

Profitability of wheat following a range of legumes in the West Midlands Region: Part 1 – Grain Yield

Brianna Hindle (WMG), Nathan Craig (WMG), Judith Storer (Liebe Group)

Key Messages

- Grain yield of wheat tended to be higher following field pea compared to lupin.
- Poor weed control in legume crops can severely reduce the yield response in the following wheat crop.

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.

Results

Table 1. Monthly rainfall for 2019 taken from the Chelsea rainfall site, compared to the long term mean for the period of 1930-2019 (Chelsea weather station site 9006, Bureau of Meteorology).

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	3.4	0	1	18	6.2	100.5	43	60.5	18.8	19.5	1	0	268.5
Mean 1930-2019	9.7	13.4	18.1	25.7	62.5	91	92.6	76	43.5	24.6	15.5	9.3	481.9

Rainfall in the 2019 season was below average rainfall for the area and received a total growing season rainfall of 266.5 mm. The site was sown dry on 6th June 2019 just before the season break of 15 mm, with an above average rainfall recorded for June (Table 1).

Wheat following field pea from 2018 was the highest yielding treatment at 5t/ha, with wheat following lupin and chickpea yielding similarly (Figure 1). Wheat following the lentil had the lowest grain yield of all treatments. Grain protein was highest following lupin and lowest following lentil (Figure 1).

The presence of weeds was highest where lentil was grown in 2018 and lowest for lupin when measured in July, and lowest for field pea when measured in October (Figure 2).

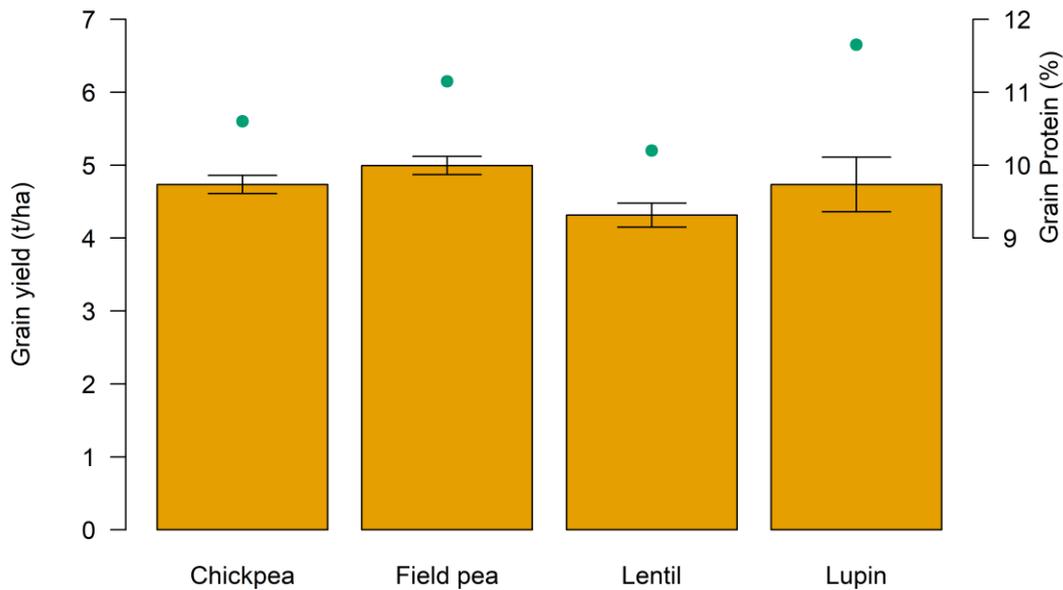


Figure 1. Grain yield and grain protein of wheat in the 2019 season following various grain legume crops grown in 2018. Error bars denote standard error of treatment mean.

Discussion

The grain yield of wheat tended to be highest following field pea compared to all other legume crops evaluated, including the commonly grown legume - lupin. While this was not a significant trend, it does show the potential for legumes crops other than lupin to be grown successfully in the region. Wheat grain yield was limited by low growing season rainfall, and a better season may change this yield response.

The grain yield of wheat following lentil was the lowest due to increased populations of capeweed and ryegrass. This was caused by poor weed control in the lentil crop in 2018 as a result of missing the window for post emergent spraying prior to lentil flowering due to paddock trafficability. This outlines the importance of weed control whilst growing legumes and its potential impacts on the crop the following year. In this case a second break crop may have been justified to decrease the weed competition for the following year.

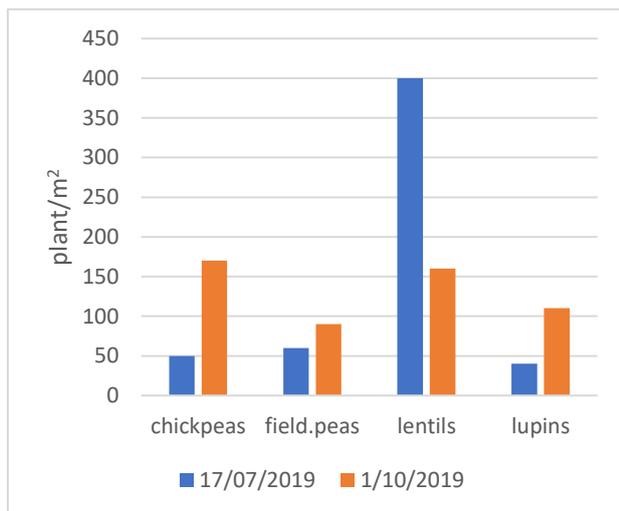


Figure 2. Total weed count in wheat grown after a various legume break crops.

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

Acknowledgements

This site is part of the “Demonstrations of Legumes for Reliable Profitability in the Western Region” through a partnership led by Liebe Group in conjunction with the West Midlands Group, Facey Group, Corrigin Farm Improvement Group and Mingenew Irwin Group.

WMG project code: RAD1603, GRDC project code: 9176164