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AgGrow
AGRONOMY + RESEARCH



ARCADE® HERBICIDE EVALUATION TRIAL

Rankins Springs, 2016

INDEPENDENT AGRONOMY ADVICE + CUTTING EDGE RESEARCH

Arcade® in wheat in a disc seeding system

KEY POINTS

- Annual ryegrass (*Lolium rigidum*) remains one of the major weeds of the western cropping system.
- There are limited pre-emergent options for controlling annual ryegrass when sowing with a disc seeder.
- Due to the lack of soil disturbance, use of pre-emergent herbicides in disc seeding systems can have major adverse effects on crop growth and development and weed control.
- Arcade® is a pre-emergent herbicide from Syngenta containing 800 g/L Prosulfocarb that provides control of annual Ryegrass in wheat. It is an alternative and much safer option than Boxer Gold® when used on lighter soils or in a disc seeding system.

BACKGROUND

In recent years, there has been a major shift towards disc seeders in the western cropping region. This has been brought about through the need to preserve our fragile cropping soils, through the implementation of zero till and stubble retention.

Annual Ryegrass remains one of the key weeds that is hard to control in a no-till farming system. There are currently no pre-emergent herbicides registered to be applied incorporated by sowing (IBS) under a disc seeding system for the adequate control of annual ryegrass. This is a pitfall in this system and has turned farmers away from utilising disc seeders in their operations as ryegrass often gets the upper hand on them.

TRIAL DETAILS

A replicated field trial was set up on the 5th of May, 2016 on Michael Pfitzner's farm "Hill End" between Griffith and Rankins Springs. The paddock was a vetch hay stubble being sown to wheat.

The aim of the trial was to evaluate the efficacy and crop safety of Arcade® when incorporated at sowing by a disc seeder and when applied early post emergent, in comparison to other common pre-emergent herbicides.

The trial consisted of 9 treatments, including a nil treatment (Table 1). The IBS treatments were applied with a knockdown of 2 L/ha of WeedMaster Argo. All treatments, including the nil treatment, received the knockdown application. Treatments were replicated three times, and the plots were 12m x 50m.

The IBS treatments were applied on the 5th May, 2016, just prior to sowing Lancer wheat. The wheat was sown at 30 kg/ha, with 70 kg/ha of MAP using an NDF SA650 disc seeder.

The EPE treatments were applied on the 25th May, 2016 at 11am with 80 L/ha water and with XR110015 nozzles. Environmental conditions at time of spraying were 16°C temperature, 54% humidity, and 19 km/hr wind.

The crop was at the Z21 stage when sprayed and the ryegrass ranged from 1 leaf up to 2 tillers, with 2 leaf ryegrass the average.

Observations and assessments on crop safety and herbicide efficacy were carried out throughout the trial. These included crop establishment (plant row count) 21 DAS (days after sowing), a visual assessment of the crop phytotoxicity and biomass reduction at approximately 35 and 56 days after

treatment (DAT) and an NDVI assessment at 28 and 56 DAT.

A summary of these measurements are shown in figures 2 to 8 in the results section. A visual representation of the treatments is also shown from figures 3 to 5.

