

Demonstrations of legumes crops for reliable profitability in the Western region

Key points

- Legumes are more susceptible to frosts and high temperatures during flowering than cereals and canola.
- When legumes prices are high, the margins are competitive with conventional crops such as wheat, barley and canola.
- Growers can learn legume agronomy very quickly. Planting legumes in favourable environmental conditions is a much more significant factor.
- Ongoing research and demonstration work is required to continue driving grower adoption of legume crops in WA. Increased cropping diversity is an ongoing ambition for the entire grains industry.

Summary

One of the aims of this project was to increase crop diversity by adding a legume into the crop rotation. Adding a legume to the cropping phase can help improve soil health, disease & weed benefits that will help farmers maintain or improve overall crop yields. In 2018 three legume demonstrations were established in Frankland, Kojonup, and Carrolup with four legume crops grown. In 2019 these trial sites were sown over with a cereal and yield data was collected.

The wheat in Frankland achieved a slightly higher yield than the grower's 5-year average of 5t/ha, with 5.1 – 5.6t/h obtained in the different legume treatments. It was a dry start and dry finish to the 2019 growing season, with most of the rainfall falling between June – August. The Frankland lupin treatment yielded significantly less than the other legume treatments in 2019. Researchers are unsure why the 2018 lupin treatment yielded less in 2019. Soil samples collected in early April 2020 may provide some clarity.

Four new legume demonstrations were established in 2019 at Amelup, Gnowellen, Muradup, and Broomehill. Chickpeas, Lentils, Lupins, Faba beans, and Field peas were grown. Jurien Lupins performed the best in both the Muradup and Broomehill trials. The Lupin prices in 19/20 season were excellent, reaching over \$500/t post-harvest. At the Muradup trial, the grower wanted to investigate the effects of double seeding Faba beans compared to single-pass (standard) seeding. The double seeded treatment was sown over twice effectively getting a 250kg/ha seeding rate and 220kg/ha of starter fertiliser. The single-seeded treatment seeding rate was 125kg/ha and 110kg/ha of fertiliser. The double seeded Faba bean treatment yielded 1t/ha higher (2.56t/ha) than the single sown treatment, which equated to a return of \$1300, \$513 more than the single-seeded treatment. It will be interesting to see the barley yield results at this site, from the over-sown 2020 crop.



Results

Frankland Legume Demo Yield

In 2019 wheat was sown over the 2018 legume trial. The wheat was monitored and yield data was collected. Harvest results showed Lupins yielded significantly less compared to the Lentils, Field peas, Faba beans and Canola treatments Fig 1.

The combined revenue per hectare from each of the legume treatments is displayed in Table 1. The Faba bean treatment combined revenue achieved nearly \$700 more than the next legume treatment. The 2018 Faba bean price was exceptional and well above the 10-year average of \$508/tonne.

There was no difference between the average grain quality in the 2019 wheat crop at Frankland (*Data not shown*).

Muradup Legume Demonstration Site

The grain yields indicate there was a 1t/ha yield increase in the double seeded Faba beans compared to the single-seeded Faba beans. The double seeded faba beans sowing rate was 250kg/ha and had 220kg/ha of starter fertiliser applied. The single-seeded Faba beans seeding rate was 125kg/ha and 110kg/ha of starter fertiliser was applied.

The gross margin of the double seeded Faba beans was \$383/ha more than the single-seeded treatment after the seed and fertiliser cost were accounted for. Assuming a contract seeding rate of \$55/ha, the gross margin of double seeding was \$328/ha.

The returns from the Jurien lupins achieved the highest revenue/ha in the 2019 trial. The 10-year average Lupin price is \$334, and therefore the 2019 price of \$509 was well above average. The double seeded Faba beans had a return of \$1300 per hectare \$153 less than Lupins. The 10-year average price for Faba beans is \$509/tonne.

The Eliza Serradella and Vetch were hand-harvested as the header comb was unable to pick up the pods at such a low height. However, dry matter cuts collected on the 31st of September calculated a 5.8t/ha, and 11.7t/ha dry matter yield for Serradella and Vetch respectively This amount of biomass would have made for excellent sheep feed.

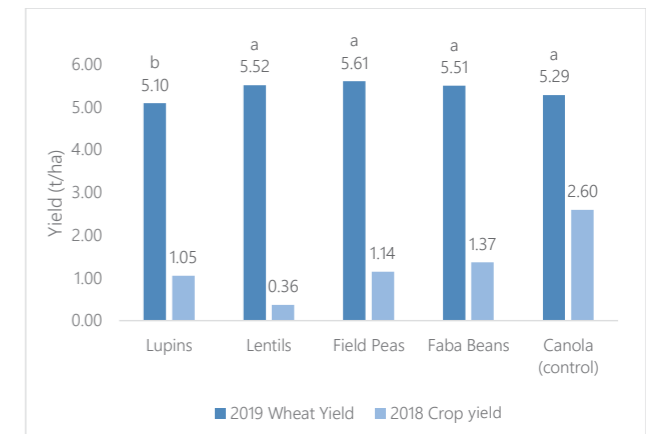


FIGURE 1. Summary of the grain yields achieved at the Frankland demonstration site (Hilder) in 2018-19. The figures indicate the t/ha of grain yield for each crop. Means followed by the same letter or symbol do not significantly differ ($p=0.5$, LSD)

TABLE 1. Revenue (\$/ha) achieved with a wheat crop in 2019 sown over the 2018 legume demonstration

Treatment	Yield (t/ha)	Wheat Price (\$/t)	Revenue (\$/ha) 2019	Revenue (\$/ha) 2018	Total Revenue (\$/ha)
Lupins	5.10	305	1556	369	1925
Lentils	5.52	305	1684	193	1877
Field Peas	5.61	305	1711	640	2351
Faba Beans	5.51	305	1681	1366	3047
Canola	5.29	305	1613	1482	3095

