

9. Bean Variety Trials

Amanda Pearce, SARDI, amanda.pearce@sa.gov.au

KEY MESSAGES

- NVT yields ranged from 0.39 t/ha at Wolseley to 2.70 t/ha at Millicent.
- New PBA Zahra was the highest performing variety in the high yielding environment of Millicent and has the highest long-term yield for the south east region.
- 2015 seed sizes are smaller than previous years; need to adjust seeding rates in 2016 accordingly to avoid excessively high plant densities.
- Disease guides should be consulted when selecting varieties to ensure correct management to maximize yields.

Summary of the South East National Variety Trials

Four NVT trials were sown in the south east region in 2015, Keith, Wolseley, Bool Lagoon and Millicent. Seeding of the NVT trials started on 18 May at Bool Lagoon and continued on 21 May at Keith, 22 May at Wolseley and 10 June at Millicent.

NVT results are presented in Table 1. Average yields at the NVT sites ranged from 2.70 t/ha at Millicent to 0.39 t/ha at Wolseley. All sites were below the regional long-term average of 2.78 t/ha, a result of the extreme seasonal conditions. Seed sizes recorded are smaller than previous years; therefore if using 2015 seed seeding rates need to be adjusted accordingly to avoid excessively high plant densities.

The new variety Zahra performed well in the high yielding environment of Millicent, 135 % of site mean. As in 2014 it appears that the slightly larger seeded and relatively later flowering varieties, PBA Samira and PBA Rana may have suffered more in the dry finish compared to Farah and Fiesta VF. Due to the extreme seasonal conditions, 2015 results need to be interpreted with caution and long-term data should be consulted when making varietal decisions.

MFMG Grower Trial Results

The MacKillop Farm Management Group funded two bean trials in 2015, a variety trial at Frances and a 'Farmer Bean Challenge' Conmurra.

The Frances bean variety trial was sown on 26 May and yields ranged from results ranged from 0.52 t/ha (Aquadulce) to 0.94 t/ha (Farah) (Table 2), with a site average of 0.68 t/ha. Yields were extremely low, a result of the exceptionally dry seasonal conditions.

The Farmer Bean Challenge at Conmurra was initiated by growers in that region. Instead of a regular variety trial in 2015, five growers supplied their broad bean seed for evaluation.

The concept was to compare the differences of the farmer selected broad beans from across the region, comparing beans that had been selected for size and/or for yield. Figure 1 presents the seed supplied for the challenge.

There were no significant differences in the yield of the beans at the challenge, but there were observable differences in grain size. The results are presented in Table 2.

This challenge will be repeated in 2016 at Conmurra and also at Millicent.

Table 1: NVT Faba bean variety trial performance, 2015 results expressed as a % of site average yield and long-term average across all sites.

Variety Name	Yield % site mean				Long term average across region		
	Bool Lagoon	Keith	Millicent	Wolseley	t/ha	% of Site Mean	No. Trials
Aquadulce	109	-	77	-			
Doza	92	-	-	-			
Farah	96	105	94	102	2.81	101	36
Fiesta VF	100	106	100	103	2.83	102	35
Fiord	92	-	-	-			
Nura	57	96	88	72	2.63	95	36
PBA Kareema	102	-	73	-			
PBA Nasma	121	-	-	-			
PBA Rana	110	87	90	69	2.6	94	36
PBA Samira	97	104	107	141	2.95	106	20
PBA Warda	132	-	-	-			
PBA Zahra	92	88	135	71	3.03	109	19
Site Mean (t/ha)	0.81	1.35	2.7	0.39	2.78		
CV (%)	14.21	7.89	13.7	9.72			
Probability	<0.001	<0.001	<0.001	<0.001			
LSD (% site mean)	23	13	23	16			
Sowing Date	18-May-2015	21-May-2015	10-Jun-2015	22-May-2015			

Table 2: Frances MFMG Bean Variety Trials, 2015 and 2014 results.

