

Trial 2. HYC Barley Elite Screen (FAR WAA B22-02)

Objective:

To examine the yield potential of new winter and spring barley germplasm grown under HYC Management packages against spring and winter controls in the traditional Anzac Day sowing window (sown 20 April).

Key Points:

- Cultivar had a significant effect on phenology, yield, grain quality and disease resistance.
- In spring cultivars, late booting (GS49) ranged from the 23 July (Leabrook) to the 25 August (Laureate and IGB21130), with the two winter varieties flowering on the 17 September and 5 October, 74 days after Leabrook.
- Newton (a two-row winter variety) and Pixel (a six-row winter variety) were some of the top yielding germplasms, 6.09 t/ha and 5.49 t/ha respectively.
- Of the spring varieties, a new InterGrain cultivar (IGB21130) produced the highest yield of 5.77 t/ha.
- Spring barleys which flowered after mid-August produced a significantly higher yield than faster-maturing varieties.
- Protein percentage also varied greatly between cultivars, with the winters having significantly lower levels (9.1% and 9.3%), and with a trend of lower yielding varieties having a higher protein percentage.
- Net Form Net Blotch (NFNB) and Spot Form Net Blotch (SFNB) were assessed throughout the season, with RGT Planet and Zena CL having significantly higher infection levels.

Table 1. Cultivar effect on the late booting period (GS49), days after sowing (DAS) and the interaction with yield (t/ha). (S) indicates spring cultivar and (W) indicates a winter cultivar.

Cultivar	GS49*	DAS	Yield (t/ha)	
RGT Planet (S)	2-Aug	104	4.63	fgh
Rosalind (S)	2-Aug	104	5.08	cde
Minotaur (S)	11-Aug	113	4.97	def
Laperouse (S)	9-Aug	111	4.24	hi
Laureate (S)	25-Aug	127	5.25	cd
AGTB0244 (S)	20-Aug	122	5.35	bcd
Fandaga (S)	3-Aug	105	3.85	i
Newton (W)	5-Oct	168	6.09	a
Pixel (W)	17-Sep	150	5.49	bc
Leabrook (S)	23-Jul	94	4.36	gh
Cyclops (S)	30-Jul	101	4.71	efg
IGB21130 (S)	25-Aug	127	5.77	ab
Zena CI (S)	2-Aug	104	4.94	def
FireFoxx (S)	29-Jul	100	4.26	hi
	Mean		4.93	
	LSD (P=0.05)		0.4	
	P-Value		<0.001	

*Barley is noted to flower before the head emerges, so GS49 is considered to be a good surrogate for the start of flowering.