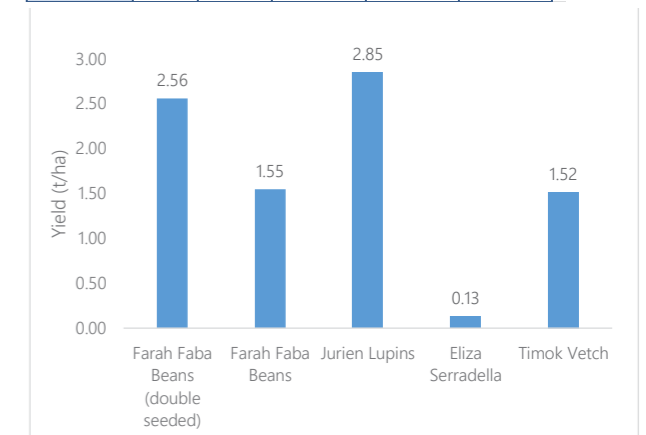


FIGURE 2. Grain yields (tonnes/hectare) achieved at the Muradup demonstration site (Webb's). The trial was sown on the 30th of April 2019.

TABLE 2. Revenue (\$/ha) achieved from each of the legume treatments in 2019 at the Muradup Legume Demonstration site.

Treatment	Yield (t/ha)	Price (\$/ha)	Revenue (\$/ha)
Farah Faba Beans (double seeded)	2.56	\$ 508	\$ 1300
Jurien Lupin	2.85	\$ 510	\$ 1453
Farah Faba Bean	1.55	\$ 508	\$ 787
Eliza Serradella	0.13	\$ 4900	\$ 637
Timok Vetch	1.52	\$ 783	\$ 1190

Thank you to Southern DIRT collaborating with SCF on this project.

Broomehill Legume Demonstration Site

The Jurien lupins yielded significantly more than the lentils, faba beans and chickpeas in 2019. The Lupins yielded 1 tonne more than the chickpeas fig 8.

Despite the Lupins achieving the highest yield in the 2019 demonstration, the Bolt lentils achieved the highest revenue. The average 10-Year pricing of \$334/tonne would have put the Lupins with the lowest revenue of \$734. All other legume prices are on par with their 10-year averages.

Implications

The grain prices for Lupins were exceptional in 2019, getting up to \$510/t due to minimal supply and high demand. The average 10-year price for Lupins is \$334/t. The other 2019 prices for the demonstrated legumes were equal with the 10-year averages. In 2018, high prices were achieved by Faba Beans getting \$1000 per tonne, but Faba beans were significantly lower in 2019 at \$508/t.

All legume crops appear to have higher pricing fluctuations than mainstream crops like wheat, barley and canola. When prices are high, growers can achieve similar revenues to the standard crops as seen at the Broomehill site in 2019 (nearly all legumes) and with Faba beans at Frankland in 2018. Ideally, the industry needs to develop more markets for legume crops which would reduce price volatility and lift average prices from year to year. With a little more pricing certainty, it is likely growers would add legumes to their cropping programs more often. Growing legume crops more often would lead to an increase in agronomic skills and knowledge, which would ultimately reduce yield volatility.

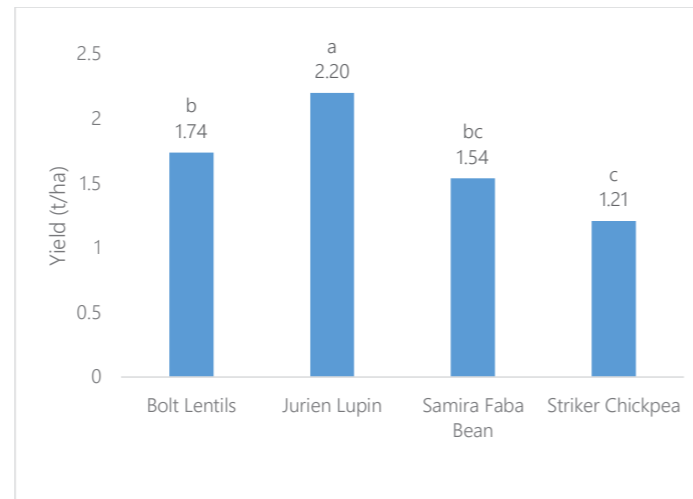


FIGURE 3. Grain yields achieved at the Broomehill demonstration site (Big-nell's). The figures indicate the t/ha of grain yield for each crop. The trial was sown on the 18th of May 2019. Means followed by the same letter or symbol do not significantly differ ($p=0.5$, LSD)

TABLE 3. Revenue (\$/ha) achieved from each of the legume treatments in 2019 at the Broomehill Legume Demonstration site.

Treatment	Yield (t/ha)	Price (\$/ha)	Revenue (\$/ha)
Bolt Lentils	1.74	\$645.00	\$1,122.30
Jurien Lupin	2.20	\$510.00	\$1,122.00
Samira Faba Bean	1.54	\$508.00	\$782.32
Striker Chickpea	1.21	\$735.00	\$889.35



CropCast
with
Craig White

Long days, planning and preparing for the season that is upon us? Why not tune into the latest episode of CropCast - Podcast? There's plenty of back episodes to listen to with new episodes added regularly so you never run out of new and interesting content.

Crop Cast episodes cover a wide range of topics including new crop protection developments and updates on agricultural research from within the Bayer Market Development Team from right around Australia.

To listen, you can simply scan the QR code with your iPhone camera (or QR reader app on other devices) or subscribe in good podcast apps "Bayer Crop Cast."

Search for it on Google or visit
www.crop.bayer.com.au/news-and-insights/cropcast

