

Annual ryegrass control with new pre-emergent herbicides and mixtures

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Key findings

- Luximax and Overwatch improved annual ryegrass control (10-26 plants/m²) compared to existing pre-emergent herbicides (45 -158 plants/m²).
- Annual ryegrass (heads/m²) were reduced when Luximax and Overwatch were applied standalone or in mixtures.
- Post-seeding conditions at Hart were dry with well below average rainfall, favouring the more soluble pre-emergent products, Luximax and Overwatch.
- No yield penalties were observed for Scepter wheat across all pre-emergent herbicides at Hart in 2020.

Why do the trial?

Herbicide resistance in grass weeds is a major constraint to crop production. Due to resistance to post-emergent herbicides, the main control tactics used in wheat for annual ryegrass control are now pre-emergent herbicides. It is important that pre-emergent herbicides are used as effectively as possible. New mode of action herbicides are being developed for annual ryegrass; however, there is limited information about the efficacy of mixtures of these new herbicides with existing herbicides to obtain higher levels of annual ryegrass control in wheat.

This trial aims to evaluate the effect of new pre-emergent herbicides Luximax (active ingredient, cinmethylin) and Overwatch (active ingredient, bixlozone) alone or in mixtures with existing pre-emergent herbicides on annual ryegrass control.

How was it done?

Plot size	1.75 m x 10.0 m	Fertiliser	Seeding: DAP (18:20) + 1% Zn + Impact @ 80 kg/ha
Seeding date	May 20, 2020		Easy N (42.5:0) 80 L/ha on June 18, 2020
Location	Hart, SA		Easy N (42.5:0) 50 L/ha on August 5, 2020
Harvest date	December 3, 2020		

Ryegrass seed at 5 kg/ha was broadcast on May 19 and was lightly incorporated. Pre-emergent herbicides were applied IBS on May 20.

Scepter wheat was sown after IBS applications were applied with a standard knife-point press wheel system, 22.5 cm (9") row spacing. Herbicides and rates used are listed in Table 1.

Table 1. Pre-emergent herbicide treatments applied for the management of ryegrass in wheat at Hart in 2020.

Herbicide treatment	Product rate (/ha)
1. Nil	-
2. Arcade	3 L
3. Avadex Xtra	2 L
4. Sakura	118 g
5. Sakura Flow	210 mL
6. Sakura + Avadex Xtra	118 g + 2 L
7. Arcade + TriflurX	3 L + 1.5 L
8. Luximax	500 mL
9. Luximax + Sakura	500 mL + 118 g
10. Luximax + Avadex Xtra	500 mL + 2 L
11. Luximax + Arcade	500 mL + 3 L
12. Overwatch	1.25 L
13. Overwatch +Sakura	1.25 L + 118 g
14. Overwatch + Avadex Xtra	1.25 L + 2 L
15. Overwatch + Arcade	1.25 L + 3 L

Results and discussion

Annual ryegrass control

Excellent rains occurred in early autumn leading to a moist soil profile at sowing (Figure 1). However, rainfall during May and June was below average. This likely influenced the ability of Sakura to be activated and control annual ryegrass.

There was no significant effect of herbicide treatment on crop emergence in 2020 (Table 2).

Most pre-emergent herbicides are safe on wheat when used with a knife-point press wheel seeding configuration. However, damage can occur with some pre-emergent herbicides if the furrow wall collapses or herbicide-treated soil is moved into the crop row.

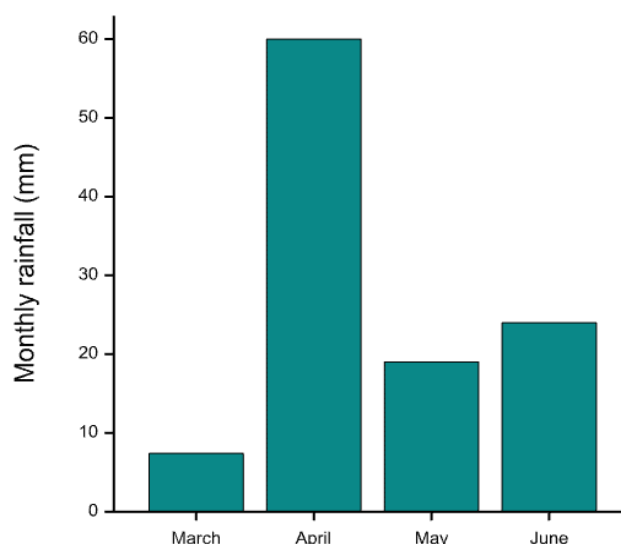


Figure 1. Monthly rainfall at Hart in 2020.

Table 2. The effect of various pre-emergent herbicides on wheat establishment, annual ryegrass plant numbers (4 weeks after sowing) and annual ryegrass head numbers at Hart in 2020.

	Herbicide treatment	Crop establishment (plants m ²)	Annual ryegrass (plants m ²)	Annual ryegrass (heads m ²)
1.	Nil	164	183	215
2.	Arcade	174	123	158
3.	Avadex Xtra	165	120	154
4.	Sakura	158	85	70
5.	Sakura Flow	168	70	45
6.	Sakura + Avadex Xtra	165	48	49
7.	Arcade + TriflurX	174	82	135
8.	Luximax	144	10	28
9.	Luximax + Sakura	160	11	17
10.	Luximax + Avadex Xtra	145	11	21
11.	Luximax + Arcade	161	16	26
12.	Overwatch	188	26	68
13.	Overwatch +Sakura	156	20	28
14.	Overwatch + Avadex Xtra	171	20	43
15.	Overwatch + Arcade	158	12	48

Shaded values indicate best performing herbicides for annual ryegrass control.

Both Luximax and Overwatch provided good control of annual ryegrass (10 – 26 plants m²). Weed control was improved with these, compared to existing pre-emergent herbicides with annual ryegrass numbers between 45 -158 plants/m². The rate of Avadex Xtra (2 L/ha) used in this trial is too low to control annual ryegrass alone.

Luximax is the most soluble of the herbicides used and would have been least affected by the relatively dry conditions after sowing. Overwatch is a little more soluble than both Sakura or Arcade and this would have assisted its performance in the drier conditions after sowing. While pre-emergent herbicides have generally worked well in 2020, situations with low rainfall after sowing, such as at Hart, have seen reduced performance of Sakura, while Overwatch and Luximax have performed well.

Overwatch and Luximax applied alone or in mixtures reduced the number of annual ryegrass heads when compared to existing pre-emergent herbicides, Arcade and Avadex Xtra. Sakura, while less effective at controlling annual ryegrass emergence was effective at reducing weed seed heads. The persistence of Sakura allows it to disrupt growth of established annual ryegrass once the herbicide is activated by sufficient rainfall.

Grain yield

Overwatch often produces crop effect on wheat as bleaching of young leaves. Crops grow out of the effect and in our trials there has been no effect on crop yield to date. Mixtures of Group K herbicides with Luximax can result in crop yield loss and are not recommended. The mixture with Sakura used here can be particularly problematic. While the crop establishes normally, growth is affected leading to yield loss. At a trial at Inverleigh in Victoria in 2019 there was a 1 t/ha reduction in wheat yield for Luximax + Sakura.

There was no yield penalty observed for Scepter wheat across all pre-emergent herbicides at Hart in 2020.

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