

High value pulses in rotation – Year 1 pulse phase

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Key messages

- Even in a dry season, root lesion nematode (RLN) (*P. neglectus*) and rhizoctonia multiplied in wheat. All break crops, except chickpea (PBA Striker), had reduced multiplication rate of RLN.
- Beans were the lowest risk non-cereal option to manage a late start or dry finish especially if you can take advantage of high prices
- Wheat outperformed all crop types in 2019, the rotational value of pulses after a dry season will be examined in 2020.

Background

Pulse production, in particular Lentil, in the Esperance port zone (EPZ) has been increasing due to advances in agronomy, high prices, market access, and their rotational advantages. In recent years, growers have been disappointed with canola performance leading to interest in sowing pulses in their place. The ability to sow deeper than canola to use stored soil moisture mean growers are considering mid-April sowing of pulses. To maximise the opportunity of pulse crops more work needs to be done to understand where they fit in the sowing program and how this impact the whole farming system.

A systems approach to crop sequencing and rotation will be considered. Fundamental to the crop sowing sequence decision is the interaction between crop development coinciding with seasonal conditions that drive biomass production and crop protection risks. These in turn have an effect on the productivity and management of the crop in the year it is sown and of subsequent crops in rotation.

The aim of this trial is to investigate the fit of high value pulse crops (faba bean, lentil, and chickpea) in the sowing program and their rotational benefits to following cereal crop.

Methods

The first year of a two-year trial was implemented in 2019 at Grass Patch, a medium to low rainfall area with clay-loam soil. The trial was a split plot design with 5 crop types (Table 1) and two times of sowing (TOS), 2 May and 12 June 2019. Differences in phenology, biomass, nodulation, disease, yield and quality were investigated. The trial will be sown to wheat with two nitrogen rates in 2020.

Table 1. Crop species and varieties sown in 2019.

Crop Type	Varieties
Chickpea	PBA Striker, breeding line 1521
Faba Bean	PBA Samira, PBA Marne, PBA Bendoc
Lentil	PBA Bolt, PBA Jumbo 2, breeding line 10H001L-11HS2007
Canola	Bonito, Hyola 350TT, Hyola 725
Wheat	Scepter, Cutlass

Results and discussion

The poor season experienced in Grass Patch was a result of a combination of dry summer, late break, decile-1 April to October rainfall (170mm), and a frost event on 6 September followed by high temperatures and low rainfall through to October. Faba beans, lentils, and chickpea outperformed canola. Wheat performed the best. All crop types had higher yield when sown on 2 May (canola = 0.25 t/ha (± 0.03), faba bean = 0.53 t/ha (± 0.02), lentil = 0.51 t/ha (± 0.02), wheat = 1.63 (± 0.04)), except chickpea which was higher when sown on 12 June (0.33 t/ha (± 0.02)).

Gross margin analysis (Figure 1) showed wheat had the greatest dollar return. Faba bean and lentil were competitive when taking advantage of high prices of \$900 and \$700, respectively. Gross margin of canola showed poor returns in both TOS and price range. Chickpea performed best when sown late

(12 June) however was only competitive with wheat with high chickpea and low wheat prices. Similarities in faba bean yields at both TOS meant they were lowest risk break crop option under poor seasonal conditions. These results show faba bean and lentil can be competitive with canola and cereals in their own right.



Figure 1. Gross Margin analysis, taking into account price volatility. Nominated low, medium and high price range were sourced from 2018/19 Profarmer and ABARES data.

Multiplication rate of RLN was stable for faba bean, lentil, and canola, but similar to wheat for chickpea (Figure 2a). Multiplication rate of rhizoctonia was significantly reduced for all crop types other than wheat (multiplication rate 23.5 and 3.0 respectively) (Figure 2b).

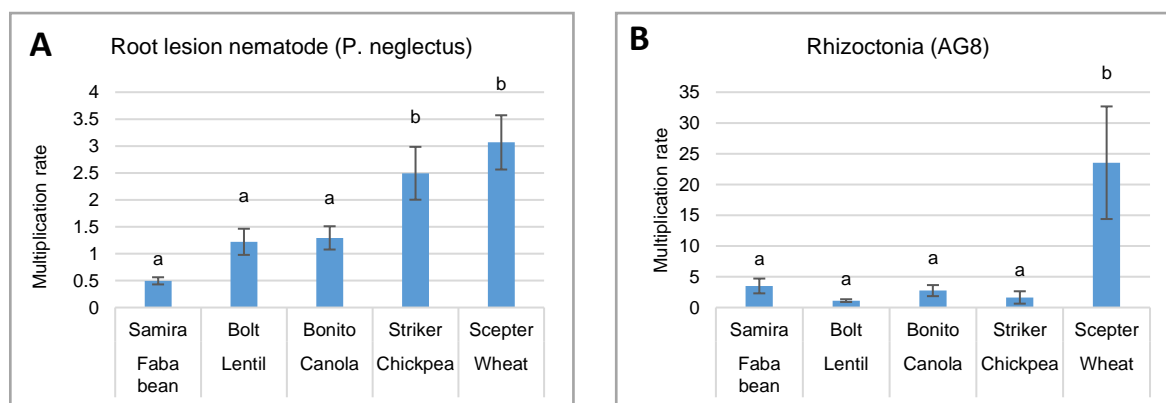


Figure 2. Multiplication rate of A) root lesion nematode (*P. neglectus*), and B) rhizoctonia solani (AG8)

Conclusion

Performance of pulse crops needs to be measured in terms of productivity in the year grown as well as the value to the farming system in following seasons. Results from the pulse phase in 2019 indicate pulses can be economically competitive with wheat given high prices. In 2020 efficacy as a disease-break and nitrogen benefits to wheat will be examined.

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