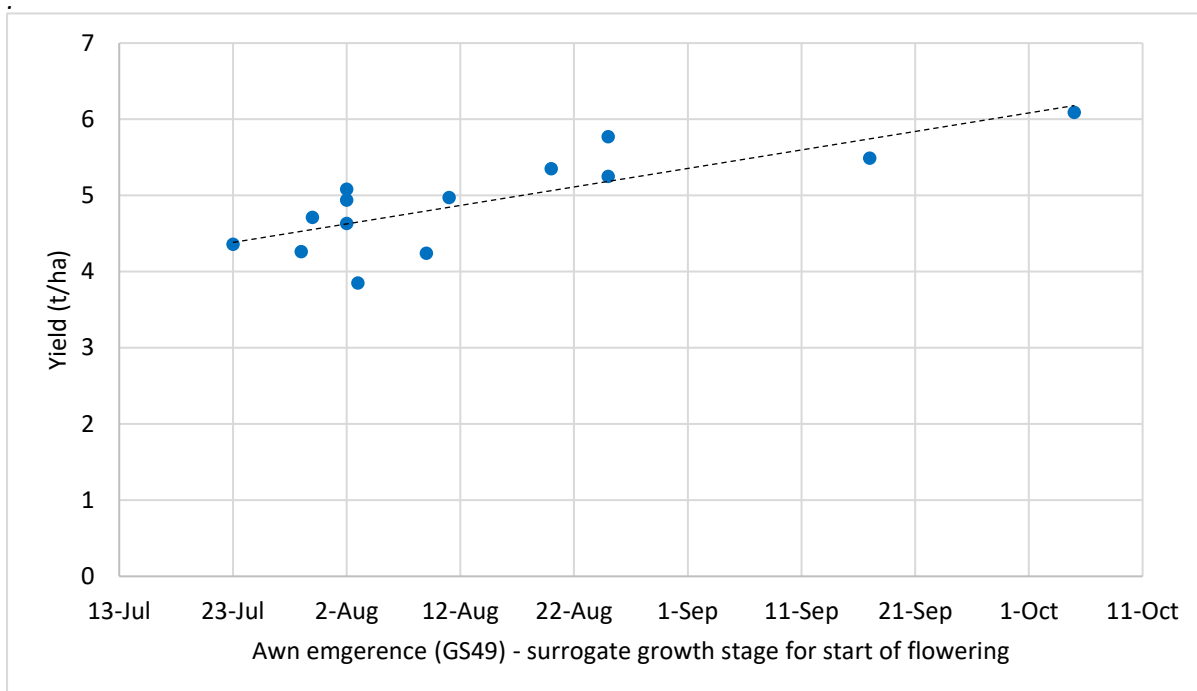


Figure 1. Relationship between the late booting stage (GS49) and yield (t/ha).

It was observed that later flowering is advantageous, with yields increasing if flowering starts after mid-August (Figure 1). Winter cultivars Newton and Pixel were some of the highest yielding varieties, 6.09 t/ha and 5.49 t/ha respectively, but due to harvesting at a high moisture of around 25%, these results may not be as accurate compared to if they were harvested on time.

All spring varieties which began flowering after the mid-August window reached over 5 t/ha, which is still two weeks before the 'sweet spot' flowering time in barley (Table 1). Of these varieties, a new InterGrain cultivar (IGB21130) produced the highest yield of 5.77 t/ha and reached GS49 on the 25 August. The fastest maturity variety was Leabrook which began flowering on the 23 July and yielded 4.36 t/ha.

Table 2. Influence of cultivar on grain protein (%), test weight (kg/hL), screenings (%) and retention (%). (S) indicates spring cultivar and (W) indicates winter cultivar.

Cultivar	Protein		Test Weight		Screenings		Retention	
	%		Kg/hL		%		%	
RGT Planet (S)	11.6	c-f	64.2	ab	0.8	f	96.3	a
Rosalind (S)	13.3	ab	62.2	bcd	1.5	cde	91.2	c
Minotaur (S)	12.2	cde	64.5	ab	0.9	ef	96.2	a
Laperouse (S)	12.5	bc	66.5	a	0.7	f	94.3	ab
Laureate (S)	10.8	fg	62.3	bcd	1.7	cd	91.7	c
AGTB0244 (S)	11.3	efg	63.0	bc	1.9	c	90.8	c
Fandaga (S)	13.6	a	63.0	bc	1.1	def	95.0	a
Newton (W)	9.3	h	58.2	e	2.5	b	82.7	d
Pixel (W)	9.1	h	60.3	de	3.2	a	71.6	e
Leabrook (S)	12.4	bcd	61.4	cd	1.2	def	94.4	ab
Cyclops (S)	12.6	abc	63.9	bc	1.3	c-f	92.3	bc
IGB21130 (S)	10.4	g	63.3	bc	1.0	ef	95.1	a
Zena CI (S)	11.3	d-g	63.5	bc	0.8	f	96.5	a
FireFoxx (S)	12.5	bc	64.2	ab	2.6	ab	82.1	d
Mean	11.6		62.9		1.5		90.8	
LSD (P=0.05)	1.1		2.6		0.6		2.4	
P-Value	<0.001		<0.001		<0.001		<0.001	

