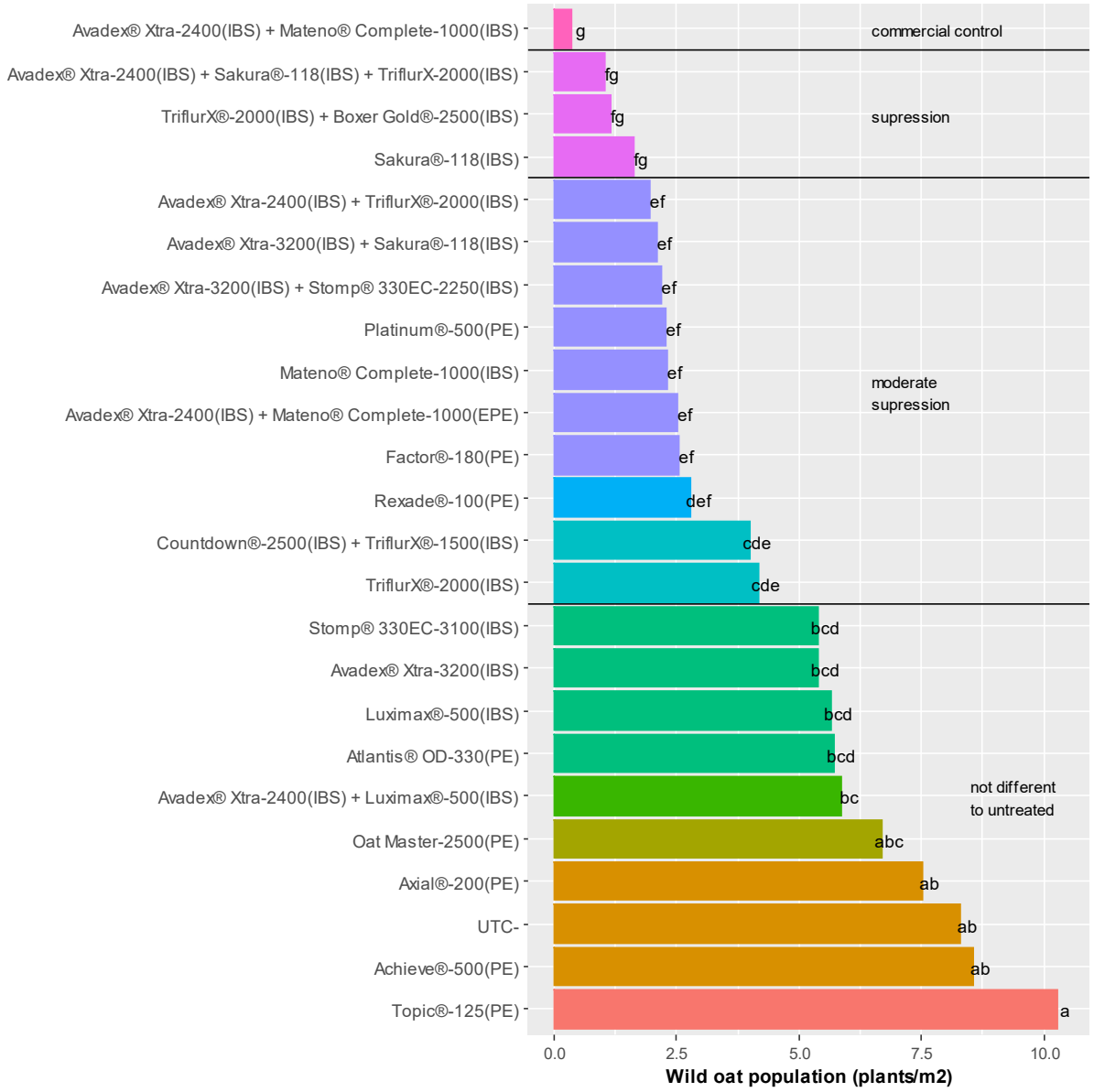

Figure 1. Wild oat populations assessed 70 days after sowing (and IBS application).

