Growing Wheat on Faba Bean Stubble Compared to Barley Stubble

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Key Messages

- Wheat on faba bean stubble yielded significantly higher than wheat on barley stubble.
- Faba beans are another potential break crop option for growers in the northern/central ag region.

Aim

This trial aims to investigate the potential yield benefits of growing cereals on a faba bean stubble compared to a cereal stubble.

Background

In the northern and central agricultural regions, the most common break crops in a cereal-dominated cropping system are lupins, canola, or both. However, there is potential for other pulse crops, such as faba beans, to become a part of the rotation strategy. Faba beans are a beneficial break crop compared to canola for a few reasons; they fix nitrogen into the system, they are a break from root lesion nematode and are registered for higher rates of butroxydim (DPIRD, 2021). In some soil types, faba beans may be used where lupins are not performing as well, for instance in alkaline soils or heavier clay loam soil types (DPIRD, 2021). This trial involved farmer scale strips of faba bean in 2022 next to barley, with wheat seeded over the top in 2023. The faba bean strips yielded an average of 1.7 t/ha and the barley yielded an average of 4.8 t/ha in 2022. This demonstration is part of the GRDC investment, Closing the Economic Yield Gap of Grain Legumes in WA.

Trial Details

Trial Location	KL Carter & Co., Jibberding
Plot size	37m x 800m
Soil type	Red loam, pH 7.4 (0-10cm)
Paddock rotation	2023 wheat, 2022 barley/faba bean, 2021 wheat
Sowing date	09/06/2023
Sowing rate	50 kg/ha Scepter wheat and Tomahawk CL Plus wheat
Fertiliser	01/06/2023 – 50 L/ha UAN, 80 kg/ha NPK, 28/07/2023 - 70 L/ha Flexi-N.
Herbicides, Insecticides & Fungicides	09/06/2023 – 1.8 L/ha trifluralin, 0.1 L/ha diuron, 0.1 L/ha clopyralid. 04/07/2023 – 2 L/ha 800 g/L prosulfocarb + 120 g/L s-metolachlor, 27/07/2023 – 0.8 L/ha 250 g/L bromoxynil + 25 g/L diflufenican, 0.4 L/ha MCPA
Harvest Date	27/11/2023

Results

Table 1. Starting Gravimetric Soil moisture from the demonstration of wheat on faba bean stubble and barley stubble taken on 2 May 2023.

Depth	Scepter wheat on barley stubble	Tomahawk CL Plus wheat on faba bean stubble
0cm - 10cm	3.90%	3.20%
10cm- 20cm	6%	4.06%
20cm - 30cm	5.60%	5.20%

Table 2. Starting Nitrogen (mg/kg) from the demonstration of wheat on faba bean stubble and barley stubble.

Treatment	0 – 10 cm		10 – 20 cm		20 – 30 cm	
	Ammonium Nitrogen	Nitrate Nitrogen	Ammonium Nitrogen	Nitrate Nitrogen	Ammonium Nitrogen	Nitrate Nitrogen
Scepter wheat on barley stubble	5	5	3	3	1	1
Tomahawk CL Plus wheat on faba bean stubble	11	9	1	4	2	4

Table 3. Harvest results, average yield (t/ha) from the demonstration of wheat on faba bean stubble and barley stubble.

Treatment	Average Yield (t/ha)
Scepter wheat on barley stubble	0.76
Tomahawk CL Plus wheat on faba bean stubble	0.93

The difference in average yield between the two treatments was significant ($p < 0.05$).

Comments

There are two well-known benefits of growing crops on legume stubble; serving as a break crop and their ability to fix nitrogen which reduces nitrogen fertiliser costs for the current and subsequent crop rotation. This practice has been researched thoroughly, however, in the Liebe Group region, is most often focused on lupins. This demonstration shows that faba bean stubble is another potential break crop option in a cropping system.

'CL Plus' varieties have two resistance genes for imidazolinone (IMI) herbicides, which are not known to reduce growth or cost yield, however, IMI-tolerant wheats have lagged behind the highest yield wheat varieties in the past (DPIRD, 2023). Tomahawk CL Plus, released by Australian Grains Technology in 2023, is closely related to Scepter and yielded very similarly at the Jibberding wheat National Variety Trial, 0.80 and 0.77 t/ha, respectively (DPIRD, 2023).

With the NVT being located in the adjacent paddock, caution must be applied when comparing the results of this farmer demonstration to the NVT, however, the NVT does provide a benchmark for variety comparison and does provide a level of confidence that both varieties should yield somewhat similarly in this environment. This was the case for the Scepter on barley stubble, which mirrored the performance of the Scepter plots in the NVT, yielding 0.76 and 0.77 (t/ha) respectively. Whereas, the Tomahawk CL Plus on faba bean stubble yielded slightly higher (0.93 t/ha) than the Tomahawk CL Plus plots in the NVT (0.8 t/ha) and the Scepter on barley stubble (0.76 t/ha). The starting soil moisture levels and Nitrogen levels were higher in the faba bean stubble compared to the barley stubble which may explain the minor yield benefit. This highlights the positive impact of a faba bean rotation on the subsequent crop, which aligns with previous studies on legume rotations (Denton et al., 2017; Peoples & Baldock, 2001).

This trial will continue in 2024, with a barley rotation planned. It will be interesting to see if the benefits are observed in the second subsequent crop, and if 2023 being a dry year, left more nitrogen in the system for this year.

Please note this is an unreplicated farmer demonstration and results should be interpreted with caution.

Acknowledgments

Thank you to Boyd Carter for hosting and implementing the trial. Additionally, thank you to AGT for supplying the cereal grain. This trial is part of a GRDC investment into grain legume extension being led by the Grower Group Alliance.

References

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Peer review

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