Trial 5. HYC PGR x harvest date interaction (FAR WAA B22-05)

Objective: To assess the value of PGRs with delayed harvest in HRZ regions for its effect on grain yield losses due to harvest timing, lodging, head loss and brackling.

Key points

- There was no significant interaction between PGR management, harvest date and variety. However, when harvested on-time, a single Moddus Evo spray was lower yielding compared to the untreated management but when harvest was delayed by almost a month, the single spray became significantly higher yielding tha*n* the split Moddus Evo management.
- Cyclops produced a yield of 4.74 t/ha which was significantly higher than Leabrook 4.31 t/ha, when averaged across all treatments in the trial.
- Leabrook was shown to be more prone to head loss when harvest is delayed and no PGR intervention used, however this did not translate into significant differences in final grain yield.
- The delayed harvest date did produce a significantly higher yield but did also create higher levels of lodging and brackling in both cultivars.
- In Cyclops, the shorter variety, the untreated control yielded the highest in both the on time and delayed harvest, with the use of PGR's reducing yield. The inverse in true for Leabrook, with the application of some PGR's increasing yield when compared to the control.

Treatments: 4 PGR management approaches applied to two cultivars and harvested at two harvest dates.

Harvest dates:

1. On time harvested on 22 November
2. Delayed harvested on 20 December

Plant growth regulators (PGR) treatments:

1. Untreated
2. GS31 PGR (trinexapac ethyl based)
3. GS31 + GS37 PGR (trinexapac ethyl based)
4. European approach based on GS31 (trinexapac ethyl & GS37 of Ethepon 720 @500 mL/ha)

Table 1. Influence of PGR management strategy, variety and canopy management regime on grain yield (t/ha).

		Cyclops		Leabrook		Mean	
Variety		4.74	a	4.31	b	**4.53**	
	LSD (P=0.05)	0.1		***P-Value***		<0.001	
Harvest Date x variety							
On time		4.36	-	3.90	-	**4.13**	**b**
Delayed (28 days delay)		5.12	-	4.71	-	**4.92**	**a**
Harvest Date	***LSD***	0.1		***P-Value***		<0.001	
Harvest Date x Variety	***LSD***	ns		***P-Value***		0.567	
Canopy Management Regime x variety							
Untreated		4.92	a	4.22	c	4.57	-
GS31 PGR		4.76	ab	4.30	c	4.53	-
GS31 + GS37 PGR		4.62	b	4.31	c	4.46	-
GS31 + GS37 PGR (Europe style)		4.66	b	4.40	c	4.53	-
Canopy Management	***LSD***	ns		***P-Value***		0.554	
Variety x Canopy Mgmt	***LSD***	0.2		***P-Value***		0.023	
Harvest Date. x Canopy Mgmt. x Variery							
On Time							
Untreated		4.57	-	3.94	-	4.26	c
GS31 PGR		4.29	-	3.74	-	4.01	d
GS31 + GS37 PGR		4.28	-	3.98	-	4.13	cd
GS31 + GS37 PGR (Europe style)		4.31	-	3.92	-	4.11	cd
Delayed							
Untreated		5.27	-	4.49	-	4.88	ab
GS31 PGR		5.22	-	4.86	-	5.04	a
GS31 + GS37 PGR		4.96	-	4.62	-	4.80	b
GS31 + GS37PGR (Europe style)		5.02	-	4.88	-	4.95	ab
Harvest Date x Canopy Mgmt	***LSD***	0.2		***P-Value***		0.030	
Harvest Date x Canopy Mgmt x Variety	***LSD***	ns		***P-Value***		0.506	

Cyclops produced a yield of 4.74 t/ha which was significantly higher than Leabrook 4.31 t/ha, when averaged across all treatments in the trial. Although not significantly different, in Cyclops, a shorter variety, the untreated in both the on time and delayed yielded higher than treatments with PGRs applied. The inverse can be seen for Leabrook, a taller cultivar, where some of the PGR treatments produced a higher yield than the untreated.

