

SAGI statistical analysis (Predicted values for Yield, Harvest dry matter and TSW). The following statistical analysis of key harvest assessments has been carried out by SAGI. This analysis uses spatial statistical analysis to refine predicted values for key assessment values.

Table 1: Harvest Traits for the Treatments

Cultivar	SeedingRate	Yield (t/ha)	Harvest DM (t/ha)	TSW (g)
Amberley	12	6.56 ± 0.28 -	12.25 ± 1.28 -	583.84 ± 23.15 -
Fiesta	12	6.67 ± 0.28 -	12.77 ± 1.27 -	597.75 ± 23.14 -
Amberley	24	7.05 ± 0.28 -	12.16 ± 1.28 -	591.49 ± 23.15 -
Fiesta	24	6.52 ± 0.28 -	13.36 ± 1.28 -	575.88 ± 23.15 -
Amberley	36	7.53 ± 0.28 -	12.51 ± 1.28 -	595.8 ± 23.14 -
Fiesta	36	7.53 ± 0.28 -	12.43 ± 1.28 -	582.78 ± 23.15 -
Amberley	48	7.63 ± 0.28 -	12.05 ± 1.28 -	580.84 ± 23.15 -
Fiesta	48	7.9 ± 0.28 -	14.03 ± 1.28 -	608.2 ± 23.15 -

Note: values expressed as mean ± standard error of prediction
- no subscripts relevant for this response

A summary of the experiment statistics is below:

Table 2: Key statistics for each response analysed

Statistic	Yield (t/ha)	Harvest DM (t/ha)	TSW (g)
LSD	0.845	2.945	53.797
Mean	7.200	7.200	7.200
Cultivar_p-value	0.833	0.170	0.912
SeedingRate_p-value	0.001	0.951	0.850
Interaction_p-value	0.600	0.776	0.250
CV	10.332	19.132	7.161

Trial 2. Optimum Plant Population Under Surface Irrigation

Protocol objective: As trial 1 but with surface irrigation

Location: Finley IRC

Code: FAR F21-01-2

Sown: 29 April 2021

Cultivar: PBA Amberley and Fiesta VF

Harvested: 22nd December 2021

Rotation position: Wheat (2020), Wheat (2019), Faba beans (2018)

Soil Management: Cultivation with speed disc to incorporate stubble in Autumn

Irrigation: Surface irrigation, 3 applications totalling 289mm

GSR: April-November 300mm. Total water available 589mm

Key Messages:

- Although not statistically comparable faba bean yields with surface irrigation were lower (2.8 – 5.95 t/ha) than the identical trial 1 under overhead irrigation (5.77 – 7.88t/ha).
- There was no significant difference ($p=0.066$) in grain yield between Fiesta VF and PBA Amberley under surface irrigation with an average yield of 5.55/ha and 4.06/ha respectively.
- Seed rate and resultant plant population had a significant impact on grain yield with yield maximised at populations of 30 plants/m² and above.

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- *There was a significant difference in pod number between the plant populations, with pod numbers maximised (approximately 500 pods/m²) at populations of 30 plants/m² and above.*
- *Stem numbers in excess of 65 stems/m² were required to maximise grain yield.*
- *Plant population had an impact on early dry matter production (8 node) with plant populations of 38/m² and above producing significantly more dry matter than lower populations.*
- *Cultivar also had an impact on early dry matter production (8 node) with Fiesta VF producing significantly more dry matter than PBA Amberley.*
- *There was no effect of plant population on dry matter at flowering, however Fiesta VF produced more biomass at flowering than PBA Amberley (9.7t/ha vs 7t/ha).*
- *Plant population had a significant effect on final harvest dry matter with dry matter maximised at plant populations of 19 plants/m² and above in this lower yielding trial.*
- *Averaging grain yield and dry matter there were no significant differences between cultivar or plant population in harvest index which averaged 39.4% (data not shown).*

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Table 1. Grain yield (t/ha) of four seed rates with two different cultivars grown with surface irrigation.

Plants/m ² (actual)		Cultivar		
		PBA Amberley	Fiesta VF	Mean
Amberley	Fiesta	Yield t/ha	Yield t/ha	Yield t/ha
8	10	2.80 -	4.29 -	3.55 c
16	22	3.63 -	6.05 -	4.84 b
26	34	4.65 -	5.95 -	5.30 ab
38	37	5.15 -	5.92 -	5.53 a
Mean		4.06 -	5.55 -	

LSD Seed Rate p = 0.05	ns	P val	0.066
LSD Cultivar p=0.05	0.67	P val	<0.001
LSD Seed Rate x Cultivar.	ns	P val	0.109

SAGI predicted yields revealed a significant advantage to Fiesta VF over Amberley with a p-value of 0.036

Table 2. Influence of seed rate and cultivar on plant population – assessed GS15 (8 June).

		Cultivar	
		PBA Amberley	Fiesta VF
Seed Rate	Plants/m ²	Plants/m ²	Plants/m ²
12 seeds/m ²	8 -	10 -	9 d
24 seeds/m ²	16 -	22 -	19 c
36 seeds/m ²	26 -	34 -	30 b
48 seeds/m ²	38 -	37 -	38 a
Mean	22 -	26 -	
Cultivar LSD	ns	P val	0.067
Seed Rate LSD	5.2	P val	<0.001
Cultivar x Seed Rate LSD	ns	P val	0.233

Table 3. Influence of plant population and cultivar on canopy composition, stems/m², pods/m² and height to first pod – assessed pre harvest (29 Nov).