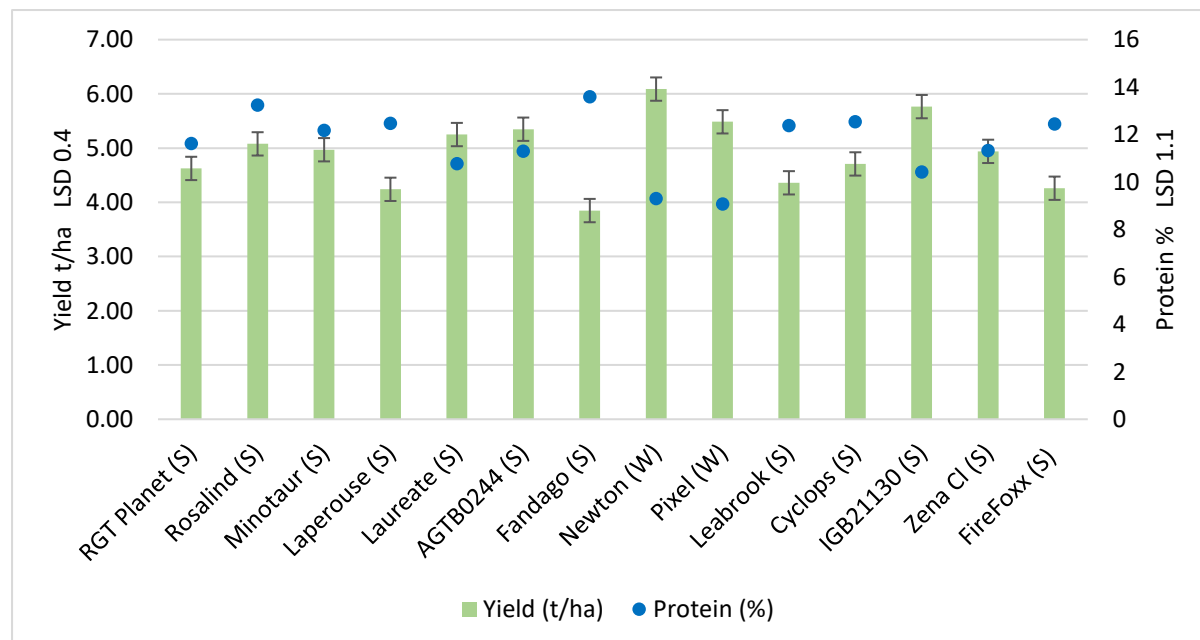


Figure 2. Influence of cultivar on grain yield (t/ha) and grain protein (%).

When comparing yield and protein content between varieties, a trend appears with higher yielding varieties in general having a lower protein percentage (Figure 2). Newton and Pixel had the significantly lowest protein percentage of 9.3% and 9.1% respectively (Table 2). Fandaga, the lowest yielding variety (3.85 t/ha) had the significantly highest protein of 13.6%.

Winter varieties had an issue with low grain quality, with significantly lower test weights (58.2 and 60.3kg/hL), higher screenings (2.5% and 3.2%) and lower retentions (82.7% and 71.6%, Table 2). Although these values wouldn't downgrade the quality from BFED1, the hectolitre weight is getting close to the minimum of 56kg/hL. There are significant differences in test weight, screenings and retention between the other cultivars, however, the effects of this are minimal.

