DEVELOPING FABA BEANS AS A VIABLE INDUSTRY IN SOUTHERN NEW SOUTH WALES

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Abstract

Until the use of lime became common practice in southern NSW, lupin and field pea were the only two pulses effectively included in local cropping rotations. During the past three years, trial work has identified key management issues which have been used to assist new growers and to develop an agronomy package for production of faba bean for the south. Trials have identified the need to sow early - by mid May - and for densities of at least 30 plants/m^2 in order to obtain maximum yields. Variety evaluation trials are helping growers choose the best variety for their district, and assisting the breeding team in varietal selection and release. Promising yields of 2.5 t/ha in low rainfall environments and up to 4.0 t/ha in the more favourable cropping zones have been achieved both commercially and in trials. Technical support to growers, new varieties and better management are all assisting in the development of a viable faba bean industry. There is a general trend to increased cropping and a growing need for a greater selection of suitable break crops. The suitability of faba beans to both low and high rainfall environments and to heavier soil types, and their high potential yield, mean production of faba beans will continue to expand across southern NSW.

Keywords: Faba bean, rotation, pulse, management, agronomy, seeding rate, sowing time.

Due to lack of agronomic knowledge and limited technical support in the past, trial paddocks of faba bean often failed. Crops frequently suffered from poor nodulation and ineffective weed control, and high levels of foliar fungal disease. Crop management guidelines have since been developed (1, 4) to enable growers to successfully include faba bean in their crop rotation and this has been assisted by the provision of technical support. As a result, farmer interest has increased and many growers have successfully produced the crop. In 1997, a year when crop yields were dramatically reduced due to water and heat stress during pod fill, a Lockhart district crop yielded 2.25 t/ha, while a later-maturing lupin crop grown in the same paddock became severely drought affected, yielding only 1.0 t/ha. Groups of growers at Temora, Cowra, Lockhart and Rand are finding with careful management faba beans are a valuable crop option.

Results

Paddock choice

The key to the success of any crop, especially pulses, is paddock choice. Faba beans prefer neutral to alkaline, moderate to heavy soils, but can perform well on moderately acidic red-brown earths, as long as the pH is above 5.2 ($CaCl_2$). Faba bean is the only pulse able to tolerate some degree of waterlogging during winter, and can withstand wetter, heavier soils than lupin.

Variety choice

Disease reaction, yield potential, seed size, maturity and marketability should all be considered when choosing a faba bean variety. The level of resistance to chocolate spot (CS) and ascochyta (ASC) greatly alters the management of the crop. ASC can infect crops at any stage while CS needs temperatures over 15E C, therefore it is not a problem during winter. Icarus, which is resistant to CS but highly susceptible to ASC must be protected from ASC infection by early application of fungicide and then monitored throughout the season to minimise the chance of seed blemishes. The risk of Icarus being affected by CS, however, is minimal. Icarus generally suffers a yield penalty compared to CS susceptible varieties (see Table 1). Seed size must also be considered as many seeders (particularly combines) cannot physically sow sufficient numbers of the very large-seeded varieties.

Table 1. Characteristics and trial yields of faba bean varieties in southern NSW for 1996-97.

?	?	Disease Reaction[a]			?	Yield (t/ha)			
Variety	Seed colour	Seed size	Ascochyta	Chocolate spot	?	Boree Ck 1996	Temora 1996	Temora 1997	Wagga 1997
Ascot	Buff	small	MR	S	?	2.580	2.492	2.376	1.894
Barkool	Buff	small	S	S		2.906	2.236	2.848	1.971
Fiesta	Buff	medium	T	T		2.865	2.724	2.821	1.873
Fiord	Buff	small	S	S		2.693	3.107	2.839	1.858
Icarus	Green	large	VS	MR		1.909	1.951	2.519	1.774
Rossa	Red	medium	S	MR		2.363	2.898	2.333	1.909

[a] MR - moderately resistant; T - tolerant; S - susceptible; VS - very susceptible

The late flowering and maturing varieties, Icarus and Rossa, are not suited to the marginal rainfall districts in the western portion of the cropping zone.

Varieties are marketed to different countries according to their end uses. Therefore, growers should obtain information from grain merchants on these preferences and on price outlooks before choosing a variety.

