Plant growth regulators in wheat

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Key findings

- Plant growth regulators had no significant impact on wheat grain yield.
- The only grain quality parameter to be influenced by PGR or nitrogen application was grain protein.

Why do the trial?

Plant growth regulators (PGR's) are common inputs for cereal crops in Europe and New Zealand, where their main role is in the prevention of crop lodging. In southern Australia much work has previously been conducted on PGR's, with inconsistent results. Even where crop height is significantly reduced, grain yield and crop water use efficiency is not always increased.

This trial using wheat aimed to measure the effect of plant growth regulants and their interaction with nitrogen on wheat grain yield and quality, in the absence of lodging.

How was it done

Plot size	2 m x 6 m	**Fertiliser**	DAP/Urea (27:12) @ 90 kg/ha
Seeding date	28th May 2013	**Variety**	Emu Rock wheat @ 75 kg/ha rate

Post emergent PGR and nitrogen:

The Hart site commercial crop received 100 kg N/ha on the 15th August.

The PGR treatment (1 L/ha Cycocel + 200 mL/ha Moddus Evo) and nitrogen (46 kg N/ha) was applied on the 14th August. Crop growth stage at the time of PGR application was stem elongation (GS31).

The exact same trial was located in two sections of the Hart commercial crop. Each trial was a randomised complete block design with 3 replicates using Emu Rock wheat.

All cereal grain plots were assessed for grain yield, protein, and wheat screenings with a 2.0 mm screen.

Results

The application of PGRs to wheat significantly reduced the crop height between 10-15 cm. Compared to the treatment where no PGR was added these plots were clearly visible in the commercial crop.

Application of PGRs with or without additional nitrogen did not increase wheat grain yield in either of the PGR trials at Hart (Table 1 and 2). Although not significant, there was a slight reduction in grain yield for treatments where PGR was applied (Table 1 and 2). This is similar to results obtained in 2012 over four sites (Hart, Saddleworth, Condowie and Spalding), where grain yield was the same or in some cases reduced where PGRs were applied.

In both trials differences in grain protein were observed. In the South-West trial (Table 1) grain protein was significantly different for nitrogen and PGR separately. The addition of nitrogen or PGR separately significantly increased grain protein compared to the nil. In the North-East trial the protein results were conflicting. The nil treatment, PGR plus nitrogen and nitrogen alone had the highest protein contents. The addition of PGR alone decreased protein content in this trial.

The application of PGRs or N did not affect grain test weight and very minor differences were observed in screenings (Table 2).

Table 1. The interaction of plant growth regulators (PGRs) and nitrogen on grain yield (t/ha) and quality of Emu Rock wheat in commercial crop (South-West) at Hart in 2013.

Treatments		Yield	Protein	Test Wt	Screenings
PGR	Nitrogen (kg /ha)	(t/ha)	(%)	(kg/hL)	(%)
No	0	2.60	12.6 c	81.6	4.8
No	46	2.40	14.0 a	80.2	4.5
Yes	0	2.30	13.5 b	80.9	5.4
Yes	46	2.45	14.4 a	79.6	4.7
LSD (P≤0.05)	PGR	ns	0.49	ns	ns
	N	ns	0.49	ns	ns
	PGR*N	ns	ns	ns	ns

Table 2. The interaction of plant growth regulators (PGRs) and nitrogen on grain yield (t/ha) and quality of Emu Rock wheat in commercial crop (North-East) at Hart in 2013.

Treatments		Yield	Protein	Test Wt	Screenings
PGR	Nitrogen (kg /ha)	(t/ha)	(%)	(kg/hL)	(%)
No	0	2.49	12.6 a	80.2	5.9 bc
No	46	2.49	12.3 ab	80.9	5.6 c
Yes	0	2.30	11.3 b	81.6	7.9 a
Yes	46	2.37	13.2 a	79.8	6.8 b
LSD (P≤0.05)	PGR	ns	ns	ns	1.09
	N	ns	ns	ns	ns
	PGR*N	ns	1.25	ns	ns