

## The impact of rate and timing of clethodim applications on canola–Coolah 2015

Trail Code: GOCD00115-3

Year: Winter 2015

Location: “Kurrajong Park” Paspaley Farms, Coolah

Collaborators: Paspaley Family & Andrew McFadyen

### Background

Increasing levels of Group A fop resistance and the drop in retail pricing of clethodim<sup>1</sup> based herbicides has driven increases in both the frequency of use and the rates applied of these products in canola. It has been long noted that clethodim can at times cause some level of crop damage but the conditions that invoke this expression are not very clear and neither are the actual impacts on yields.

Visual effects are most commonly observed at higher rates however, it is ambiguous as to whether the damage is simply related to higher rates or a combination of rate, timings (either late or during unfavourable weather conditions) or just some varieties are more sensitive than others.

The translation of these visible effects to yield is also unclear, some commentary suggests that the visual symptoms of flower distortion or pod abortion have little or no impact upon final yield as the canola crop compensates well. The other end of the commentary is that the impacts on flowering and pod formation are irreversibly detrimental and the effects upon yield substantial.

GOA has been running trials investigating these questions over the past two years and this report details the findings from further trials in 2015.

### DISCLAIMER

Following is a report on a scientific experiment. It may contain some herbicide treatments that are not registered for the situation, manner or rate at which they are used in this trial. This document or anything else resulting from, construed or taken from this or by GOA or its representatives should not be taken as a suggestion, recommendation or endorsement of any unregistered herbicide uses.

### Aim

- Identify possible contributors to the expression of clethodim damage in canola, such as the herbicide application rate & timing or other factors such as environmental conditions around application.
- Quantify what, if any, is the level of yield impact is associated with the use of clethodim

### Methods

The trial was conducted on cone seeded small plots, using a randomised complete block design with three replicates.

---

<sup>1</sup> Example trade names- Select, Plantinum, Status, Clethodim 240

To investigate the possible causes of clethodim damage a range of clethodim rates (1/2, full and double the label rate) and a range of timings were tested. The timings tested were applications within label recommendations, delayed applications when the bud was visible and ones applied when poor growing conditions were forecast. The use of Factor, an alternate Group A, Dim herbicide was also tested both alone and in combinations with clethodim. All herbicide treatments were applied with Uptake Spraying oil at 0.5% of the spray volume.

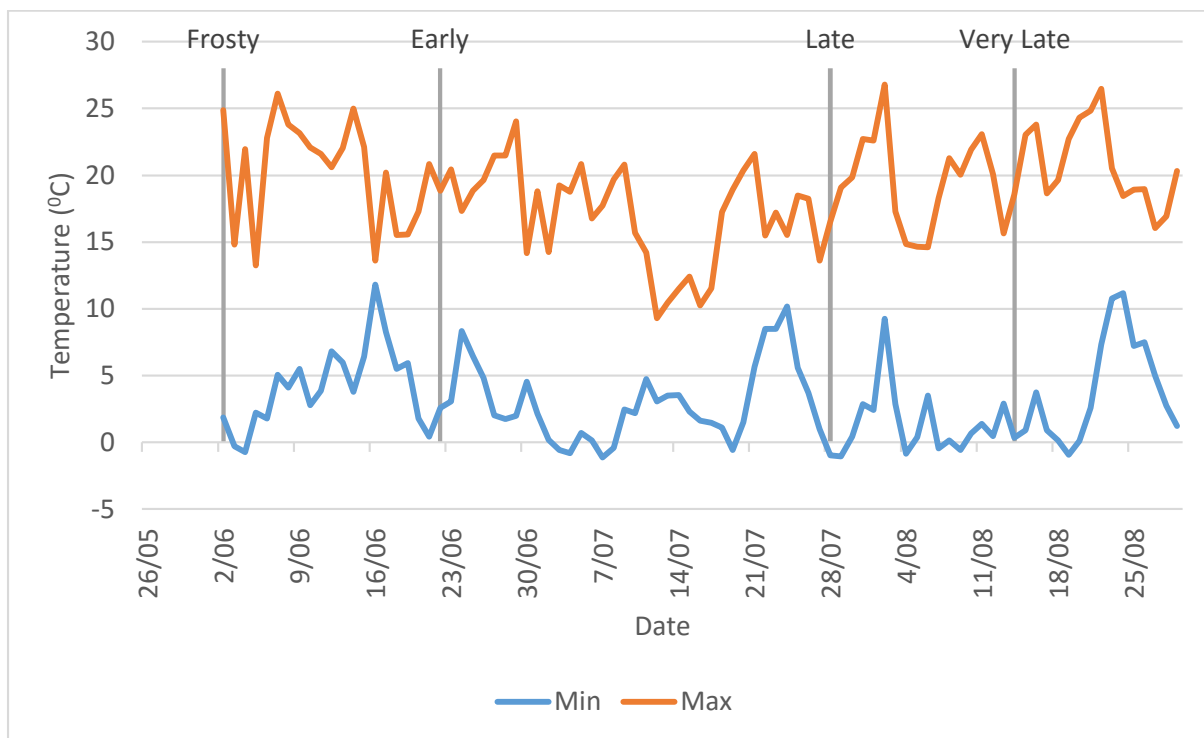
Details of the timing of applications are contained in **Table 2** below. All treatments were applied using a hand boom applying 100L/ha of herbicide and rain water through AIXR015 nozzles at 3 bar. The trial was also sprayed with Lontrel Advance™ @150 mL/ha and Verdict 520™ at 100 mL/ha (with Uptake™) on the 15/06/2015 and Intervix @ 750 mL/ha on the 15/6/2015 to ensure no weed pressure in the trial area, any surviving plants were hand pulled when found.

