Capturing barley grass seeds in broad acre paddocks

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Location
Condada: Matt Cook
Rainfall
Av. Annual: 324 mm
Av. GSR: 241 mm
2019 Total: 224 mm
2019 GSR: 209 mm
Paddock history
2019: Scepter wheat
2018: Emu Rock wheat
2017: Self-regenerating grass free medic pasture
Soil type
Red Sandy loam
Plot size
Paddock monitoring

Key messages

- **In 2019, approximately 40% of barley grass seeds had already dropped on the ground before the first swathing opportunity.**
- **Barley grass seed retention declines with every successive week and by crop maturity retained only 20% of its seed on the head.**
- **If growers are aiming to collect grass seed using harvest weed seed management strategies (chaff carts or windrows) they need to harvest grassy paddocks as early as possible to maximise weed seed collection.**

Why do the trial?

Barley grass continues to be a major grass weed in cereal cropping regions on the upper Eyre Peninsula (EP). Swathing a cereal crop involves cutting and collecting the cereal crop and weeds into windrows at 20 to 40% grain moisture and allowing it to dry. Having the weed seeds cut and in the windrow before the seed heads shatter and before tillers fall over (lodging), may allow greater weed seed collection when using a chaff cart or windrows. Swathing early then harvesting for weed seed collection needs further evaluation as it may provide farmers with another tool for integrated weed management, especially for barley grass that matures and sheds seed before crops ripen.

How was it done?

Crop and weeds were cut at 17 cm height (front cutting height) at four quadrats over the harvest period to assess barley grass seed retention. Crop and grass weeds were separated to measure weight and weed seed head length, number of barley grass seeds and calculate potential weed seed capture. Surface soil was also collected, and barley grass seeds were cleaned from the soil sample and weighed to calculate the weed seed which would have dropped before swathing or was below 17 cm in height.

What happened?

At Minnipa, on the upper EP, the 2019 growing season rainfall was decile 4 (below average). The season had an early break in late April and ideal May seeding conditions, with just below average rainfall for winter. However, spring was drier than normal, but 42 mm of rain in late September enabled crops to maximise grain fill, resulting in above average grain yields.

Swathing wheat at Heddle's did not occur in 2019 due to low grass weed numbers. However, data for barley grass seed drop in crop before harvest was still captured by monitoring grass patches in a cereal crop weekly over a six week period from the beginning of harvest (1 October) at Cook's (Table 1).

Plant cuts and soils were collected using 50*50 cm quadrants, with four samples collected per timing, to assess the amount of barley grass which could have been captured if early swathing of a cereal crop had occurred.

The results obtained in 2019 are largely consistent with assessments in previous years (Figure 1).

Table 1. Wheat plants and barley grass seeds/m² from the beginning of harvest 2019 at Cook's.

Date	Grain moisture (%)	Wheat (plants/m²)	Barley grass seed heads/m² above 17 cm	Barley grass seeds/m² above 17 cm	Barley grass seed heads/m² below 17 cm	Total Barley grass seeds/m² below 17 cm	Barley grass seeds/m² for weed seed collection* (%)
1 Oct	25.5	145	77	1621	77	1138	59
10 Oct	-	119	60	1466	17	735	67
18 Oct	29.2	99	85	631	28	2041	24
25 Oct	25.7	117	34	461	5	584	44
1 Nov	15.9	91	218	1390	36	3862	26
7 Nov	10.8	125	47	368	13	1399	21

**(Barley grass seeds/m² above 17 cm)/(Barley grass seeds/m² above 17 cm + Total Barley grass seeds/m² below 17 cm) multiplied by 100*

