

Table 2. Details of the management levels (kg, g, ml/ha).

Sowing date:		8 September
Seed Rate:		300 seeds/m ²
Sowing Fertiliser:		100kg MAP/ha
Seed Treatment:		Pontiac
Nitrogen:	1 Oct	160kg N/ha
Fungicide:	GS00	Systiva
	GS30	Radial 840ml/ha
	GS49	Aviator Xpro 420ml/ha

Trial 3. HYC G.E.M Trial series

Objective: To assess the performance of new spring barley germplasm managed under different canopy structures which includes plant density, fungicide and Nitrogen rate. This includes a spring sown wheat for comparison.

Key Points:

- The best managed treatments in Laureate, RGT Planet, Rosalind and the Wheat Zanzibar yielded 10.7, 10.7, 10.5, and 8.2t/ha respectively, highlighting spring sown barley out yields spring sown wheat by up to 2t/ha (table 1)
- Increasing fungicide inputs had little impact on grain yield in the cultivars Rosalind, Laureate and the wheat Zanzibar – this highlights the robustness of spring sowing for disease management and the fact high yields can be achieved with cheaper (without the SDHIs) and less fungicide inputs than Autumn sowing.
- Laureate: Canopy management was important in Laureate, lower nitrogen rates had a bigger influence on grain yield in Laureate than higher seeding and N rates due to increased lodging (figure 1)
 - High seeding density (360 seeds/m²), and high N rate (140kg N) yielded 8.2t/ha,
 - Lower density (150 seeds/m²) and low N rate (70 kg N/ha) yielded 10.3 t/ha.
- Planet: Highest yields were achieved at higher plant densities and high fungicide inputs irrespective of N strategy, highlighting Planet is less disease resistant but more tolerant to lodging than Laureate.
- Rosalind: Higher yields were achieved at higher plant densities irrespective of N and fungicide strategy, this highlights the importance of higher seeding densities in shorter faster developing cultivars under spring sown conditions.
- Test weights, screenings, and retention were all with malt specifications despite the heat during grain fill. Grain proteins ranged from 10.6 – 11.5 at low N in the malt cultivars Laureate and Planet, whereas at high N they ranged from 11.3 – 12.4 and were above malt specification in Laureate (Table 3)

Treatments: Lever 1 – Level of fungicide inputs (Standard input & high input).
 Lever 2 – Level of Nitrogen Inputs 70kg N/ha upfront, and 140 kg N/ha upfront.
 Lever 3 – Seeding Density (standard 150 seeds/m² versus 360 seeds/m²).
 Lever 3 –Germplasm (3 spring barleys - Laureate, RGT Planet & Rosalind, 1 spring wheat- Zanzibar).

Table 1. Details of the management levels (kg, g, ml/ha).

Sowing date:	8 September		
Seed Rate:		As per treatment list	
Sowing Fertiliser:		100kg MAP/ha	
Seed Treatment:		Pontiac	
Nitrogen:		As per treatment list	
Fungicide:		Standard Input	High Input
	GS00	----	Systiva
	GS30	Opus 500ml/ha	Radial 840ml/ha
	GS49	Prosaro 300ml/ha	Aviator Xpro 420ml/ha

Table 2. Influence of fungicide management strategy, variety and canopy management regime on grain yield (t/ha).

Management			Laureate		RGT Planet		Rosalind		Zanzibar		Mean	
Fungicide Input	Seed rate (m ²)	Nitrogen (kg N/ha)	Yield (t/ha)		Yield (t/ha)		Yield (t/ha)		Yield (t/ha)		Yield (t/ha)	
Standard	150	140	9.50	fgh	9.80	b-f	9.50	fgh	7.40	lm	9.10	c
Standard	360	140	8.50	ij	9.80	c-g	10.10	a-f	7.50	klm	9.00	c
High	150	140	9.10	ghi	9.70	d-g	10.50	a	7.30	m	9.10	bc
High	360	140	8.20	jk	10.20	a-e	10.30	a-d	7.70	klm	9.10	bc
Standard	150	70	10.00	a-f	9.80	b-f	9.00	hi	7.30	m	9.00	c
Standard	360	70	10.70	a	10.50	ab	10.10	a-f	8.00	jkl	9.80	a
High	150	70	10.30	a-d	10.20	a-f	9.60	e-h	7.50	klm	9.40	b
High	360	70	10.40	abc	10.70	a	10.30	a-e	8.20	jk	9.90	a
Mean			9.60	b	10.10	a	9.90	a	7.60	c	9.30	
LSD Variety p = 0.05					0.30		P Value		<0.001			
LSD Management p=0.05					0.20		P Value		<0.001			
LSD Var.x Man. P=0.05					0.70		P Value		<0.001			