**Table 1.** Trial site details

Trial Establishment Date	Autumn 2015		
Crop and Variety	Canola - 44Y84CL	Seeding rate	2 kg/ha
Sowing date	30/04/2015	Harvest Date	9/11/2015
Seedling equipment	Double Boot Tyne	Row Spacing	27.5 cm
Crop Nutrition (kg/ha)	100 MAP, 100 Urea	Soil type	Clay Loam
Previous Crop	Wheat	Pre Sowing Stubble Management	Burnt pre-sowing

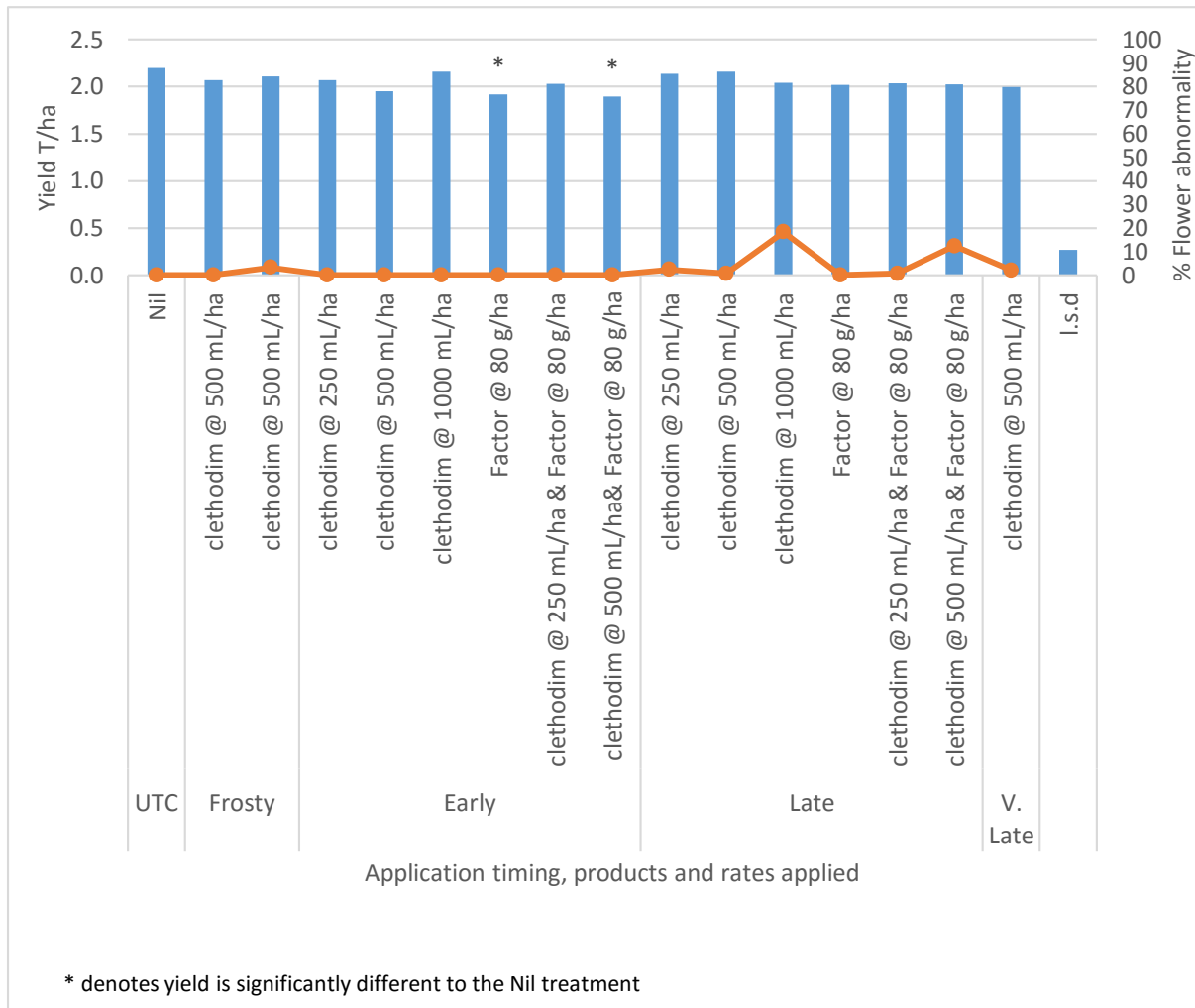
**Table 2.** Details of herbicide treatments

