Table 1: Harvest Traits for the Treatments

NTiming	NRate	Grain Yield (t/ha)	Test Weight (kg/hL)	Protein (%)	Retention (%)	Screenings (%)
GS00GS23	0	9.35 ± 0.2 -	65.05 ± 0.42 -	11.52 ± 0.28 -	97.08 ± 0.63 -	0.86 ± 0.11 -
GS23GS30	0	9.16 ± 0.2 -	65.4 ± 0.42 -	10.9 ± 0.28 -	97.77 ± 0.63 -	0.62 ± 0.11 -
GS30GS33	0	9.57 ± 0.2 -	65.1 ± 0.42 -	11.48 ± 0.28 -	96.9 ± 0.63 -	0.75 ± 0.11 -
GS00GS23	80	9.42 ± 0.2 -	65.66 ± 0.42 -	12.37 ± 0.28 -	96.3 ± 0.63 -	0.77 ± 0.11 -
GS23GS30	80	9.73 ± 0.2 -	65.01 ± 0.42 -	11.8 ± 0.28 -	96.43 ± 0.63 -	0.95 ± 0.11 -
GS30GS33	80	10.19 ± 0.2 -	65.8 ± 0.42 -	12.03 ± 0.28 -	96.46 ± 0.63 -	0.76 ± 0.11 -
GS00GS23	160	9.49 ± 0.23 -	65.13 ± 0.48 -	12.48 ± 0.31 -	96.65 ± 0.69 -	0.8 ± 0.12 -
GS23GS30	160	10.06 ± 0.2 -	64.77 ± 0.42 -	12.15 ± 0.28 -	95.79 ± 0.63 -	1.07 ± 0.11 -
GS30GS33	160	10.08 ± 0.2 -	65.3 ± 0.42 -	13.03 ± 0.28 -	95.14 ± 0.63 -	0.94 ± 0.11 -
GS00GS23	240	9.23 ± 0.23 -	65.15 ± 0.48 -	12.97 ± 0.31 -	95.85 ± 0.69 -	0.8 ± 0.12 -
GS23GS30	240	9.75 ± 0.2 -	65.19 ± 0.42 -	12.5 ± 0.28 -	95.54 ± 0.63 -	1.06 ± 0.11 -
GS30GS33	240	9.98 ± 0.2 -	64.77 ± 0.42 -	13.72 ± 0.28 -	94.68 ± 0.63 -	1.06 ± 0.11 -

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	Grain Yield (t/ha)	Test Weight (kg/hL)	Protein (%)	Retention (%)	Screenings (%)
LSD	0.600	1.200	0.700	1.400	0.300
Mean	9.700	65.200	12.200	96.200	0.900
NTiming_p-value	0.012	0.876	0.088	0.173	0.266
NRate_p-value	0.020	0.391	0.000	0.000	0.012
Interaction_p-value	0.475	0.640	0.105	0.530	0.095
CV	4.968	1.238	7.327	1.433	27.797

Trial 3. Lodging Control in Irrigated Crops – Winter and Spring Barley

Protocol Objective:
To compare and contrast plant growth regulation strategies in winter and spring barley germplasm.

Location: Finley IRC
Sown: 29th April 2021
Harvested: 4th December 2021
FAR Code: FAR B21-09-1
Cultivar: RGT Planet & Cassiopee
Rotation position: Canola (2020), Wheat (2019), Faba Beans (2018)
Soil Management: Cultivated with speed disc in Autumn
Irrigation: Surface irrigation, 2 applications totalling 224mm
GSR: April-October 192mm. Total water available 416mm.

Key Points:

- *Under overhead irrigation in a relatively fertile rotation position (first barley after canola) the spring barley RGT Planet significantly out yielded the winter cultivar Cassiopee (10.07 vs. 8.98t/ha).*
- *Applying Moddus Evo at 400 ml/ha either as a single application (GS31) or split (GS31 & GS33) led to a significant increase in grain yield (9.87 – 9.92 t/ha) compared to the grazed or untreated plots (8.97 & 9.35 t/ha), averaged across both varieties.*
- *There was no interaction between variety and PGR application or grazing on plant height, lodging or yield indicating that both the spring and winter cultivar responded similarly.*
- *Cassiopee grew taller and was subject to significantly more lodging than RGT Planet.*

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- *Both varieties showed positive responses to PGR applications of Moddus Evo (trinexapac ethyl) in terms of reduced crop height, lodging control and final grain yield.*
- *Grazing achieved a significant reduction in crop height (6cm) at harvest; statistically the same as the effect of Moddus Evo at either rate however it was associated with reduced yield and grain protein (data not shown).*
- *Grazing winter barley at GS30 produced significantly more dry matter than grazing spring barley that reached GS30 earlier in the winter (1928 vs 726kg DM).*
- *Unlike other trials conducted on cereals at the Finley site grazing did not reduce lodging in this experiment.*
- *A single application of Moddus Evo 400mL/ha at GS31 had significantly less lodging than the untreated plots.*

The spring barley RGT Planet was significantly higher yielding than the winter barley Cassiopee grown under overhead irrigation. Cassiopee was later to develop in the spring and subject to greater lodging (Table 1 & 3).

Table 1. Influence of variety (winter v spring barley), PGR strategy and grazing on grain yield (t/ha).

