

Profitability of wheat following a range of legumes in the West Midlands Region: Part 2 – Gross Margin

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Key Messages

- Gross Margin of wheat following field pea and chickpea was double the Gross Margin of lupin and lentil.
- High Gross Margins came from higher legume grain yield and price/tonne, despite higher variable costs.

Background

The use of an effective crop rotation is an important tool to reduce the potential effects of soilborne and foliar diseases on cereal production. Crop rotations in WA are based on a predominance of wheat and barley that are rotated with canola or lupin. While this has been an effective crop rotation in the past, the low profitability of lupin crops due to low yield and price/tonne has reduced the use of this legume in rotation. However, legumes can provide value to the crop rotation through the fixation of nitrogen, and there is the need to evaluate a wider range of legumes that could be grown in WA. Nine demonstration sites were established across the wheatbelt region as part of a GRDC project led by Liebe Group. In 2018, demonstration strips of field pea, lupin, lentil, and chickpea were grown and then followed by Scepter wheat in the 2019 season.

The West Midlands Group demonstration site was located at 'Kayanaba', 1 km east of Dandaragan on a clay loam soil type. The site was sown and harvested by the grower and managed similar to the remaining area of the paddock. The Gross Margin was calculated for 2018 by Farmanco as part of the overall project, while Gross Margin was calculated in 2019 based on grower supplied data, and including machinery costs at contract rates. Net Present Value (NPV) was used to value the future benefit of a crop rotation in todays value of money using a discount rate of 5%.

Results

The highest Gross Margin for legume crops in the 2018 season was achieved by field pea and closely followed by chickpea (Table 1). The Gross Margin for lentil was only \$47/ha, while lupin had a negative Gross Margin. Gross Margin was influenced by an interaction between the yield of the crop and value of the grain, with the highest yielding legumes also having the highest value of grain/tonne. The variable cost associated with growing the legume crop ranged from \$398-520/ha, with the highest Gross Margin crops having the highest cost/ha.

The Gross Margin for wheat grown in 2019 following the legume crops varied between \$1141/ha following field pea and \$917/ha following lentil (Table 1). There was a small difference between the yield of each treatment, and this reflects in the small differences in Gross Margin.

The Total rotation Gross Margin (NPV) varied widely, with the highest Gross Margin being \$1924/ha for wheat following field pea, and lowest for wheat following lupin (\$815/ha).

Table 1. Gross Margin analysis for each legume/wheat sequence evaluated at the Kayanaba demonstration site for the 2018-19 seasons. The Total rotation Gross Margin is the cumulative value of the Gross Margin across both years and discounted to net present day value (NPV) at a rate of 5%.

2018	Lupin	Field pea	Chickpea	Lentil
Yield	0.73	2.35	1.92	0.89
Price/tonne	\$370	\$600	\$700	\$500
Gross Value	\$270	\$1,410	\$1,344	\$445
Variable Cost	\$410	\$476	\$520	\$398
Machinery	Machinery included in variable cost			
Gross Margin	-\$140	\$934	\$824	\$47

2019	Wheat	Wheat	Wheat	Wheat
Yield	4.7	5	4.7	4.3
Price/tonne	320	320	320	320
Gross Value	\$1,504	\$1,600	\$1,504	\$1,376
Variable Cost	\$291	\$291	\$291	\$291
Machinery	\$168	\$168	\$168	\$168
Gross Margin	\$1,045	\$1,141	\$1,045	\$917

Total Rotation Gross Margin (NPV)	\$815	\$1,924	\$1,733	\$877
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Discussion

The crop sequences of field pea/wheat and chickpea/wheat doubled the profitability of growing a grain legume in rotation with wheat as compared to lupin and lentil. The main contribution came from higher grain yield and price/tonne of field pea, even though the variable cost of growing these legumes was slightly higher than lupin.

The Gross Margin of the lentil/wheat sequence was reduced by the presence of a high weed population due to poor weed control in the lentil phase of the rotation. The Total rotation Gross Margin of the lupin/wheat sequence reduced by the presence of the fungal disease that caused 'Black pod syndrome', where many seeds were poorly formed in the pod. If the yield of lupin was not affected in 2018, then the Gross Margin would have been \$330/ha based on a yield of 2 t/ha, and Total rotation Gross Margin would have been \$1,2626/ha.

The amount and value of N fixation was not assessed in this study, although it is expected that there would have been good contributions of N to the soil from field pea, chickpea, and lupin in this study.

The full report can be found on the WMG website www.wmggroup.org.au

Acknowledgements

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