Timing	Date	Crop Stage	Comments
Frosty	2/06/2015	2-4 leaf	Two light frosts followed the application
Early	22/06/2015	4-6 leaf	No frost for a week either side of application
Late	28/07/2015	Full Cabbage to stem elongation	Application followed by 5 frosty nights
Very Late	14/08/2015	Early Flowering (5%)	Light frost (-0.8) the night before application.



**Figure 1.** *Daily maximum and minimum temperature measured at canopy height and clethodim application timing at the Gilgandra trial site 2015.*

For the purpose of analysis and discussion unless otherwise stated, treatments and their effects will be compared to the nil treatment. Outcomes are statistically analysed using ANOVA at a 95% confidence interval with means compared by the LSD method.



**Figure 2.** Yield and flower abnormality response in canola to different application timings and rates of Clethodim and/or Factor herbicide.

## Results

**Flower damage:** was assessed at mid flowering and the percent of abnormal flowers was recorded. Only two treatments resulted increased levels of flower abnormality- clethodim applied late at 1000 mL/ha resulted in 18% and 500 mL/ha of clethodim mixed with Factor also applied late resulted in 12%. Neither Factor alone or clethodim alone at 500mL/ha applied late resulted in flower abnormalities only the combination of the two products.

**Yields:** were assessed using a plot harvester and are outlined in

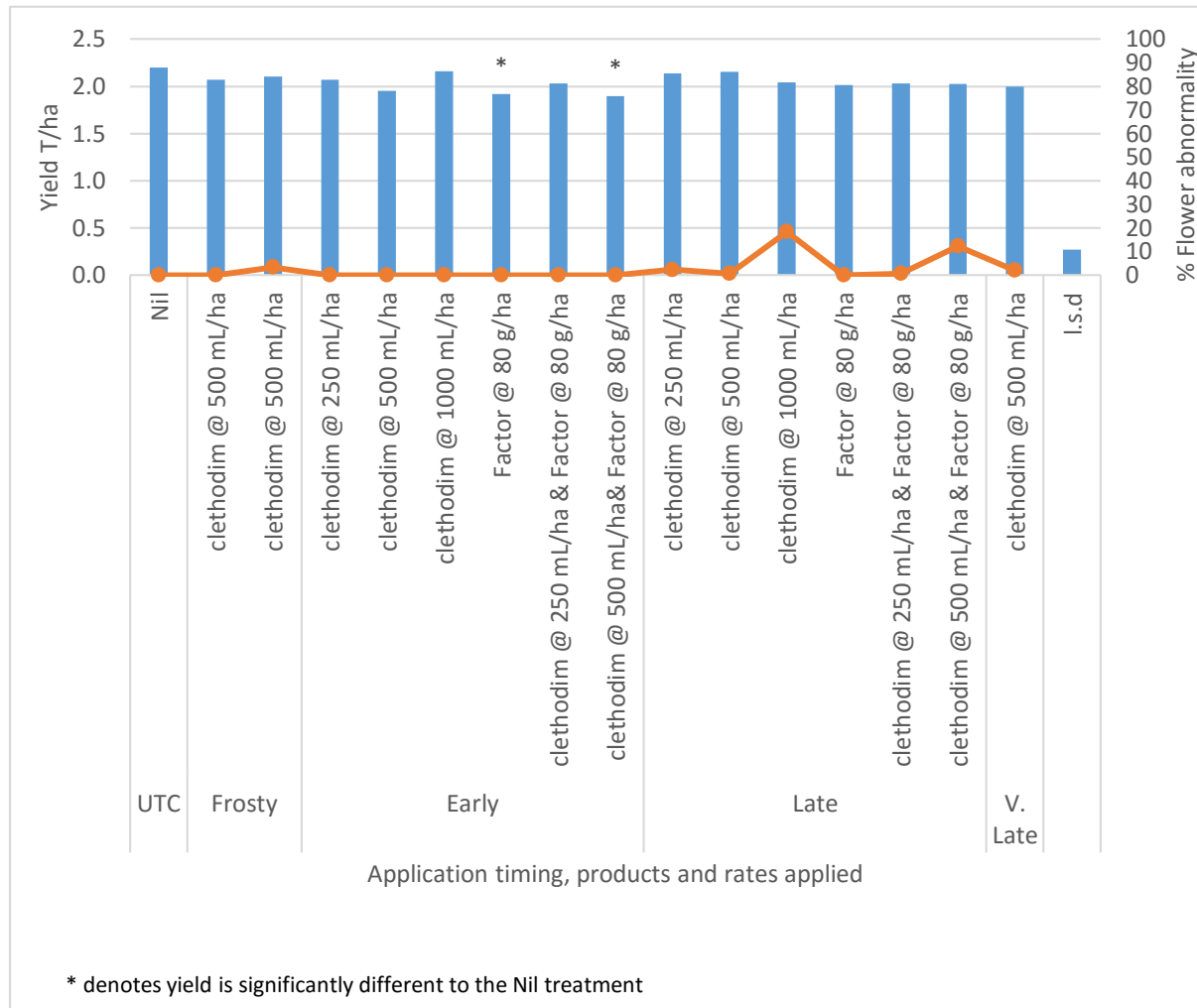


Figure 2. above. Two treatments resulted in a lower yield than the nil treatment. Factor or Factor + clethodim when applied at the earlier timing resulted in approximately 13% less yield.

No treatments resulted in any impact on oil %.