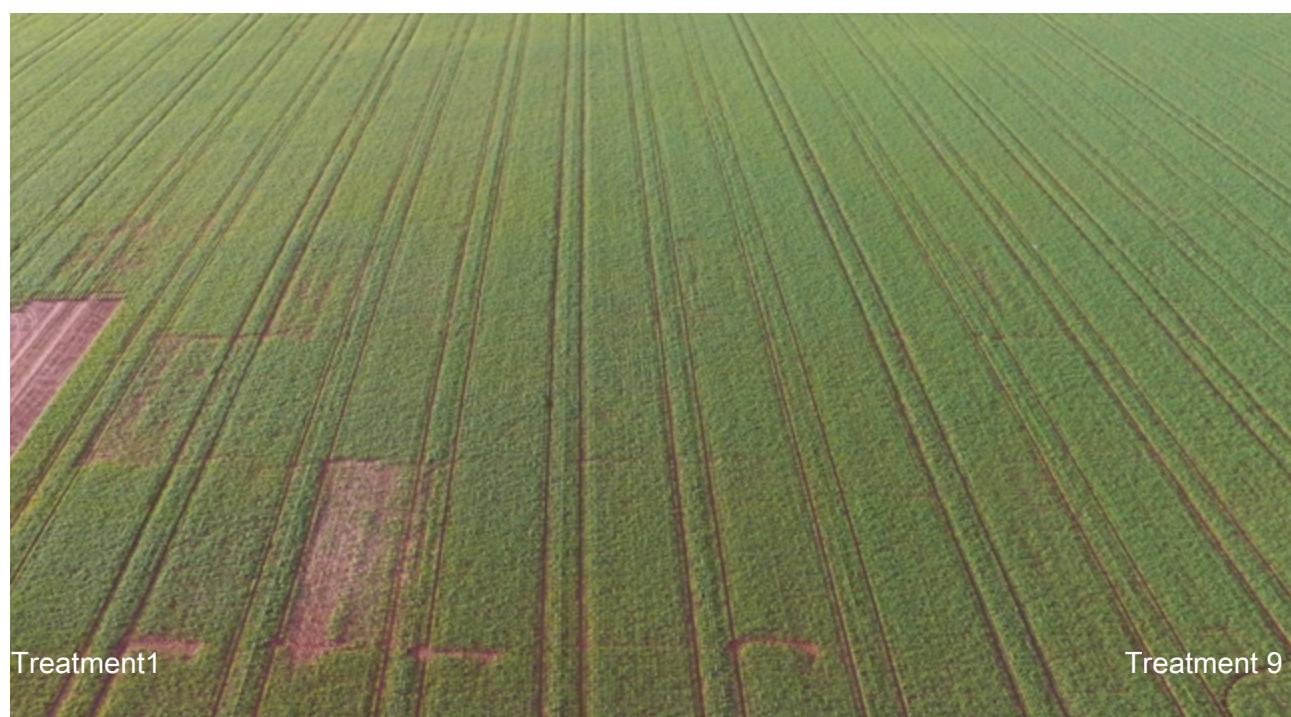
Table 1: Treatment and product list for the Arcade® herbicide demonstration

Treatment Number	Herbicide	Timing	Rate (L or g)	Active
1	Untreated	-	-	-
2	Boxer Gold®	IBS	1.5 L	Prosulfocarb 800 g/L S-Metolachlor 120 g/L
3	Boxer Gold®	IBS	2.5 L	Prosulfocarb 800 g/L S-Metolachlor 120 g/L
4	Arcade®	IBS	2.5 L	Prosulfocarb 800 g/L
5	Arcade®	IBS	3.0 L	Prosulfocarb 800 g/L
6	Sakura®	IBS	118 g	Pyroxasulfone 850 g/kg
7	Boxer Gold®	EPE	1.5 L	Prosulfocarb 800 g/L S-Metolachlor 120 g/L
8	Boxer Gold®	EPE	2.5 L	Prosulfocarb 800 g/L S-Metolachlor 120 g/L
9	* Arcade®	EPE	2.5 L	Prosulfocarb 800 g/L

Note: all treatments received 2L/ha Weedmaster Argo

*Arcade is not currently registered for EPE applications

Figure 1: Aerial photograph of the trial site, taken July 2016 (treatment 1 far left).



RESULTS AND DISCUSSION

Growing conditions in 2016 were very wet and mild, with rainfall from May to September one of the wettest on record. Growing season rainfall was well above average with 525mm recorded at the site. Given the season, waterlogging had an impact on the trial.

Statistical analysis was carried out of the trial for emergence, crop phyto-toxicity, vigour reduction, NDVI and grain yield.

Effect on Emergence:

The average plant population of the trial was 76 plants/m², with plant counts ranging from 46 to 91 plants/m², (Figure 2).

Emergence of all treatments varied slightly, with the exception of the 2.5 L/ha Boxer Gold® IBS

treatment, where emergence was approximately 50% lower than all other treatments, with 46 plants/m², (Figure 3).

