

Demonstrating and validating the implementation of integrated weed management strategies to control barley grass in the low rainfall zone farming systems

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Key messages

- Pre-sow knockdown still shows promise for barley grass control on this farm
- Seeding rate did not impact barley grass numbers at this site in 2020, but is a proven technique to reduce weed numbers and seed set so should still be considered for integrated weed management
- Trifluralin and pyroxasulfone (Sakura) both worked well to control barley grass at this site in 2020

Background

Over the last few years there have been increases in barley grass infestations in cereal crops in southern Australia. Evolution of herbicide resistance to group A and B herbicides is contributing to the increase in barley grass in cropping areas of southern Australia. There is evidence to show that barley grass from cropping areas has developed longer seed dormancy than those from non-cropping areas. Along with these two main selections, barley grass possesses several biological traits that make it difficult for the growers to manage it in the low rainfall zone. This includes early onset of seed production, which reduces effectiveness of crop-topping or spray-topping in pastures. This species has also been shown (GRDC project UA00156) to shed its seeds well before crop

harvest. Therefore, harvest weed seed control tactics are likely to have a much lower effect on barley grass management as compared to weeds such as ryegrass which has a much higher seed retention. Barley grass management may also be a little more challenging in the low rainfall zone because the growing seasons tend to be more variable in terms of rainfall, which can affect the performance of the pre-emergence herbicides. Furthermore, many growers in these areas tend to have a lower threshold for expenditure on management tactics. (Adapted from Barley Grass GRDC project submission, Gill 2019)

Aim

The proposed project plans to undertake coordinated development research with target farming systems groups

to demonstrate tactics that can be reliably used to improve management of barley grass. These tactics will include herbicide options within relevant rotations in the target area. (Sourced from Barley Grass GRDC project submission, Gill 2019). In 2020 the project demonstrated two seeding rates and two pre-emergent herbicide strategies to determine if high inputs offered better barley grass control compared to grower standard practice.

Paddock Details

- **Location:** North Condobolin
- **Rainfall Condobolin Airport**
2020 Total: 670 mm (2019 144.2 mm)
2020 GSR (April-Oct): 364 mm (2019 62.8 mm)
- **Paddock history**
2019: Fallow
2018: Wheat

- **Soil type** Sandy loam

Trial Details 2020

- Variety: Lancer wheat
- Treatments: Pre-emergent herbicide 1.5 L/ha trifluralin vs 118 g Sakura. Paddock had a knockdown weed control of glyphosate and amine seven days prior to sowing.
- Sowing rate: GSP 27 kg/ha, double seed rate 48 kg/ha.
- Sowing date: 27/4/20 into good moisture.
- Fertiliser: 60 kg/ha MAP, none in crop.
- Harvest date: 18/11/20.

Method and Measurements

This demonstration was an on farm broadacre trial

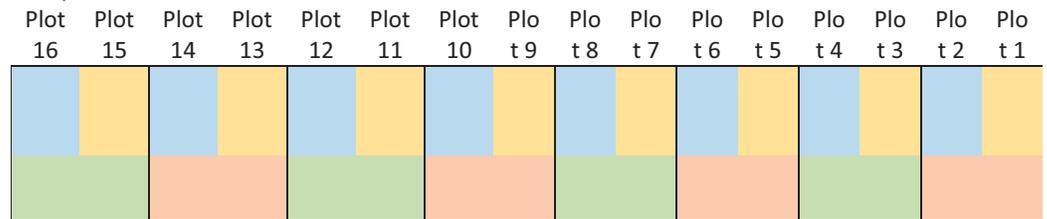
with four replicates, pre-emergent herbicides were applied immediately prior to sowing and were applied at a width of two sowing passes wide. The grower adjusted the seeding rate accordingly as they travelled up and down the paddock. Main measurements collected in 2020 were plant counts, barley grass weed counts, harvest cuts, grain quality and photographs.

Results

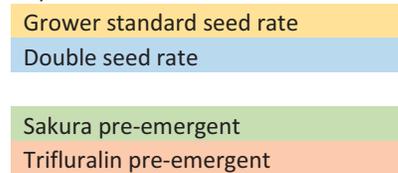
2020 was one of the best seasons on record for the Condobolin region, recording 670 mm of rain with over 350 mm falling during the growing season. However, there was a dry spring which increased screenings and possibly reduced some yields in the district.

In this trial increasing seeding rate did increase plant population (Table 1, Figure 2, Figure 3, Figure 4) with almost twice as many plants in the double seed rate compared to grower standard seed rate. However, this had no impact on barley grass numbers (data not shown). Possibly due to the dry spring yield was lower and screenings were higher in the double seeding rate compared to grower standard seed rate and high protein in

Trial plan:



Key:



all treatments indicates that the paddock may have run out of moisture (Table 2).

Pre-sowing knock down and pre-emergent herbicides controlled the majority of barley grass in the demonstration as only 5 barley grass plants were recorded at the time of plant counts in June, and

spring weed monitoring recorded 8 barley grass plants in total (data not shown).

Due to no difference in barley grass numbers between the herbicide and seed rate treatments at this site, the most economical option for barley grass control in this paddock was grower standard seed rate and trifluralin pre-emergent herbicide.

Table 1: Crop density counts (plants/m²) for seeding rate and herbicide treatments

Treatments	Plants/m ²
Double Seed Rate (48 kg/ha)	
Sakura	49
Trifluralin	50
Grower Standard (27 kg/ha)	
Sakura	24
Trifluralin	27

Table 1: Grain yield and quality for seeding rate and herbicide treatments

Treatments	Yield t/ha	Protein (%)	Screening %
Double Seed Rate (48 kg/ha)			
Sakura	3.7	17.8	11.6
Trifluralin	3.9	18.2	10.5
Grower Standard (27 kg/ha)			
Sakura	4.0	17.6	7.7
Trifluralin	3.9	17.8	9.2

Conclusions

- Pre-sow knockdown still shows promise for barley grass control on this farm.
- Seeding rate did not impact barley grass numbers at this site in 2020, but is a proven

technique to reduce weed numbers and seed set, so should still be considered for integrated weed management

- Trifluralin and pyroxasulfone (Sakura) both worked well to control barley grass



Figure 1. Sowing treatments 2/4/20



Figure 2. LHS double seed rate, RHS grower standard seed rate (11.6.20)



Figure 3. Grower standard seed rate (27 kg/ha)



Figure 4. Double seed rate (48 kg/ha)



Acknowledgements

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