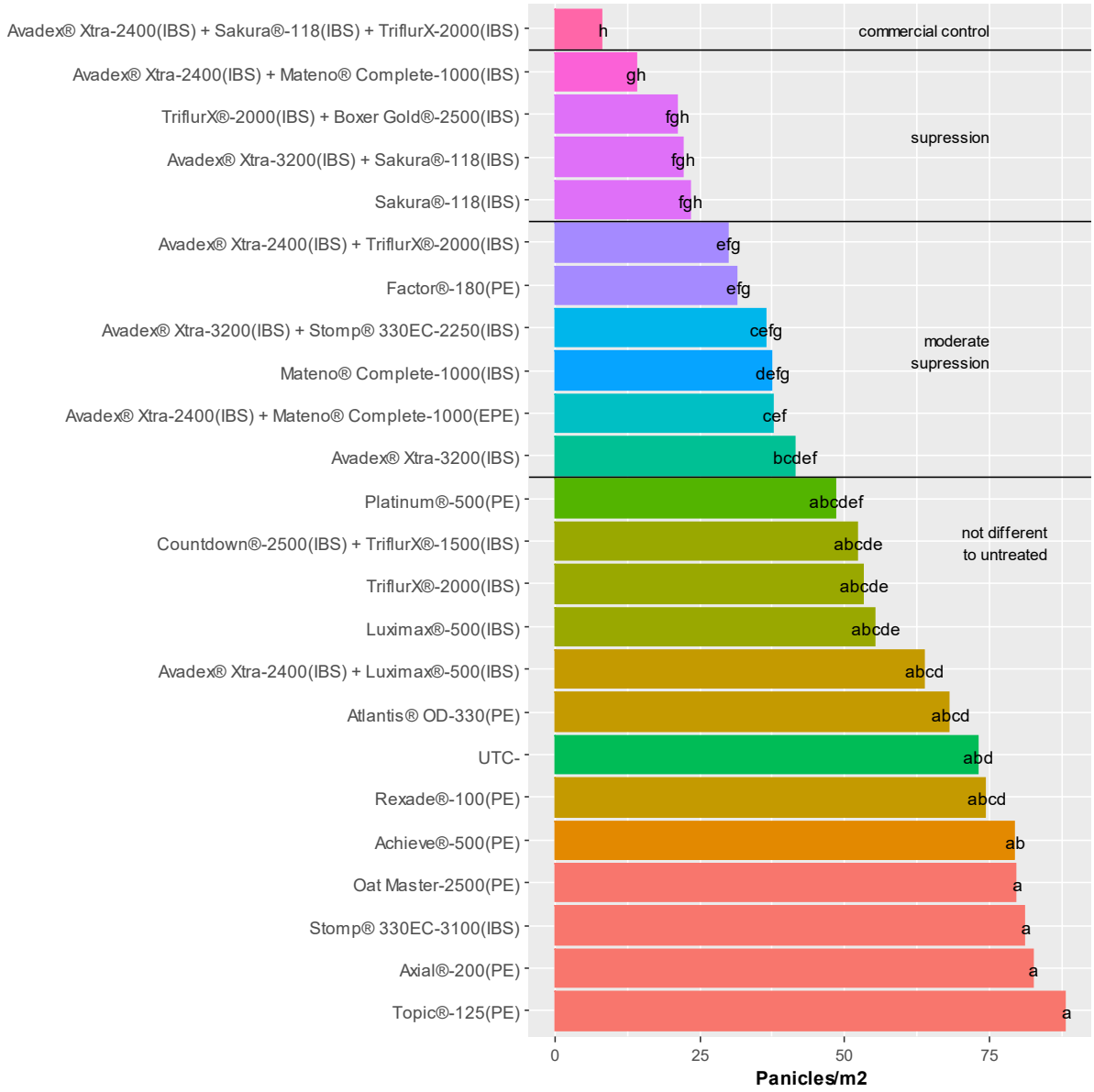

Figure 2. Wild oat panicle counts assessed 128 days after application (sowing and IBS application).

Discussion

Avadex® Xtra (IBS) + Mateno® Complete (IBS) was the only treatment to achieve a commercial level of control. All other treatments tested only achieved suppression or failed to meet any commercial levels of control or suppression.

Tank mixing these chemicals significantly improved control when compared to the individual products performance, in fact a higher rate of Avadex® Xtra as a standalone product did not perform better than the untreated control. The addition of TriflurX®(IBS) to Avadex® Xtra also improved the level of control when compared to the individual products.

Sakura®(IBS), Platinum®(PE), Factor®(PE) and Rexade®(PE) were the best performing of the standalone products and along with TriflurX®(IBS) @ 2 L/ha, all reducing the wild oat population when compared to the untreated.

