

# Faba bean variety performance at Westmere

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Thanks to the GRDC for their funding of project UA00163, the farmers who hosted the sites and SFS staff for trial management.



## KEY MESSAGES

- PBA Samira and PBA Zahra have consistently been among the highest yielding commercial entries at the Westmere site in 2015-2017, out-yielding older faba bean varieties
- There is continued improvement in yield of faba bean lines with the top breeding lines out-yielding current varieties at the Westmere site in 2015-2017
- Seed weight was lower in 2017 than 2016 and this is most likely due to lower rainfall during the seed development phase in 2017

**Key words:** Faba bean, varieties, disease resistance

## BACKGROUND

The area of faba bean production in Australia has expanded considerably in recent years, including in south west Victoria. The Pulse Breeding Australia faba bean breeding 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 major markets, particularly in the Middle East. Trials are conducted at a range of sites throughout southern Australia to identify varieties and breeding lines that are suited to particular regions. The breeding trial at Westmere is helping to both develop future varieties for south western Victoria and make recommendations about current varieties.

## METHOD

The Westmere breeding trial included 5 varieties and 15 advanced breeding lines. The trial was sown and managed according to local recommendations, with the exception that control of fungal disease was delayed beyond the time of optimal first application so that resistant varieties could be identified. A single fungicide application was then made to prevent severe disease damage (Table 1).

Table 1. Site details and crop inputs for the faba bean trial at Westmere in 2017

Previous crop	Barley
Sowing date	2 May 2017
Fertiliser	2 May: MAP 60kg/ha
Herbicide	1 May: Terbazine + Rustler 22 June: Simazine 6 July: Liaise + Factor + Select + Hasten
Fungicide	22 September: Carbendazin + Mancozeb + BS1000
Harvest date	3 January 2018

## RESULTS AND DISCUSSION

The yield of the faba bean breeding trial at Westmere in 2017 averaged about 4.6 t/ha (Table 2), and while this was below the record trial yield of over 5.5 t/ha achieved in 2016 it was greater than yields in 2013-2015. PBA Samira was the highest yielding variety that is commercially available, the same as in 2016, while PBA Zahra was also among the highest yielding varieties which is consistent with the long-term trend. PBA Rana, Nura and Farah performed well in individual years, but when results over three years are taken into account it appears that PBA Samira and PBA Zahra have overtaken the older varieties.

Results of four advanced breeding lines are included in Table 2 to illustrate some of the progress being made by the breeding program. Of particular interest is the result for AF11023 which was the highest yielding entry in 2015, 2016 and 2017. AF11023 has a very good overall level of resistance to fungal diseases, being resistant to Ascochyta blight and more resistant to chocolate spot than any of the current varieties. It is classified as MR to chocolate spot, whereas PBA Samira is considered MS. AF09169 is a line that has demonstrated good adaptation to lower rainfall areas, but yield results in high rainfall areas have been inconsistent. AF10089 is a medium-large seeded faba bean with resistance to Ascochyta blight, that has yielded well across a range of trials in South Australia and Victoria. AF15369 is small-medium seeded faba bean that is tolerant to imidazolinone herbicides and has only recently entered the most advanced stage of evaluation.

There was a significant range in seed weight among the trial entries. PBA Rana and AF10089 had the largest seed, while Farah, Nura and AF15369 were the smallest (Table 2). The average seed weight from the 2017 trial was less than in 2016 and this could be attributed to the lower rainfall during spring in 2017 compared to 2016. Only PBA Samira had a similar seed weight in the two years, but the ranking of varieties for seed weight was similar in the two years. The range in seed size of the faba bean varieties provides the opportunity to supply several market categories, although it also introduces the need to segregate varieties of different seed types to ensure uniformity within each market category.

Table 2. Yield and seed weight of the faba bean varieties and advanced breeding lines in trials at Westmere in 2016 and 2017.

Variety	Yield (t/ha)			Seed weight (g/100 seeds)	
	2015	2016	2017	2016	2017
Farah	2.93	5.65	4.54	65	61
Nura	2.80	6.23	4.81	68	57
PBA Rana	3.00	5.25	4.69	80	74
PBA Samira	2.79	6.38	5.31	71	73
PBA Zahra	3.14	5.90	4.96	72	65
AF09169	2.86	5.94	4.44	76	67
AF10089	2.94	5.92	4.73	80	73
AF11023	3.21	6.40	5.42	70	67
AF15369	-	5.26	5.22	62	57
<b>Site mean</b>	2.95	5.58	4.61	71	66
<b>LSD (<math>p=0.05</math>)</b>	0.42	0.82	0.81	4.9	2.7

\*Please note that LSD values were calculated upon all twenty trial entries.

The fungal diseases, chocolate spot and cercospora leaf spot, established in the lower canopy during winter and early spring, and preliminary disease assessment during August indicated that AF11023 was again among the most resistant lines (data not presented). The fungal diseases did not progress to a significant extent due to the generally dry conditions in spring and further disease assessment was not possible. The seed harvested from the trial was very clean and there was no staining due to either disease or weather damage. All the varieties and breeding lines in the trial were selected for resistance to Ascochyta blight, but a recent adaptation in the fungus *Ascochyta fabae* (the causal agent of Ascochyta blight) has resulted in the resistance of some varieties being compromised. Farah is now categorized S to the new pathotype, PBA Rana and PBA Zahra are now classified as MS/MR and Nura and PBA Samira are MR/R to the new pathotype. The new pathotype was first observed in the mid-north of South Australia in 2013, but it is spreading and was observed at Kaniva in 2017. The emergence of the new pathotype means that increased monitoring and potentially revised disease management strategies will be required for some varieties.

Faba beans are cross-pollinated and this raises some challenges in maintaining pure seed, particularly as the area sown to faba beans increases and more varieties become available. Cross-pollination between varieties does not affect seed in the immediate crop, but it can affect major traits such as disease resistance and seed size for any crop that is grown from cross-pollinated seed. Ideally, a seed crop should be grown at least 400m from a faba bean crop of a different variety. If that is not possible, seed that is retained to sow the following season's crop should be sourced from the distant end of the paddock to ensure there has been minimal cross-pollination with another variety.