Sowing

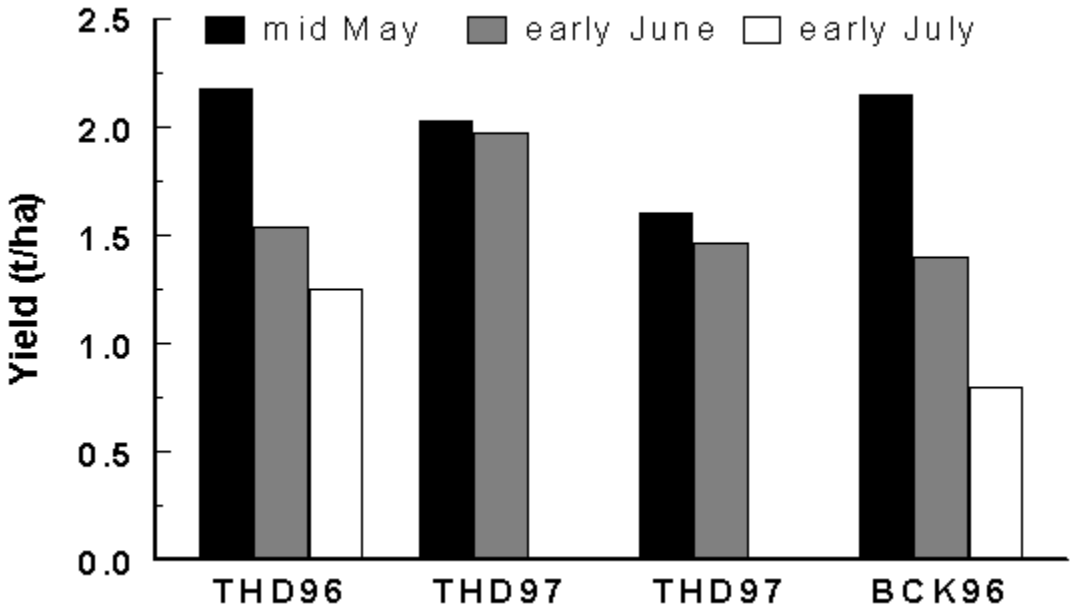

Figure 1

Faba bean should always be inoculated with Group E (SU303) inoculum just prior to sowing. Investigations suggests that double or even triple rates of inoculum result in improved nodulation and

increased yield (A. Mead, pers. comm.). To optimise yield, faba bean should be sown early - from mid April to mid May. Delaying sowing beyond mid May greatly reduces potential yield (Figure 1).

Figure 1. Faba bean sowing time experiments in southern NSW for 1996-97 show yield declines when sowing is delayed beyond the second week of May (THD = Thuddungra, BCK = Boree Creek).

Seeding rate should be calculated using germination percentage and seed size targeting a plant density of 30 - 40 plants/m^2 (2) (use the higher rates for later sowing). As highlighted in Figure 2, seeding rate should not be compromised by limitations imposed by seeding machinery or seed cost. Yield is reduced with plant populations below 30 plants/m^2. Grower experience and trials conducted in Western Australia (2, 3) highlight the need to sow faba beans deep, from 5 to 8 cm. This is necessary to achieve good establishment and to avoid damage from soil residual herbicides, such as simazine. When sowing early under dry conditions, seeds can be placed even deeper -up to 10 cm, providing better rhizobium survival.

Fertiliser requirements can easily be calculated using target yields and balancing nutrient removed in harvested seed. The actual requirement of elements such as phosphorus (P), sulfur and zinc are still being refined for southern NSW soils. Results from a preliminary trial conducted at Temora in 1996 suggest faba beans require high rates of applied P. Icarus yields increased with up to 30 kgP/ha applied on a site with a moderate P status. In Western Australian trials, faba beans responded to P fertiliser on soils that may have been considered to have adequate P (2). As a rule, phosphorus is applied at the same levels as for wheat, while the application of zinc and sulfur depend on soil type and previous fertiliser application.

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Figure 2. Effect of plant density on yield of Ascot (Ž), Barkool (–) and Icarus (•) faba bean at Boree Creek and Galong in southern NSW in 1996-97.

Weed control

The key to weed free faba beans is to grow weed free crops in the preceding seasons, especially given there are no post-emergent broadleaf herbicides yet registered for this crop. While faba beans are winter active and good competitors they can only tolerate low weed burdens. The use of pre-emergent broadleaf herbicides is frequently essential. Grass control is relatively easy, with many selective herbicides available. Caution should be taken when selecting herbicides to ensure herbicide groups are rotated to avoid resistance.

Disease management

Two foliar fungal diseases affect faba bean in southern NSW - Ascochyta (ASC) and Chocolate Spot (CS). Both diseases produce leaf, stem and pod lesions and can mark the seed to the extent where quality is downgraded. Severe infection of either or both diseases will reduce yield. There are three main steps in managing CS and ASC.

1. Hygiene - through the use of seed which is disease free, the control of any volunteer plants, spatial separation of crops from the previous years stubbles, and not growing faba beans in the same paddock within a three-year period.

2. Monitoring crops on a regular basis to identify initial infection and to ensure timely fungicide application.

3. Fungicide application earlier rather than later - the fungicide is a protectant only (not systemic) so it needs to be applied at the early stage of infection when weather conditions are expected to be conducive to disease spread (high canopy humidity).

Conclusion

The development of an agronomy package (1, 4) and availability of technical support has encouraged the successful commercial production of faba beans in several districts of southern NSW. A group of farmers in the Temora district are successfully producing the variety Icarus. They are growing them on heavy clay soils which are prone to waterlogging in winter, where no other break crop can be successfully produced. Yields have ranged from 0.5 t/ha up to 3 t/ha, with an average 2 t/ha over the last 3 years.

In the area between Lockhart and Corowa, where lupins are generally too short for harvest and canola yield and oil content too variable, faba beans have successfully been incorporated into rotations with wheat and barley. In these districts, yields range between 1 and 2 t/ha, with a potential of up to 3.5 t/ha in years with above average rainfall and a mild spring. Other areas where faba beans are being introduced include the Young, Cowra, Henty and Wagga districts.

The recent release of Fiesta, a high yielding (Table 1), high quality, medium sized, buff coloured bean with tolerance to chocolate spot and ascochyta, will greatly enhance the faba bean industry in southern NSW. It will reduce the likely number of fungicide applications and maximise potential yield. These two factors alone will greatly improve the gross margin for faba beans. The high quality of Fiesta makes it easily marketed and may also attract a premium price.

Further information is required on the likely yield and protein benefit of wheat crops following faba beans. Trial work to quantify the comparative benefit of various pulse crops is under way. This information can only further enhance this fledgling industry.

As production of faba bean increases, so will the market outlets which are at present limited in southern NSW.

Best management practices for faba bean production are improved and updated each season as farmers and researchers gain more experience. With the completion of crop nutrition trials, and the release of further improved varieties, faba beans have enormous potential in southern NSW.

References

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