Several standalone products were not effective in controlling wild oats including Stomp, Avadex® Xtra, Luximax®, Atlantis® OD, Oat Master, Axial®, Achieve® and Topic®.

While some tank mixes improved the level of control of both products, this was not universal. For example, the combination of Avadex® Xtra and Luximax® was no better than the sum of its parts nor the untreated.

Mixing Countdown®(IBS) + TriflurX® (IBS) did not improve control when compared to standalone TriflurX® (IBS) (albeit differing rates), however the tank mix of TriflurX®(IBS) + Boxer Gold®(IBS) with the common active (Prosulfocarb), did improve control (note that Boxer Gold® was not tested as a standalone treatment).

Herbicide resistance were detected in this population to Axial®, Achieve®, Topic®, Verdict®, Atlantis® and Mataven® (see the appendix). The performance of the products included in these trials (Axial®, Achieve®, Topic®) was not different to the untreated plots. On the other hand, no resistance was detected to clethodim, trifluralin, Factor®, Avadex®, or Intervix®.

Conclusions

Of the 23 herbicides and herbicide combinations tested only one of them achieved commercially acceptable control. A further 4 options tested achieved what would be considered suppression. All other options would be considered commercial failures.

Herbicide mixes tend to work better than stand-alone products, represented in 4 of the five options tested that achieved suppression or control. Only one standalone option achieved commercial suppression.

Test populations where control tends to be poor for herbicide resistance, this can guide herbicide selection to chemistries that are more likely to be effective.

There are a number of products that did not perform very well that need further testing to see if they still have a fit in wild oat control.

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 the hosts of this trial.

DISCLAIMER — TECHNICAL

Products may be identified by proprietary or trade names to help readers identify 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

Treatment list

Trt	Product 1	Rate (mL or g/ha)	Method 1	Product 2	Rate (mL or g/ha)2	Method 2	Product 3	Rate (mL or g/ha)3	Method 3	Adj	rate %
1	Mateno Complete	1000	(IBS)								
2	Avadex Xtra	2400	(IBS)	Mateno Complete	1000	(IBS)					
3	Avadex Xtra	2400	(IBS)	Mateno Complete	1000	(EPE)					
4	Avadex Xtra	3200	(IBS)								
5	Avadex Xtra	3200	(IBS)	Sakura	118	(IBS)					
6	Avadex Xtra	2400	(IBS)	Sakura	118	(IBS)	TriflurX	2000	(IBS)		
7	Avadex Xtra	3200	(IBS)	StompXtra	2250	(IBS)					
8	Avadex Xtra	2400	(IBS)	TriflurX	2000	(IBS)					
9	Avadex Xtra	2400	(IBS)	Luximax	500	(IBS)					
10	Luximax	500	(IBS)								
11	TriflurX	2000	(IBS)								
12	TriflurX	2000	(IBS)	Boxer Gold	2500	(IBS)					
13	Sakura	118	(IBS)								
14	Stomp 330	3100	(IBS)								
15	Countdown	2500	(IBS)	TriflurX	1500	(IBS)					
16	Achieve	500	(PE)							Supercharge® Elite	1.00%
17	Axial	200	(PE)							AGIDOR	0.50%
18	Clethodim	500	(PE)							Uptake	0.25%
19	AtlantisOD	330	(PE)							BS1000	0.25%
20	Factor	180	(PE)							Supercharge® Elite	1.00%
21	Mataven 90	2500	(PE)								
22	Rexade	100	(PE)							BS1000	0.25%
23	Topic	125	(PE)							AGIDOR	0.50%
24	UTC										

Table 1. Application records

IBS	**Date applied**	23/06/2021	**Temp**	**Wind vel.**	**Wind dir.**	**Humidity**	Comments
	Start time	2.30pm	16.9	10-13k	N	63.0%	
	Finish Time	3.36pm	**Δt**	4.8	**% Cloud**	80%	
	Water rate	100	**Nozzle**	Aixr015	**Pressure**	3	
	Equipment	HB	**Speed**	7			
EPE	**Date applied**	26/07/2021	**Temp**	**Wind vel.**	**Wind Dir.**	**Humidity**	Comments
	Start time	16:50	16	2-3k	NW	62.8%	Weeds at 2-5 leaf, most at 3 leaf. Split germination (surface seed and buried seed)
	Finish Time	17:00	**Δt**	3.9	**% Cloud**	0%	
	Water rate	100	**Nozzle**	Aixr015	**Pressure**	3	
	Equipment	HB	**Speed**	7			
PE	**Date applied**	4/08/2021	**Temp**	**Wind vel.**	**Wind Dir.**	**Humidity**	Comments
	Start time	8:45	10.3			68.8%	Wild oats early tillering, some frosty mornings
	Finish Time		**Δt**	2.7	**% Cloud**	85-90%	
	Water rate	100	**Nozzle**	Aixr015	**Pressure**	3	
	Equipment	HB	**Speed**	7			

Table 3. Product names, herbicide groups and active ingredients.