The only other treatments to reduce emergence, in comparison to the untreated control, were the Boxer Gold® 1.5 L/ha IBS and Sakura® 118 g/ha IBS treatments, which reduced emergence to 70 plants/m² and 72 plants/m² respectively, (Figure 4).

Treatments applied EPE had no effect on emergence, neither did Arcade® Applied IBS with emergence ranging from 77 plants/m² to 85 plants/m², (Figure 5).

Figure 2: Crop emergence - average plant count (plants/m²) for each treatment taken 25th May, 2016.

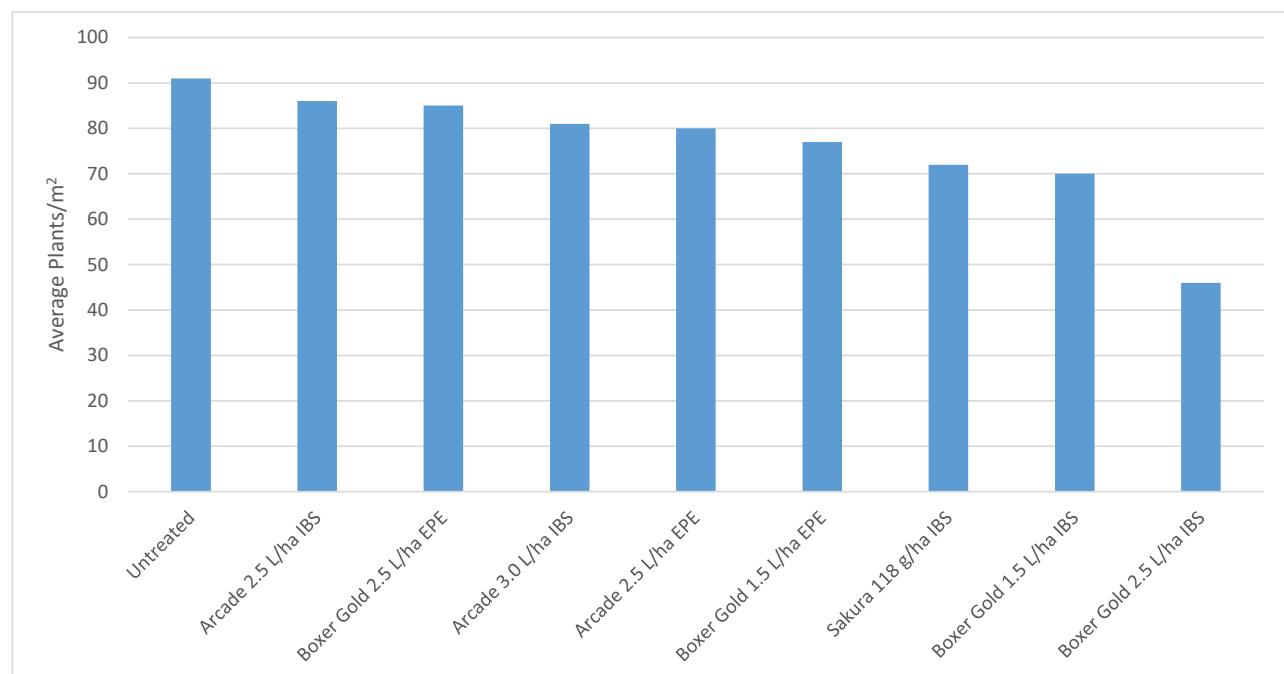


Figure 3: Crop emergence - Boxer Gold® 2.5 L/ha IBS vs Untreated plot in background (left) and Boxer Gold® 2.5 L/ha IBS vs Boxer Gold® 1.5 L/ha IBS in background (right), May 2016.



Figure 4: Crop emergence - Arcade® 2.5 L/ha IBS (left) and Sakura® 118 g/ha IBS (right), May 2016.



Figure 5: Crop emergence - Arcade® 2.5 L/ha EPE (left) and Boxer Gold® 2.5 L/ha EPE (right), May 2016.