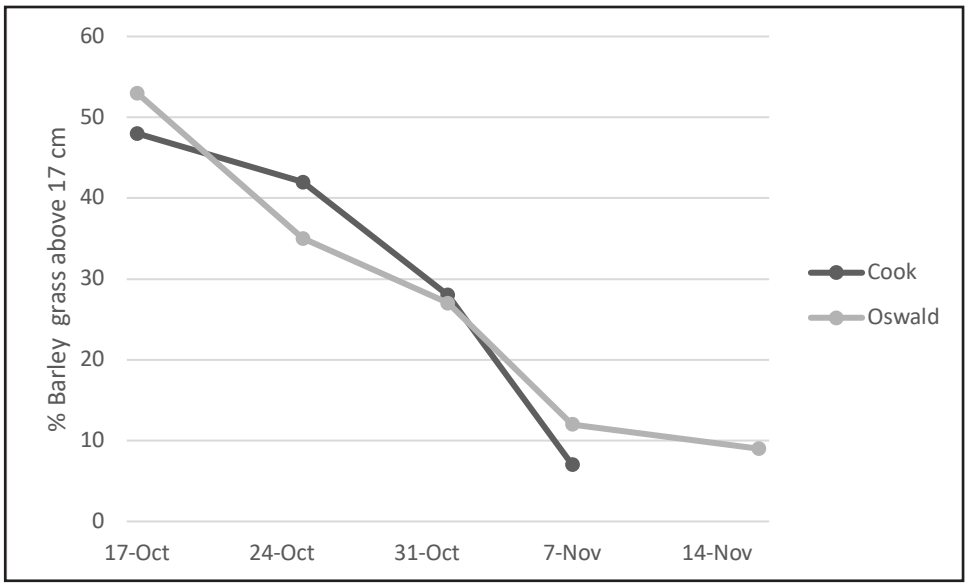

Figure 1. Barley grass seed/m² for potential harvest weed seed capture above 15 cm at harvest 2017 at Cook's and Oswald's.

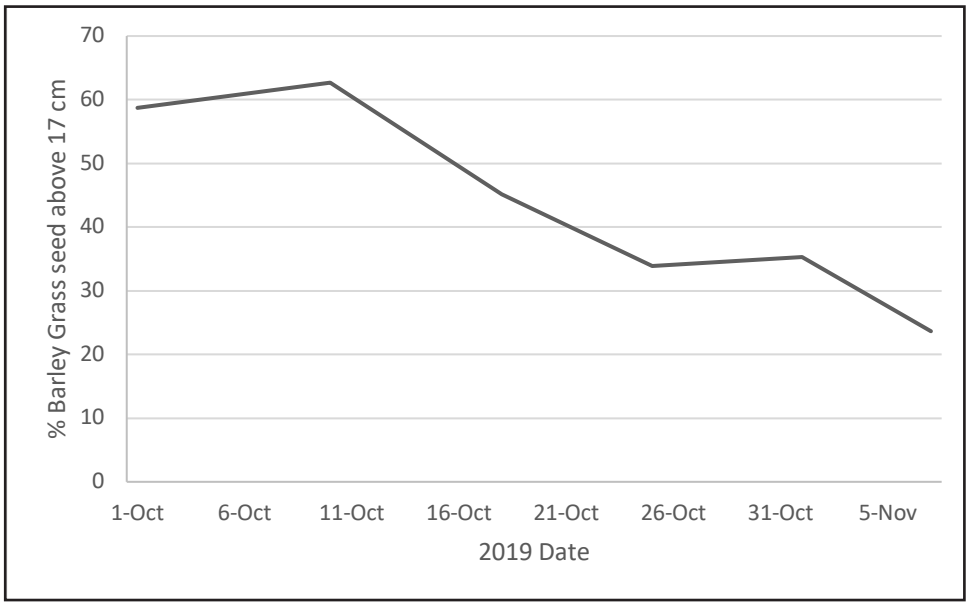

Figure 2. Barley grass seeds (%) for potential harvest weed seed capture above 17 cm at harvest 2019 at Cook's.

In the 2016 season, 65% of barley grass seed had already dropped onto the ground by 27 October in Heddle's swathed paddock. In 2017 the amount of barley grass seed which could potentially be collected using swathing of the crop was 50% when grain moisture was above 25% (Figure 1). In 2017 harvest generally started in the Minnipa area in late October/early November, and only 30-40% of barley grass seed was still in the heads or above 15 cm during this time.

At harvest 2019, the first opportunity for swathing a cereal crop was early October with the grain moisture being around 25%. At this stage, the opportunity to collect barley grass seed heads into the swathing row was approximately 60% (i.e. 40% had already shed). Over the next three weeks the amount of barley grass seed which could be collected dropped back to 35%. By 5 November when the paddock was harvested the potential to collect barley grass seed heads into the harvester at 17 cm cutting height was 21%.

What does this mean?

The grass weed seed collection data showed the opportunity to collect barley grass weed seed is greater earlier in the season. Swathing a cereal crop may be an option to increase barley grass weed seed capture rather than waiting until full crop maturity. The barley grass seed retention will decline with every successive week and likely to be between 10-20% at full crop maturity. If growers are aiming to collect grass seed using harvest weed seed management strategies (chaff carts or windrows), they need to harvest grassy paddocks as early as possible to maximise the weed seed collection.

This is the final season of this research to increase knowledge of barley grass weed seed management in current farming systems.

Acknowledgements

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