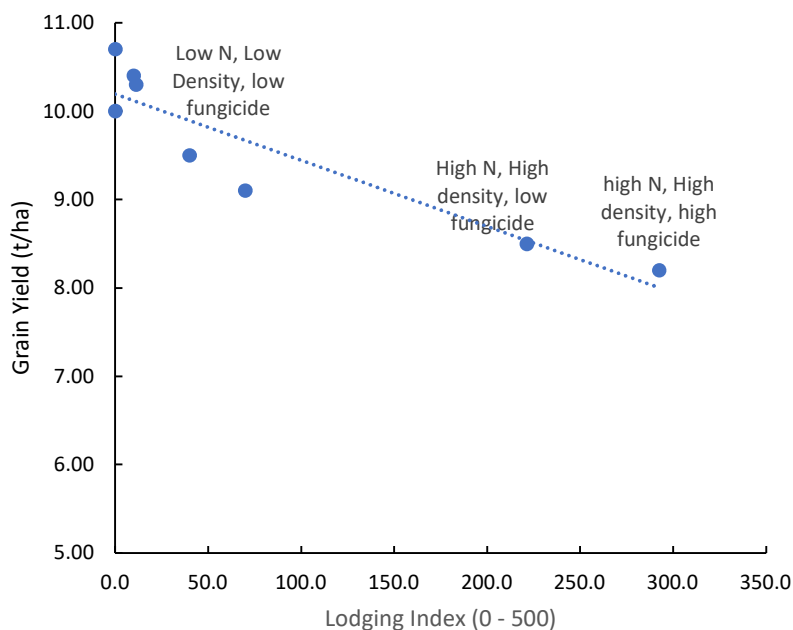
**Figure 1.** Relationship between lodging and grain yield in Laureate under different management intensities at Hagley, 2021

Table 3. Influence of fungicide management strategy, variety and canopy management regime on grain quality (note the wheat data has been omitted but can be available upon request).

	Fungicide	Seed rate	Nitrogen	Protein	Test wt	Retention	Screenings
Var.	Input	m ²	kg N/ha	%	Kg/hl	%	%
Laureate	Standard	150	140	12.3 -	66.3 -	89.3 de	2.6 a-d
	Standard	360	140	12.2 -	65.5 -	82.0 f	3.4 a
	High	150	140	12.4 -	66.7 -	90.0 cde	2.5 b-e
	High	360	140	12.1 -	66.3 -	87.4 e	2.3 c-g
	Standard	150	70	10.6 -	68.1 -	95.1 a	1.7 f-i
	Standard	360	70	11.4 -	66.5 -	93.2 abc	1.6 ghi
	High	150	70	11.5 -	67.6 -	93.6 abc	1.8 e-i
	High	360	70	11.3 -	67.0 -	93.4 abc	1.8 e-i
Mean				11.7 c	66.8 d	90.5 c	2.2 ab
RGT Planet	Standard	150	140	12.0 -	68.7 -	92.3 a-d	2.4 b-f
	Standard	360	140	11.8 -	67.9 -	90.0 cde	2.1 c-h
	High	150	140	11.8 -	68.2 -	93.1 abc	2.2 c-h
	High	360	140	11.3 -	68.7 -	91.0 b-e	2.0 c-i
	Standard	150	70	10.8 -	69.6 -	95.7 a	1.6 ghi
	Standard	360	70	11.1 -	68.9 -	94.2 ab	1.7 f-i
	High	150	70	10.8 -	69.8 -	95.4 a	1.5 ghi
	High	360	70	10.6 -	68.9 -	93.8 ab	1.8 d-i
Mean				11.3 d	68.8 b	93.2 b	1.9 b
Rosalind	Standard	150	140	12.9 -	67.8 -	95.9 a	1.4 hi
	Standard	360	140	12.7 -	69.1 -	95.6 a	1.5 ghi
	High	150	140	12.9 -	67.9 -	95.0 a	1.9 d-i
	High	360	140	13.1 -	68.3 -	95.7 a	1.2 i
	Standard	150	70	12.3 -	66.8 -	95.1 a	1.7 e-i
	Standard	360	70	11.9 -	69.4 -	95.0 a	1.6 f-i
	High	150	70	11.9 -	66.5 -	94.8 a	1.9 d-i
	High	360	70	12.0 -	68.7 -	95.0 a	1.7 f-i
Mean				12.1 b	79.5 a	---	2.4 a
Grand Mean				11.9	70.8	93.0	2.0
LSD Management p=0.05				0.4	ns	1.3	0.3
LSD Variety p = 0.05				0.3	0.7	1.2	0.3
LSD Var.x Man. P=0.05				ns	ns	3.5	0.8
P Value Management				<0.001	0.588	<0.001	0.001
P Value Variety				<0.001	<0.001	<0.001	<0.001
P Value Var.x Man.				0.685	0.289	<0.001	0.046

Trial 4. HYC Disease Management germplasm interaction

Objective: To develop profitable and sustainable approaches to disease management in HRZ barley.

Key Messages:

- There was no significant response to fungicide for grain yield or grain quality from spring sowing (table 1 and table 2).
- Disease levels were low, but despite up to 20% of the leaf area affected with net form of net blotch and scald there was no yield response (figure 1).
- Spring sown barley is incredibly robust, the canopy develops rapidly and disease develops later and has less impact on grain yield.