Variety	Bean	2014			2015		
		Yield (t/ha)	% site mean	100 seed weight (g)	Yield (t/ha)	% site mean	100 seed weight (g)
Aquadulce	Broad	2.02	89	99.9	0.52	76	89.1
PBA Kareema	Broad	1.88	83	98.2	-	-	-
AF06125	Faba	2.29	101	62.9	-	-	-
AF09169	Faba	-	-	-	0.63	93	60.2
AF10089	Faba	-	-	-	0.72	106	65.7
Farah	Faba	2.55	112	65.4	0.94	138	55.5
Fiesta VF	Faba	2.41	106	60.4	0.86	126	53.4
Nura	Faba	2.2	97	56.2	0.55	81	49.2
PBA Rana	Faba	2.17	95	73.1	0.55	81	60.1
PBA Samira	Faba	2.32	102	64.1	0.64	94	58.8
PBA Zahra	Faba	2.62	115	73.8	0.71	104	60.6
Site mean		2.27			0.68		
P(0.05)		0.553			0.055		
I.s.d		0.76			0.27		

Table 3: Conmurra MFMG Farmer Bean Challenge Results, supplied seed weights (g) and harvested seed weights (g) and harvested yields (t/ha).

Entry	Seed Source Location	Supplied seed 100 seed weight (g)	Grain yield t/ha	Harvested seed 100 seed weight (g)
Farmer Race #1	Lake Hawdon	135	1.73	114
Farmer Race #2	Mayura Station	203	1.47	138
Farmer Race #3	Furner	155	1.7	119
Farmer Race #4	Hatherleigh	136	1.74	108
Farmer Race #5	Conmurra	118	1.58	117
AF10089		71	1.78	74
Aquadulce		121	1.79	106
Manafest		74	1.62	71
PBA Samira		60	1.67	64
Site mean			1.68	
I.s.d.			0.492	
P value (<0.05)			0.903	



Figure 1. Photographs of seed supplied for the Conmurra Farmer Bean Challenge.

In general disease levels in faba bean crops were low in 2015 due to the dry warm conditions. Changes in *Ascochyta* blight reactions on cultivars are being monitored on faba beans. Research has identified a new pathotype and the previous resistance in Farah and partial resistance in PBA Rana have been overcome in the Mid North of SA. The Mid North has been confirmed as the major region affected by this change in virulence, but a weakly aggressive isolate was found in the south east of SA, indicating a potential further spread of the new pathotype. Faba bean crops should be monitored regularly for *Ascochyta* blight to allow timely fungicide responses and any anomalies in resistant cultivars reported to SARDI. This shift in virulence has seen the disease rating for *Ascochyta* blight in faba beans separated into pathotype 1 (widely distributed in the southern region) and pathotype 2 (recently identified in the Mid North). Disease guides should be consulted when making varietal decisions.

Table 4 presents faba bean variety response to herbicides in South Australia (2000-2014) as printed in the SARDI 2016 sowing guide.

The 2015 season saw growers in the south east utilising failed bean crops for livestock. MFMG Livestock Project Officer, Tiffany Bennett compiled a number of articles on getting the best from unsuccessful crops within the livestock enterprise, focusing at grazing, hay/silage and withholding periods. This valuable information can be accessed via the MFMG website using the link below. www.mackillopgroup.com.au/pages/livestock/utilising-failed-crops-for-livestock.php

Table 4: Faba bean variety response to herbicides in South Australia (2000-2014)

