Faba bean variety performance at Westmere

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KEY MESSAGES

- Very high yields achieved in faba bean breeding trial in South Western Victoria in 2016
- New PBA faba bean varieties have higher yield than older varieties
- A high level of fungal disease developed in 2016 and a proactive fungicide program is required to manage faba beans in high rainfall districts

Key words: Main Season wheat; Early-planted wheat; Triple Rust resistance; protein yield

BACKGROUND

The area of faba bean production in Australia has expended considerably in recent years, including in south west Victoria where it is a relatively recent crop. The Pulse Breeding Australia faba bean program has the objectives of developing new varieties that are high yielding, with a manageable level of resistance to the major fungal diseases, and with quality suited to the Middle East food markets. Trials are conducted at a range of sites throughout southern Australia to enable the identification of varieties and breeding lines that are suited to particular regions. The breeding trial at Westmere will provide information to assist in selecting among the current varieties, and ensure progress in developing future varieties for south western Victoria.

METHOD

The breeding trial included six varieties and 12 advanced breeding lines at the Westmere site. It was sown on 22 April 2016 and harvested on 31 December 2016. Control of disease was delayed beyond the time of optimal first application to enable resistant varieties to be identified and then managed with fungicide applications to prevent severe damage (Table 1).

Table 1. Site details and crop inputs for the faba bean variety trial

	Date	Product
Fertilizer	22/04/2016	MAP 60 kg/ha
Herbicides	21/04/2016	Rustler 1 L/ha
		Terbyne 1 kg/ha
	5/08/2016	Clethodim 240 0.5 L/ha
		Factor 0.18 kg/ha
		Liase 2 L/ha
	7/11/2016	Reglone 3 L/ha
	12/12/2016	Reglone 3 L/ha
Fungicides	5/09/2016	SpinFlo 500 ml/ha
		Cavalry 720 1 L/ha
	24/09/2016	Spinflo500 500 ml/ha
		Mancozeb 750 2 kg/ha
	8/10/2016	Mancozeb750 1 kg/ha
		Veritas 1 L/ha

RESULTS

Faba bean yields in 2016 were the highest observed in breeding trials conducted in south west Victoria in conjunction with SFS in the past 10 years, and the site average yield was over 5.5 t/ha. All varieties yielded more than 5.2 t/ha with PBA Samira producing the highest yield (Table 2). PBA Zahra, which was the highest yielding variety in 2015, also produced above average yield in 2016. Results of two advanced breeding lines are presented to illustrate continuing progress with breeding and one, AF11023, yielded

more than all varieties in both 2015 and 2016. There was a significant range in seed weight with PBA Rana having the highest 100 seed weight and Farah and Fiesta VF being the lowest; breeding lines were generally within this range.

There was a very high level of foliar fungal disease, and at the first time of disease rating in late July there was over 20% of infection within plots for some varieties and breeding lines. One breeding line, AF11023, had significantly less disease than other entries in the trial at the first time of rating, and this greater level of disease resistance was still apparent at the end of August although disease did continue to develop.

Table 2. Yield, disease and grain weight results for the varieties and selected breeding lines in the faba bean trial at Westmere.

Variety	**Yield** (t/ha)		**Disease** (% plot affected)		**Seed weight** (g/100 seeds)
	2015	2016	21/07/2016	29/08/2016	
Farah	2.93	5.65	23	33	65
Fiesta VF	2.93	5.37	16	37	63
Nura	2.8	6.23	20	25	68
PBA Rana	3	5.25	14	32	80
PBA Samira	2.79	6.38	23	32	71
PBA Zahra	3.14	5.9	21	34	72
AF10089	2.94	5.92	19	34	80
AF11023	3.21	6.4	9	23	70
Site mean	2.95	5.58	18	34	71
LSD (*p*=0.05)	0.42	0.82	6	6	5
CV	10.1	10.1	29	9	5

DISCUSSION

The high yields achieved by all faba bean varieties in 2016 demonstrate the responsiveness of the crop to favourable seasonal conditions, and contrast with 2015 when there was a very dry finish to the season and yields were only half those of 2016. There was some variation in relative performance of varieties between 2015 and 2016, and PBA Zahra was the only variety to yield more than the site mean in both years. This continues a general trend for the good performance of PBA Zahra in south western Victoria and other higher rainfall, long-season sites such as the South East of SA.

A high level of foliar fungal disease developed in the trial and this highlights the need for a proactive fungicide program for faba bean in high rainfall areas, with initial applications required prior to disease becoming established in the crop. This is particularly important when excessive biomass production prevents fungicide penetrating the crop later in the season. The trial was managed with a deliberate delay to application of fungicides to enable the more disease resistant entries to be identified, and while there was some variation between varieties, all developed a significant level of disease. The major diseases present were chocolate sot and Cercospora leaf spot. The mode of resistance to both diseases is quantitative and even the best material is only moderately resistant and requires management. This contrasts with Ascochyta blight where resistance is conditioned by major genes and all recent varieties are resistant to the dominant pathotype of Ascochyta in Victoria. A new pathotype of Ascochyta that can overcome the resistance of Farah and to a lesser extent PBA Rana and PBA Zahra has recently been identified in South Australia. Crops of these varieties should be monitored and if an unexpected level of Ascochyta is observed the disease should be managed with fungicides, and in particular during podding to prevent seed staining.

The range in seed size of the varieties is consistent with observations in other trials. The size of faba bean seeds is determined by both the genotype and the growing environment, with larger seeds generally produced when there is a prolonged period of cool weather without moisture stress during seed development. Australian faba beans fit into two major categories based on seed size, with the small-medium types fitting in the traditional “Fiesta” category. The medium-large types such as PBA Rana and PBA Zahra have been released in recent years in response to feedback from the Egyptian market and have the potential to form a new market category, provided segregation is available.

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