Treatment	Canopy composition		
	Stems/m ²	Pods/m ²	1st Pod Height (cm)
9 plants/m ²	43 b	337 c	24 b
19 plants/m ²	65 a	424 b	35 a
30 plants/m ²	67 a	474 ab	36 a
38 plants/m ²	70 a	498 a	37 a
Mean	61	433	33
Seed Rate LSD	10.1	72.2	5.3
P val	<0.001	0.001	<0.001

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Table 4. Influence of plant population and cultivar on dry matter production (kg/ha) at 8 node – assessed 27 July.

Dry Matter Production at 8 node				
Plants/m ² (actual)		PBA Amberley	Fiesta VF	Mean
Amberley	Fiesta	kg/ha	kg/ha	kg/ha
8	10	233 -	489 -	361 c
16	22	528 -	939 -	733 b
26	34	528 -	849 -	688 b
38	37	926 -	1135 -	1031 a
Mean		554 b	853 a	
LSD Seed Rate p = 0.05		256	P val	0.034
LSD Cultivar p=0.05		263	P val	<0.001
LSD Seed Rate x Cultivar.		ns	P val	0.864

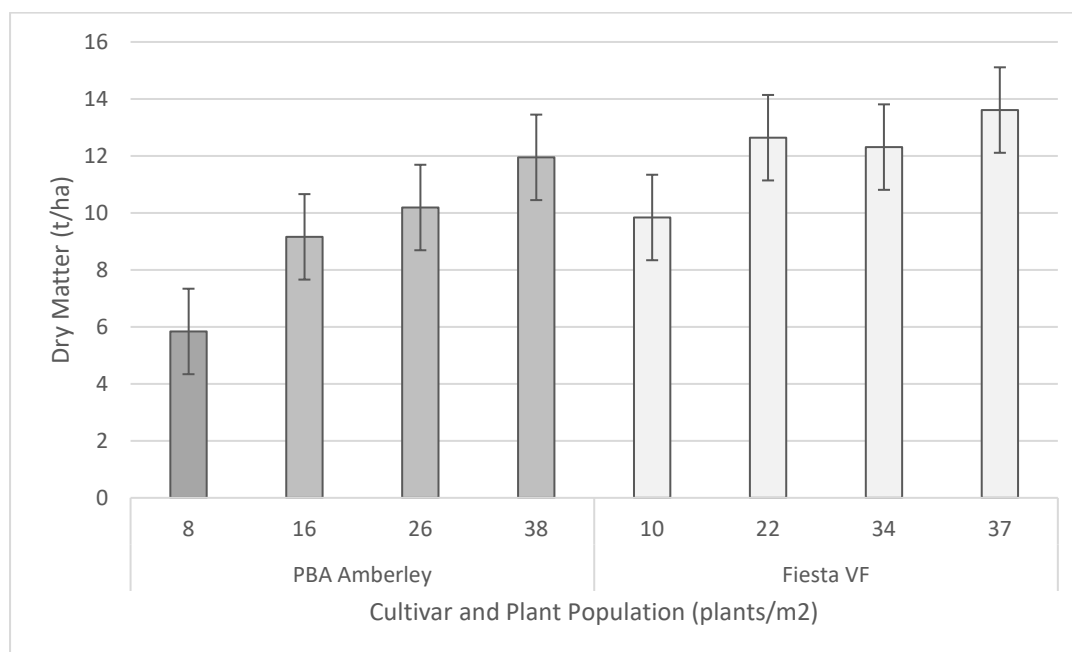
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Table 5. Influence of plant population and cultivar on dry matter production (t/ha) at GS65 – assessed 23 September.

Dry Matter Production at flowering (GS65)				
Plants/m ² (actual)		PBA Amberley	Fiesta VF	Mean
Amberley	Fiesta	t/ha	t/ha	t/ha
8	10	5.25 -	9.04 -	7.15 -
16	22	7.93 -	11.5 -	9.71 -
26	34	7.50 -	9.94 -	8.72 -
38	37	7.40 -	8.32 -	7.86 -
Mean		7.02 b	9.70 a	
LSD Cultivar p=0.05		1.00	P val	0.003
LSD Seed Rate p = 0.05		ns	P val	0.056
LSD Seed Rate x Cultivar.		ns	P val	0.388

**Figure 1.** Influence of plant population and cultivar on dry matter production (t/ha) at harvest – assessed 29 November. Cultivar P value = 0.108, LSD ns. Plant population P value = 0.001, LSD = 2.12. Cultivar x Plant population P value = 0.624, LSD 3.0t/ha

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A summary of the harvest traits is below:

Table 1: Harvest Traits for the Treatments

Cultivar	SeedingRate	Yield (t/ha)	Harvest DM
Amberley	12	2.88 ± 0.59 -	5.63 ± 1.63 -
Fiesta	12	3.76 ± 0.59 -	10.08 ± 1.63 -
Amberley	24	3.86 ± 0.6 -	9.03 ± 1.64 -
Fiesta	24	5.35 ± 0.6 -	12.7 ± 1.64 -
Amberley	36	4.81 ± 0.59 -	10.05 ± 1.63 -
Fiesta	36	5.66 ± 0.59 -	12.31 ± 1.63 -
Amberley	48	5.34 ± 0.6 -	11.95 ± 1.64 -
Fiesta	48	5.7 ± 0.59 -	13.69 ± 1.63 -

Note: values expressed as mean ± standard error of prediction
- no subscripts relevant for this response

A summary of the experiment statistics is below:

Table 2: Key statistics for each response analysed

Statistic	Yield (t/ha)	Harvest DM
LSD	0.949	3.298
Mean	4.700	10.700
Cultivar_p-value	0.036	0.092
SeedingRate_p-value	0.000	0.001
Interaction_p-value	0.333	0.518
CV	33.613	34.777

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