		Cultivar		
		RGT Planet	**Cassiopee**	**Mean**
		Yield t/ha	**Yield t/ha**	**Yield t/ha**
Untreated		9.95 -	8.75 -	9.35 b
200ml/ha Moddus Evo x 2 apps		10.16 -	9.68 -	9.92 a
400ml/ha Moddus Evo		10.42 -	9.32 -	9.87 a
Grazed at GS31		9.77 -	8.18 -	8.97 b
Mean		10.07 a	8.98 b	
Cultivar	LSD p=0.05	0.32	**P val**	<0.001
PGR Strategy	LSD p=0.05	0.42	**P val**	0.002
Cultivar x PGR	LSD p=0.05	ns	**P val**	0.114

Yield figures followed by different letters are considered to be statistically different (p<0.05)

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Table 2. Influence of variety (winter v spring barley), PGR strategy and grazing on plant height (cm) at harvest – 2nd December.

		Cultivar		
		RGT Planet	**Cassiopee**	**Mean**
		Height cm	**Height cm**	**Height cm**
Untreated		81.8 -	95.5 -	88.6 a
200ml/ha Moddus Evo x 2 apps		79.5 -	89.3 -	84.4 b
400ml/ha Moddus Evo		77.8 -	90.8 -	84.3 b
Grazed at GS31		79.5 -	86.5 -	83.0 b
Mean		79.6 b	90.5 a	
Cultivar	LSD p=0.05	2.1	**P val**	<0.001
PGR Strategy	LSD p=0.05	3.0	**P val**	**0.011**
Cultivar x PGR	LSD p=0.05	ns	**P val**	0.109

Height figures followed by different letters are considered to be statistically different (p<0.05)

Table 3. Influence of variety (winter v spring barley), PGR strategy and grazing on crop lodging (0 – 500 scale) at maturity – 15th November.

		Cultivar		
		RGT Planet	**Cassiopee**	**Mean**
		Lodging 0-500	**Lodging 0-500**	**Lodging 0-500**
Untreated		13 -	99 -	56 ab
200ml/ha Moddus Evo x 2 apps		14 -	45 -	30 bc
400ml/ha Moddus Evo		5 -	50 -	27 c
Grazed at GS31		25 -	102 -	63 a
Mean		14 **b**	74 **a**	
Cultivar	LSD p=0.05	27	**P val**	<0.001
PGR Strategy	LSD p=0.05	29	**P val**	**0.042**
Cultivar x PGR	LSD p=0.05	ns	**P val**	0.394

The winter barley Cassiopee produced more dry matter at GS30 than RGT Planet with almost 2000kg/ha dry matter produced (Table 4). This is primarily the result of a longer vegetative period up to GS31 for dry matter production. The spring variety RGT Planet reached 1st node (GS31) on 2tth July whilst Cassiopee reached the same growth stage on 18th August.

Table 4. Influence of variety (winter v spring barley) on a single dry matter removal at GS31 (kg/ha DM).

		Dry matter (kg/ha)		
Cultivar	**Grazing date and GS**	**Pre-graze**	**Post Graze**	**DM Removed**
		kg/ha	**kg/ha**	**kg/ha**
RGT Planet	27 July - GS31	1696 -	971 -	726 b
Cassiopee	18 August - GS31	3283 -	1355 -	1928 a
LSD p=0.05		ns	ns	1039
P val		0.076	0.322	0.038

Released: 27 Sept 2022

SAGI statistical analysis (Predicted values for Yield, Harvest dry matter, test weight, retentions, screenings and grain protein) 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

PGR	Cultivar	Grain Yield (t/ha)	Test Weight (kg/hL)	Harvest DM (t/ha)	Protein (%)	Retention (%)	Screenings (%)
FullRate	Cassiopee	9.31 ± 0.28 -	65.24 ± 0.57 -	17.82 ± 1.32 -	13.8 ± 0.31 -	89.51 ± 1.7 -	2.07 ± 0.26 -
Grazed	Cassiopee	8.19 ± 0.28 -	64.28 ± 0.57 -	18.16 ± 1.33 -	12.86 ± 0.31 -	86.07 ± 1.8 -	2.86 ± 0.35 -
HalfRateSplit	Cassiopee	9.69 ± 0.27 -	64.8 ± 0.56 -	19.47 ± 1.31 -	13.54 ± 0.31 -	85.32 ± 1.7 -	2.96 ± 0.37 -
Untreated	Cassiopee	8.74 ± 0.28 -	64.92 ± 0.57 -	18.39 ± 1.33 -	14.14 ± 0.31 -	88.88 ± 1.8 -	2.07 ± 0.26 -
FullRate	RGT Planet	10.48 ± 0.27 -	65.78 ± 0.56 -	19.44 ± 1.31 -	12.76 ± 0.31 -	95.04 ± 1.65 -	1 ± 0.12 -
Grazed	RGT Planet	9.78 ± 0.28 -	66.03 ± 0.57 -	17.33 ± 1.34 -	11.8 ± 0.32 -	92.28 ± 1.85 -	1.21 ± 0.15 -
HalfRateSplit	RGT Planet	10.11 ± 0.27 -	65.08 ± 0.57 -	20.1 ± 1.31 -	13.03 ± 0.31 -	93.17 ± 1.79 -	1.12 ± 0.14 -
Untreated	RGT Planet	9.93 ± 0.27 -	66.25 ± 0.57 -	17.12 ± 1.31 -	12.46 ± 0.31 -	95.7 ± 1.67 -	0.93 ± 0.11 -

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	Grain Yield (t/ha)	Test Weight (kg/hL)	Harvest DM (t/ha)	Protein (%)	Retention (%)	Screenings (%)
LSD	0.600	1.600	3.500	0.700	4.500	0.300
Mean	9.500	65.300	18.500	13.000	90.700	1.700
PGR_p-value	0.002	0.729	0.152	0.010	0.141	0.334
Cultivar_p-value	0.000	0.011	0.867	0.000	0.000	0.000
Interaction_p-value	0.108	0.404	0.711	0.123	0.898	0.802
CV	9.047	1.831	14.229	6.905	5.191	59.113

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