Biomass Reduction:

Two measurements were taken in this trial. These were percent reduction in biomass at 28 DAS, and percent phyto-toxicity at 37 and 61 DAS, as shown in figures 6 and 7.

Biomass reduction was a measure of the reduction in biomass compared to the untreated control. The percent phyto-toxicity included the health and colour of the plants as well as any leaf spotting or blotching.

The treatment which had the largest effect on crop vigour was 2.5 L/ha of Boxer Gold® IBS, (Figure 6). This treatment reduced crop vigour by 25% for both the 28 and 56DAA assessments.

118g IBS Sakura® and Boxer Gold® 1.5L IBS treatments both reduced crop vigour by 15 & 10% respectively 28DAA, however the Sakura® treatment only had a 10% vigour reduction at 56DAA compared to 17% with the 1.5L Boxer Gold®.

Arcade® was the safest treatment IBS for both vigour reduction and phyto-toxicity. Both 2.5L and 3 L/ha had a vigour reduction of 10% and crop phyto-toxicity of 5% 28DAA, (figure 7).

The effects were more pronounced at 56 DAA with the 3L treatment, having a 12.5% vigour reduction at

56DAA compared to 5% in the 2.5L treatment, crop phyto-toxicity also followed the same trend.

The EPE treatments had little effect on either vigour or crop phyto-toxicity.

NDVI:

Crop vigour was also measured late tillering and at milk development, which was later than ideal due to the seasonal conditions and paddock accessibility, using a hand held NDVI.

NDVI values late tillering ranged from 0.32 up to 0.49. The Boxer Gold® 2.5 L/ha IBS treatment had the lowest NDVI value of 0.32 at tillering, which was significantly lower than all other treatments.

The later NDVI showed no difference in crop vigour between any of the herbicide treatments.

Figure 6: Crop Vigour Reduction (%) for each treatment taken 7th June and 22nd June, 2016