Table 2. Canopy management and harvest date effect on peduncle length (mm), lodging index (0-500) and brackling (%) across two varieties (Cyclops and Leabrook).

Canopy Management x Harvest Date		Peduncle Length (mm)		Lodging Index (0-500)				Brackling %			
		Leabrook		Cyclops		Leabrook		Cyclops		Leabrook	
On Time	Untreated	200.6	a	0.8	c	3.4	bc	1.0	e	3.5	de
	GS31	167.3	ab	0.0	c	0.8	c	0.0	e	2.3	de
	GS31 + GS37	138.1	b	0.0	c	1.0	c	0.0	e	1.0	e
	European GS31	150.5	b	0.0	c	0.0	c	0.0	e	1.8	e
Delayed	Untreated	199.7	a	8.8	a	8.3	a	3.0	de	22.5	a
	GS31	173.5	ab	1.0	c	6.6	ab	1.8	e	9.5	c
	GS31 + GS37	151.6	b	1.6	c	7.6	a	0.0	e	16.3	b
	European GS31	161.1	b	0.5	c	0.5	c	0.0	e	6.8	cd
Grand Mean		167.8		2.5				4.3			
LSD (P=0.05)		36.3		4				4.6			
Treatment Prob(F)		0.035		<0.001				<0.001			

Peduncle length was measured in Leabrook to determine if the PGRs had an effect on plant growth, with results showing that two applications of Moddus Evo at GS31 and GS37 and the European approach significantly reduce the length when compared to the untreated. Although there weren't high levels of lodging in either variety, it can be seen that PGRs did reduce the severity in both varieties, with a similar trend being true for brackling.

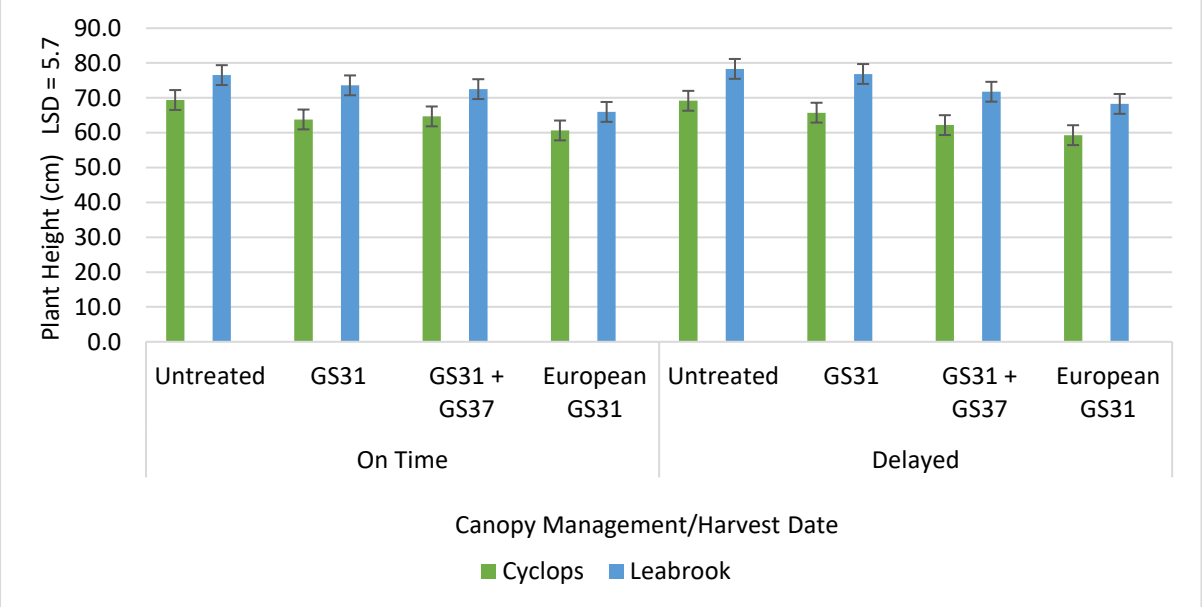

Figure 1. Canopy management and harvest date effect on plant height across two varieties (Cyclops and Leabrook) at GS99.