Registered Name	Group	Active
Achieve WG	A	400 g/kg tralkoxydim
Atlantis® OD	B	30 g/L mesosulfuron-methyl
Avadex® Xtra	E	500 g/l triallate
Axial	A	100 g/l pinoxaden, 25 g/l cloquintocet-mexyl
Boxer Gold®	J K	800 g/l prosulfocarb, 120 g/l S-Metolachlor
Countdown®	J	800 g/l prosulfocarb
Factor®	A	250 g/l butroxydim
Luximax®	T	750 g/l cinmethylin
Mateno® Complete		400 g/L aclonifen 66 g/L diflufenican 100 g/L pyroxasulfone
Oat Master (Mataven)	Z	90 g/l flamprop-m-methyl
Rexade®	B I	150g/kg pyroxsulam 50 g/kg halauxifen
Platinum	A	240 g/l clethodim
Sakura®	K	850 g/kg pyroxasulfone
Stomp® 330ec	D	330 g/l pendimethalin
Topik	A	240 g/l clodinafop-propargyl 60 g/l cloquintocetmexyl
TriflurX®	D	480 g/l trifluralin

HERBICIDE RESISTANCE TEST

Ben Obrien (Grain Orana Alliance)

Wild Oats [redacted]

Plant Science Consulting P/L
22 Linley Avenue
Prospect SA 5082
T: 0400 66 44 60
info@plantscienceconsulting.com.au
www.plantscienceconsulting.com.au

09/05/2022

SUMMARY: A Wild Oats sample exhibited strong resistance to Axial 200ml/ha (wild oat rate) and Achieve, intermediate resistance to Topik 210ml/ha and Atlantis, weak resistance to Verdict and Mataven, and no resistance to Clethodim 500ml/ha, Clethodim 500ml/ha + Factor 180g/ha, Factor 180g/ha, Avadex, Intervix, and Trifluralin 1.5 L/ha.

Table 1: Results as determined by resistance testing 3 weeks after treatment. Data recorded as % survival (% of plants surviving) as compared to untreated plants. 100% refers to all plants surviving and 0% refers to death. Data is the mean of 2 replicate pots per herbicide rate. Included in the test was a susceptible (S) biotype and resistant biotypes. Data for the S and R biotypes is not shown.

Herbicide	**Herbicide Group**	**Paddock Sample** Oakbend	
		Survival	Rating
Axial 200ml/ha + 0.5% Adigor	Group 1 - Den	80	RRR
Achieve 500g/ha + 1% Supercharge	Group 1 - Dims	80	RRR
Clethodim 500ml/ha + 1% Hasten	Group 1 - Dims	0	S
Clethodim 500ml/ha + Factor 180g/ha + 1% Hasten	Group 1 - Dims	0	S
Factor 180g/ha + 1% Supercharge	Group 1 - Dims	0	S
Topik 210ml/ha + 0.5% Adigor	Group 1 - Fops	65	RR
Verdict 100ml/ha + 1% Hasten	Group 1 - Fops	40	R
Avadex 1.6L/ha	Group 15 - Group J	0	S
Intervix 750ml/ha + 1% Hasten	Group 2 - Imidazolinones	0	S
Atlantis 330ml/ha + 1% Hasten	Group 2 - Sulfonylureas	20	RR
Trifluralin 1.5 L/ha	Group 3 - Group D- Dinitroanilines	0	S
Mataven 2L/ha	Group 0 - Group Z	30	R

Resistance-rating:	RRR- indicates plants tested have strong resistance	RR - indicates medium-level resistance	R-indicates low-level but detectable resistance	S- indicates no detection of resistance

RESULTS

The standard susceptible weed biotype was killed with all the herbicides and my standard resistant biotypes responded to the herbicides as expected confirming accurate herbicide performance (Table 1). There are two