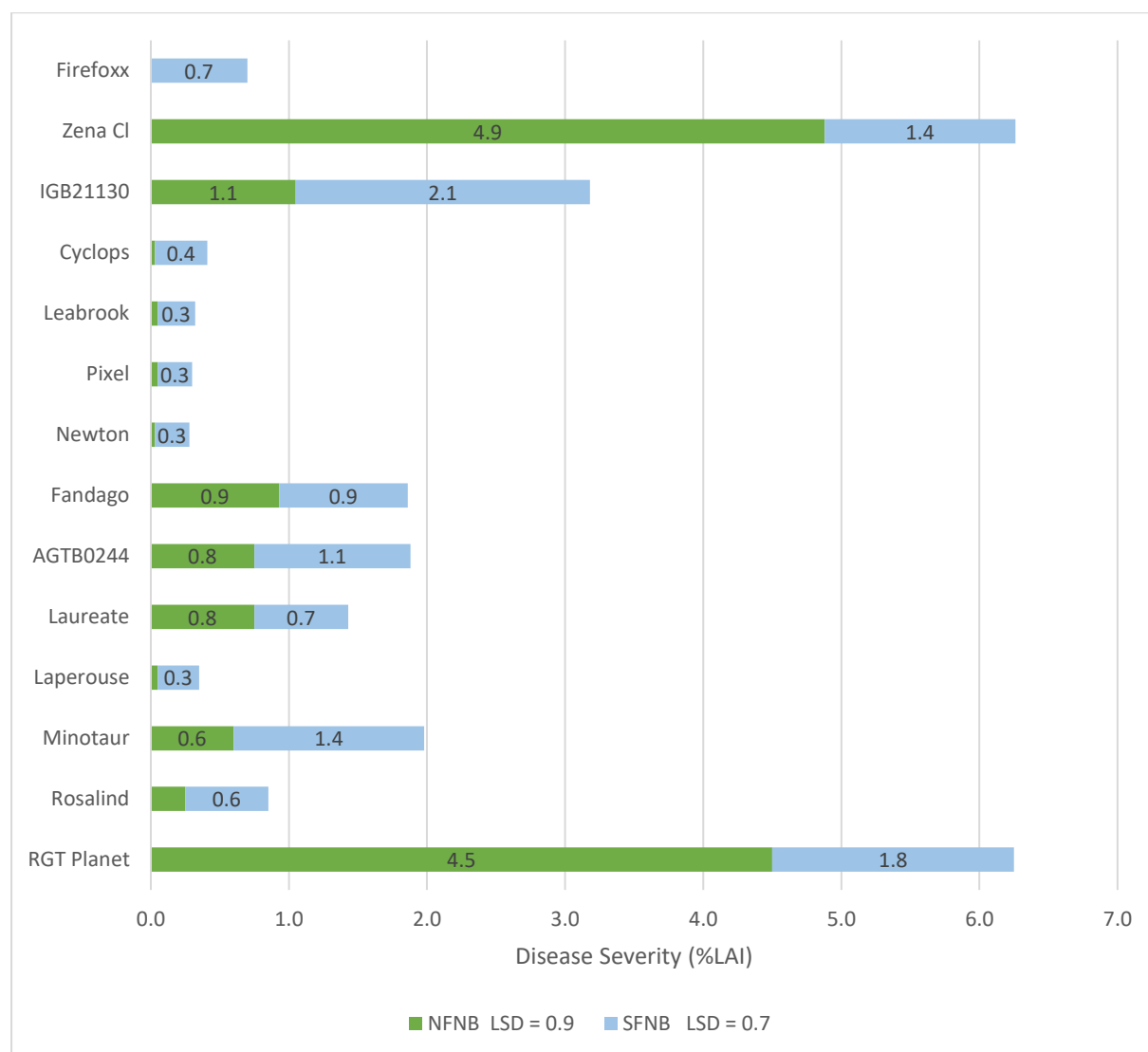


Figure 3. Net Form Net Blotch (NFNB) and Spot Form Net Blotch (SFNB) disease severity (%LAI) between cultivars.

The 2022 season presented high levels of disease pressure with SFNB being more prevalent, but NFNB having a larger impact on certain cultivars. Two fungicides were applied, 300 mL Prosaro at GS31 and 840 mL Radial at GS37-45. Due to the high volume of RGT Planet grown in the Albany and Esperance port zones, and the resistance of the fungus *Pyrenophora teres* to some DMI actives, this variety had significantly higher levels of NFNB incidence (4.5%, Figure 3). Zena CI, a new InterGrain variety, also had significantly higher levels, with an incidence of 4.8% as this cultivar is moderately resistance to very susceptible. IGB21130 had the highest incidence of SFNB (2.3%), however many cultivars were infected by this disease. Laperouse, Newton, Pixel, Leabrook and Cyclops all had very low levels of both diseases suggesting stronger genetic resistance package.

Table 3. Details of the management levels.

Sowing date:		20 April
Seed Rate:		200 Seeds /m ²
Sowing Fertiliser:		139kg MAP/MOP
Seed Treatment:		Vibrance / Cruiser
Grazing:		Nil
Nitrogen:	31 May	55 kg N/ha (20K)
	30 June	32 kg N/ha
PGR:	29 June	200 mL/ha Moddus Evo
	31 July	200 mL/ha Moddus Evo
Fungicide:	29 June (GS31)	300 mL/ha Prosaro
	31 July (GS37-45)	840 mL/ha Radial