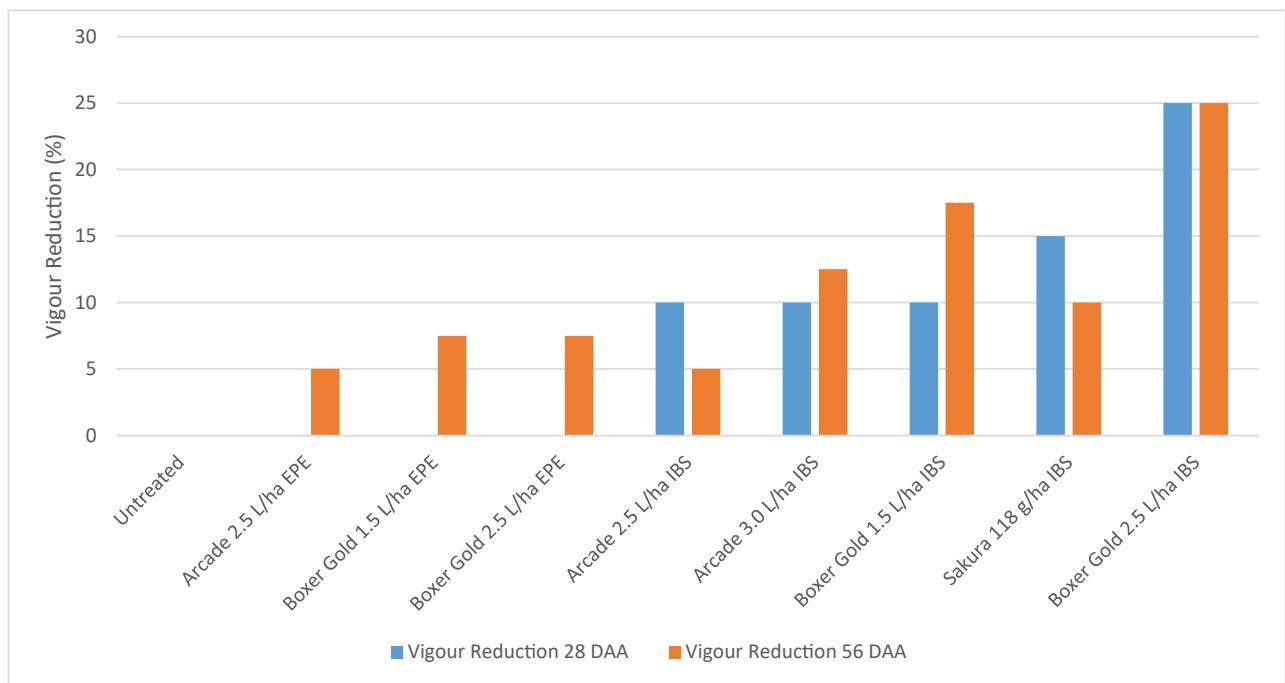
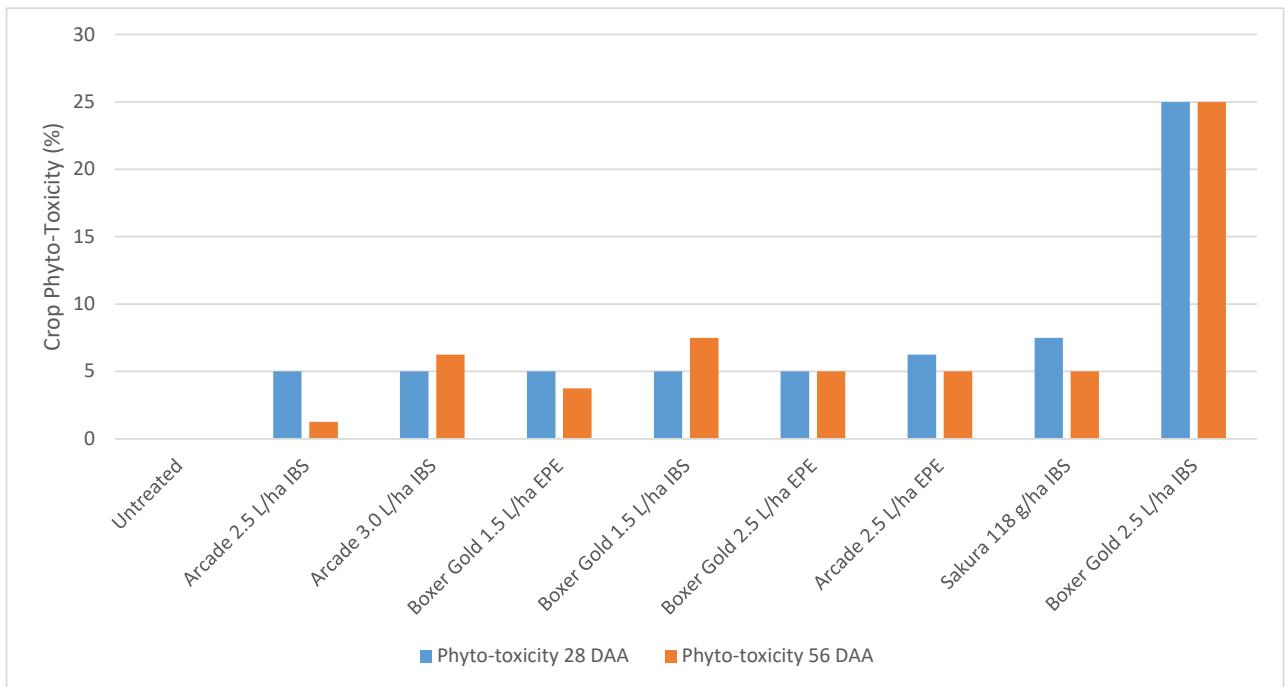


Figure 7: Crop Phyto-toxicity (%) for each treatment taken 7th June and 22nd June, 2016



Grain Yield:

This trial was taken through to harvest. Strips were harvested from each plot on the 30th November 2016, to ascertain the effect of each treatment on grain yield. The average grain yield of the trial was 3.42 t/ha, with yields ranging from 3.01 t/ha up to 4.0 t/ha, (figure 8).

