

Plant Growth Regulators Trial

In 2012 and 2013, trials looking at Plant Growth Regulator (PGR) use on barley were resulting in yield increases with the use of the PGR trinexapac-ethyl (Moddus Evo or Marvel) despite little effect on crop height or lodging.

The 2014 trial was sown to see if the yield improvement could be repeated and to expand the trial to examine the effects the effect of a range of PGRs on canola, fabas and wheat.

PGR Overview

Plant Growth Regulator is a term that describes many agricultural and horticultural chemicals that influence plant growth and development. This influence can be positive, eg larger fruit or more pasture growth, and negative eg shorter stems or smaller plant canopies. Most of the broadacre use of PGRs is to have a negative influence on plant growth, ie they are applied with the intention of producing a smaller plant that is resistant to lodging or reduce excessive growth in the crop.

There are 4 broad groups of PGRs in use in Australian crops. **NOTE: Not all products are registered for use on all crop types, and some products are registered for use but not as PGRs which may have different rates and timings from that on the label.**

- i. Ethephon eg Ethrel®
- ii. Onium types eg Cycocel®, Chlomequat®, Pix®
- iii. Triazoles eg propiconazole, Orius® (tebuconazole)
- iv. Trinexapac-ethyl eg Moddus Evo®, Marvel®

These PGRs act by reducing plant cell expansion, resulting in, among other things, shorter and possibly thicker stems. If the stems are stronger and shorter, then the crop is less likely to lodge.

The majority of the PGRs (groups ii to iv) reduce crop height by reducing the effect of the plant hormone gibberellin. These are applied at early stem elongation (Z30-32). Ethephon is applied from flag leaf emerging (Z37) to booting (Z45) and reduces stem elongation through the increase in concentration of ethylene gas in the expanding cells.

Other benefits claimed by the producers of various products include;

1. better root development that allows for increased root anchorage
2. better root development providing greater opportunity for water and nutrient scavenging
3. may offer improved grain quality
4. reduction in shedding in barley
5. increased Harvest Index (the ratio between grain and total dry matter)
6. faster harvest speeds and reduced stress at harvest.

An alternative to the chemical PGRs is grazing. Demonstrated in the Grain and Graze project on a number of sites was the effect grazing had on the crops where the grazed treatments/crops were shorter than the non-grazed and were less prone to lodging.

Faba Bean Results

Once again, there are no PGRs registered for use on faba beans. Using similar treatments to that used in canola, Fiesta fabas were treated when the first flowers were visible.

Fabas	Treatment	Yield (t/ha)	Height (cm)	Lodging
	Control	5.94	98.3	7.3
	Orius	5.95	96.7	7.7
	Orius + Cycocel	6.03	96.7	7.3
	Marvel	6.21	98.3	8.0
p		0.548	0.125	0.194
lsd		NS	NS	NS

As can be seen in the table, no treatment had any effect on yield, plant height or lodging. 2015 will see a repeat of the trial but looking at a wider range of PGRs, as well as timing of application.