Herbicide	Variety	Year	Diuron®	Outlook®*	Simazine	Simazine	Lexone ®	Spinnaker®	Raptor®*	Terbyne®
			Diuron	Di-methenamid-P	Simazine	Simazine	Metribuzin	Imazethapyr	Imazamox	Terbuthylazine
			2000-2014	2011-2013	2000-2014	2001-2008	2003-2010	2000-2014	2003-2014	2009-2014
	PBA Samira	2013-2014	✓(2)	✓(2)	✓(2)	-	-	✓(2)	30-35 (1/2)	✓(2)
	Farah	2002-2008	✓(7)	-	N (1/7)	6-18 (3/7)	✓(6)	28-39 (2/3)	N (3/6)	-
	Fiesta	2000-2007	N (1/8)	-	18 (1/8)	21 (1/7)	✓(5)	11-32 (2/8)	N (4/5)	-
	Fiord	2000-2002	N (1/3)	-	N (2/3)	N (1/2)	-	18-30 (2/3)	-	-
	PBA Rana	2009-2011	✓(3)	✓(1)	✓(3)	-	N (1/2)	14 (1/3)	18 (1/3)	N (1/3)
	Nura	2003-2014	✓(11)	✓(2)	N (1/11)	N (1/7)	✓(8)	10-53 (6/11)	20 (2/11)	N (1/5)
Rates (product/ha)			1 L	1 L	1.5 L	1.5 L	280 g	85 g	45 g	1 kg
Crop stage at spraying			PSPE	IBS	PSPE	6 weeks	PSPE	PSPE	3 - 4 leaf	PSPE

* Denotes an off label use. This use is not endorsed by this data and no responsibility will be taken for its interpretation.

-	not tested or insufficient data.
✓	no significant yield reductions at label or higher than recommended rates in (z) trials.
N (w/z)	narrow margin, significant yield reductions at higher than recommended rate, but not at recommended rate. Significant event occurring in w trials out of z trials tested. Eg. (2/5) = tested in 5 trials, 2 trials returning a significant yield reduction.
x% (1/z)	yield reduction (warning) significant yield reduction at recommended rate in 1 trial only out of z trials conducted.
x-y% (w/z)	yield reductions (warning) significant yield reductions at recommended rate in w trials out of z trials conducted.

Notes on New Faba Bean Varieties

PBA Zahra (evaluated as AF05095 and re-selection AF05095-1) is the result of a cross between Farah and an Accession 920/3 which originated from Morocco. It has shown wide adaptation throughout southern Australia and is very responsive to high yielding situations. PBA Zahra seed is uniform large size and colour and should be suitable to co-mingle with PBA Rana for a medium-large faba bean category for the Egyptian market. PBA Zahra is mid-late flowering, similar to Nura, PBA Rana and PBA Samira and mid maturity similar to PBA Rana. It is a medium/tall plant similar to PBA Rana and taller than other varieties. It is resistant to the old strain of ascochyta blight (pathotype 1) but is MS/MR to pathotype 2. PBA Zahra is rated as moderately susceptible to chocolate spot and rust. It is susceptible to Cercospora leaf spot. PBA Zahra is licensed to Seednet and an end point royalty applies.

PBA Samira (tested as AF05069 and the re-selection AF05069-2) is one of the highest yielding faba bean varieties for Southern Australia. It is widely adapted and has shown a yield advantage of more than 5% over other varieties in most districts throughout SA, Victoria and Southern New South Wales. It is responsive to high yielding situations. It has mid flowering (similar to Nura and PBA Rana) and 5-10 days later than Fiesta VF and Farah, but matures at the same time as other varieties. PBA Samira is resistant to ascochyta blight pathotype 1 and pathotype 2. It is moderately susceptible to chocolate spot and rust, and susceptible to Cercospora leaf spot. Seed of PBA Samira is slightly larger than Fiesta VF, Farah and Nura, but the overall seed colour is similar for all varieties. PBA Samira can be co-mingled with these other varieties for the Middle East market. PBA Samira is licensed to Seednet and an end point royalty applies.

PBA Rana (tested as AF10060/15-1 or 974*(611*974)/15-1) has good vigour and stem strength. It has mid to late flowering (similar to Nura) and mid maturity (later than Nura and Farah). PBA Rana is well adapted to high rainfall areas with long growing seasons. PBA Rana has good resistance to ascochyta blight pathotype 1 and MS/MR to pathotype 2. This variety is moderately susceptible to chocolate spot. It has demonstrated very useful resistance to rust (MS). PBA Rana produces large, plump, light brown seeds and is suited to meeting Egyptian market requirements for that grade. PBA Rana represents a unique category for faba bean marketing. As PBA Rana is three quarters Manafest in its breeding, it should establish itself into areas where Manafest was grown before ascochyta blight saw its demise. PBA Rana is licensed to Seednet and an end point royalty applies.