Given the season, with waterlogging having an impact on some plots in the trial, results showed no significant difference in grain yield between the treatments.

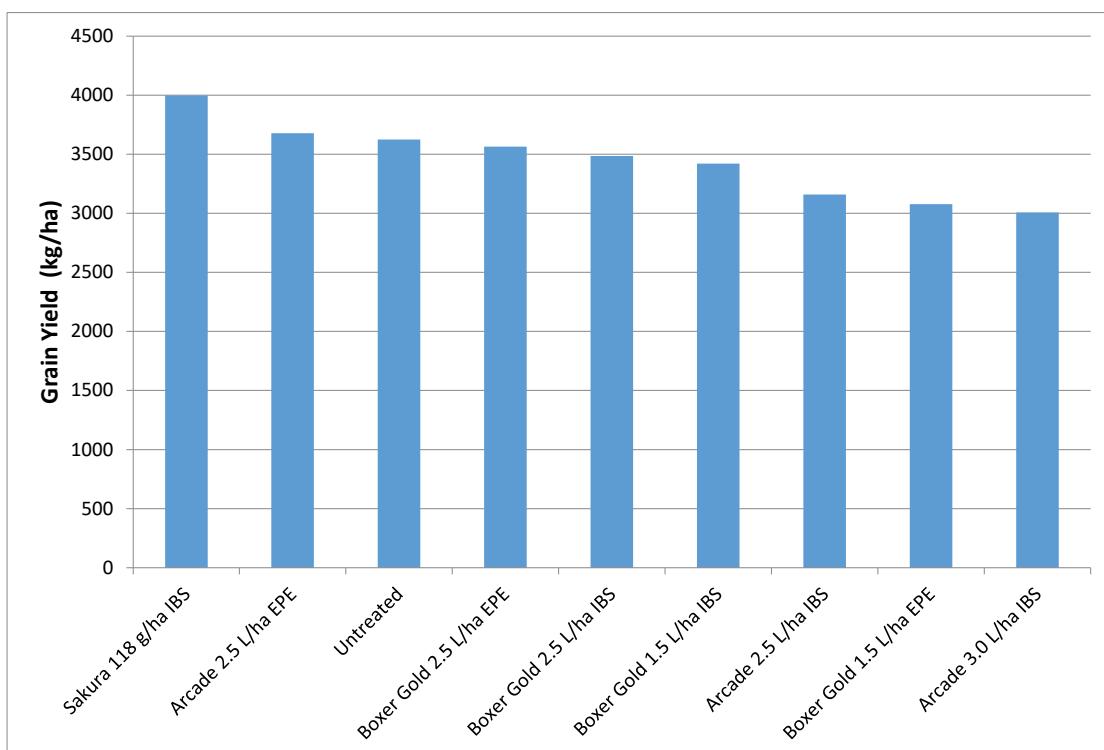
Mean grain yields for both the Sakura® and Arcade®

EPE treatments yielded higher than the untreated plots.

The Sakura® and Boxer Gold® 2.5L IBS treatments both had reduced tiller counts and decreased vigour in early assessments, however average yields indicate they have compensated for this late in the season.

Crop injury levels were higher in the 2.5L Boxer Gold® EPE treatment than the 1.5L EPE treatment. Despite this, the 2.5L treatment yielded higher than the 1.5L treatment.

Figure 8: Grain yield of each treatment, harvested 30th November 2016.



Summary:

Arcade® herbicide proved safer on the crop when used in a disc seeding system compared to Sakura® or Boxer Gold® when incorporated by sowing (IBS).

Arcade® was also the safest treatment on the crop when applied early post emergent (EPE), having no effect on crop vigour.

2.5 L/ha of Boxer Gold® IBS resulted in an unacceptable emergence, and had severe effects

on crop vigour. This treatment would not be recommended for use in disc seeding situations.

1.5 L/ha Boxer Gold® EPE treatment provided adequate crop safety, similar to the Arcade® treatments.

Figure 6: Aerial photograph of the trial site, taken before harvest 2016 (treatment 1 far left).



ACKNOWLEDGEMENTS

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