In general, Cyclops was significantly shorter than Leabrook, with PGRs having a significant influence on plant height. The European approach produced the shortest crops out of all treatments.

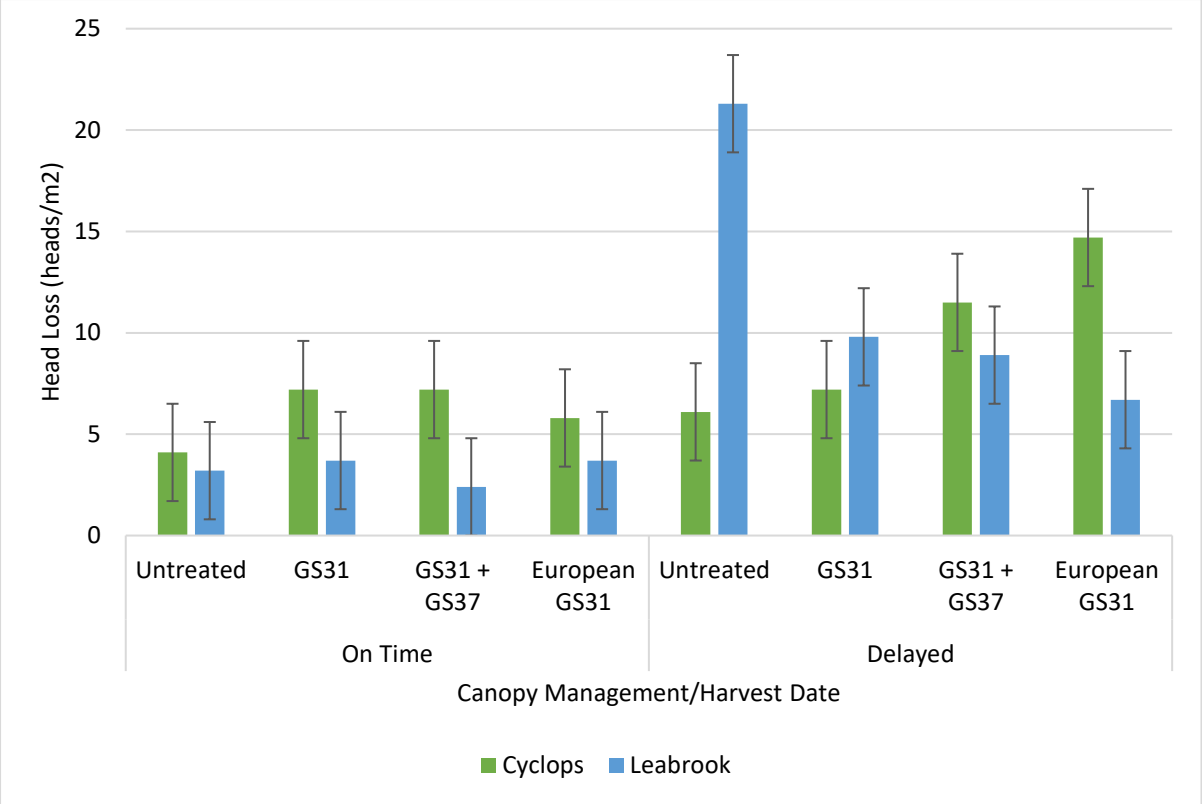

Figure 2. Canopy management and harvest date effect on head loss at harvest, across two varieties (Cyclops and Leabrook).

Table 3. Details of the management levels.

Sowing date:		**20 April**
Seed Rate:		200 Seeds/m^2
Sowing Fertiliser:		139 kg MAP/ MOP
Seed Treatment:		Vibrance / Cruiser
Grazing:		Nil
Nitrogen:	31 May	55 kg N/ha (20K)
	30 June	32 kg N/ha
PGR:	30 June (GS31)	As per treatment list
	31 July (GS37-39)	As per treatment list
Fungicide:	30 June (GS31)	300 mL/ha Prosaro