Nura is a medium-sized faba bean with moderate resistance to both strains of ascochyta blight (pathotype 1 & 2) and moderate susceptibility to rust. Nura is moderately susceptible to chocolate spot, especially in situations when sown early and where disease pressure is high. Nura is susceptible to Cercospora leaf spot, similar to Farah and Fiesta VF. Protection from ascochyta blight and rust is only required in high risk situations which is a major advantage for growers, as it means a likely reduction in fungicide sprays. Nura is more sensitive to high rates of imazethapyr (e.g. Spinnaker®) than Farah but is more tolerant of simazine and metribuzin. It is generally shorter than Fiesta VF and Farah meaning it is less likely to lodge. However since its bottom pods are closer to the ground, harvest can be more difficult in lower rainfall districts or when sown late. In most areas Nura's long-term yields tend to be slightly lower than Farah, although this is improved when Nura is sown early. It has good seed appearance, light buff in colour, with minimal seed staining and discolouration. Flowering time of Nura is generally around 7 days later than Farah, although has similar maturity. Seed is available from Seednet and an end point royalty applies.

Farah was selected directly from Fiesta VF and is identical in many respects, except for its moderate resistance to ascochyta blight pathotype 1 seed staining and more uniform seed size and colour. The risk of crop infection from ascochyta blight seed staining is reduced with Farah, if managed properly. In the mid-north of SA where pathotype 2 of ascochyta blight has developed Farah will exhibit a susceptible reaction to ascochyta blight, comparable to Fiesta VF. Farah's yields are similar to Fiesta VF and slightly higher than Nura in most regions of southern Australia. The major advantage of Farah over Fiesta VF is the increased likelihood of achieving market standards for freedom from seed staining and a likely reduction in fungicide sprays required for controlling ascochyta blight. Farah is licensed to Heritage Seeds and an end point royalty applies.

Fiesta VF seed is buff coloured and larger than Fiord. Fiesta VF has good seedling vigour, is of medium height and is early to mid flowering. It is classed as susceptible to chocolate spot, although it is less susceptible than Fiord. Fiesta VF is susceptible to ascochyta blight pathotype 1 and 2, so a proactive disease management strategy is recommended to achieve clean seed and ensure market standards are met. Fiesta VF is no longer protected by PBR, and no end point royalty applies.

PBA Kareema was selected from Aquadulce and has similar plant type and adaptation to this variety, but larger and more uniform seed and no “evergreens”. It is well adapted to the very high rainfall, broad bean districts in the Lower South East of SA. It has significantly improved resistance to ascochyta blight (MR-R) and better rust resistance (MR) than Aquadulce and is slightly less susceptible to chocolate spot than other faba bean varieties. Like Aquadulce, PBA Kareema is more tolerant of waterlogging than most varieties of faba bean, and is more tolerant of iron and manganese deficiencies. Trials in the South East of SA have shown PBA Kareema yields to be similar to, or slightly less than, Aquadulce. PBA Kareema is licensed to PGG Wrightson and an end point royalty applies.

Aquadulce is a tall broad bean variety, with late flowering and maturity, suited to areas with at least 500 mm average annual rainfall, such as the Lower South East of SA. It is rated

MS for chocolate spot, but can succumb under high disease pressure and rainfall situations. Aquadulce is more tolerant of waterlogging than most faba bean varieties and tolerates soils with iron and manganese deficiencies. The large seed size of Aquadulce means it must be considered a specialty bean as it has different marketing opportunities to faba beans. It commands a price premium over faba beans, dependent on grading and seed size.

For further information: Variety Management Packages (VMP) for all varieties (except Aquadulce), are available on the Pulse Australia website: <http://www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean>

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