

Plant Growth Regulators Trials - Canola

The ICC has been trialling the use of Plant Growth Regulator (PGR) for many years. Results have been mixed, but their use on barley appears to be promising with yield increases in 3 out of 4 seasons, using the PGR trinexapac-ethyl (Moddus Evo or Marvel) despite little effect on crop height or lodging. Other crops have had mixed results - wheat has seen variable response to crop height control and little yield response, minimal height response in canola with no change in yield and no response at all in fabas.

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®, Chlormequat®, Pix®
- iii. Triazoles eg propiconazole, tebuconazole, paclobutrazol
- 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.

There are no PGRs registered for use on canola, although there are products used overseas that may be registered for use in Australia in the future. PGRs are used in Europe to reduce the depth of the canopy so light can reach the lower pods and aid grain fill. Compared to European conditions, Australian crops ripen under much higher sunlight levels that can penetrate through the canopy.

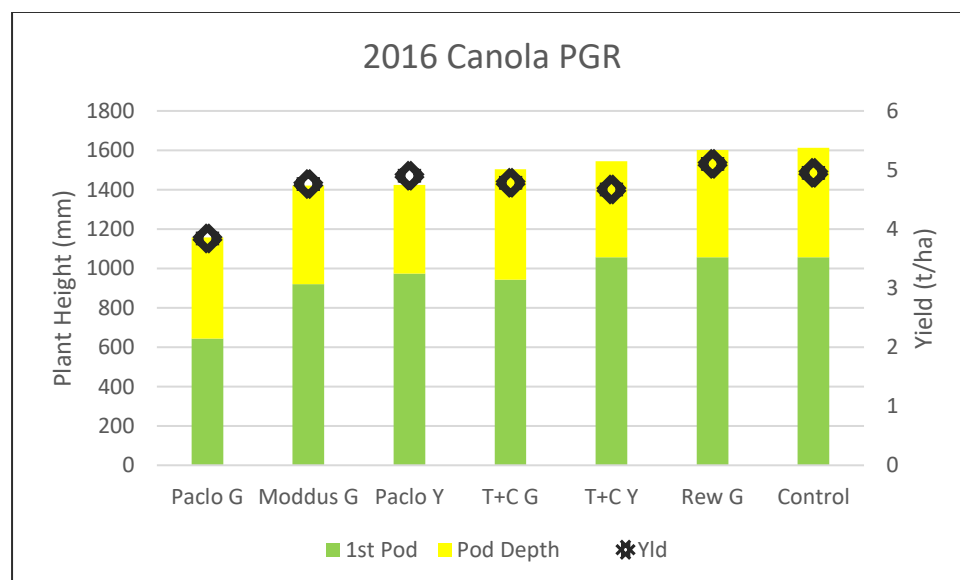
With little result in the last two seasons, the trial was repeated again looking at alternative timings for the application of the PGRs and a new triazole fungicide paclobutrazol not tested last season.

The PGR treatments were:

1. Chloremequat + Tebuconazole (pgr + triazole)
2. Prosaro (triazole fungicide)
3. Reward (mepiquat)
4. Moddus (trinexapac-ethyl)
5. Paclobutrazol (triazole fungicide)

GT50 canola was sown April 18th. The PGRs were applied at either green buds (G) visible on July 14th or the beginning of flowering (Y) on August 4th.

Timing of application of the treatments is not definitive. While searching papers for suitable treatments to include in this trial, successful results were achieved with the application of the PGRs at around buds visible through to the flower buds starting to yellow.



The paclobutrazol applied at green bud did an extremely effective job in reducing the overall plant height, but did so by shortening the height to first pod. Teb + Chloremequat and Moddus both at green bud also reduced height to first pod. Any green bud applications did not affect the depth of podding and this was only influenced by paclobutrazol and Teb + Chloremequat at yellow bud.

Yield and oil content was reduced by the paclobutrazol applied at green bud. No other treatment had any effect on yield and oil.

Lodging was reduced slightly in the Teb + Chlormequat Y, Paclo Y and Moddus G treatments, with the Paclo G treatment not lodging at all.