## Discussion

No damage to the crop was evident in biomass reduction as measured by NDVI. While flower damage was observed in two treatments this did not transfer to a yield reduction in those treatments. Interestingly however two other treatments did result in a yield reduction but these expressed no abnormality in the flowers. Both treatments were applied at the early timing and were either Factor alone or in combination with clethodim. Although not statistically different to the nil treatment clethodim applied alone at the same timing was the third lowest yielding treatment in the trial. This suggest that the crop may have been more susceptible to crop damage by the herbicides applied at that time but we have no indicators why this may be so. Temperatures both before and after application were mild and with good rainfall prior moisture stress should not have been a factor.

At this trials site the 'Frosty' treatments were applied on the 2<sup>nd</sup> June with minimum temperatures of 1.9, -0.3 and -0.7°C recorded at canopy height for the following three nights. These temperatures are not extreme and they would not represent a heavy frost, in any case no damage was observed.

## Conclusion

In this trial two treatment did exhibit flower abnormalities following treatment with herbicide later than label recommendations, however the crop recovered without penalty. Two other treatments with any flower damage or other signs demonstrated did result in depressed yields however no clear explanation can be offered. Interestingly Factor herbicide was common in three out of the four instance of flower or yield damage and may indicate growers should be cautious in its use

In this trial there was no clear evidence that clethodim damage is exacerbated by frosty conditions.

However, many other treatments not result in yield or crop impacts even when applied outside label rates and timings. Despite this, growers should strive to apply clethodim within label recommendation as a number of other trials by GOA have demonstrated impacts from high rates and delayed application.

This trial also only tested on one canola variety (whose relative tolerance is unknown) and with 2 tank mixes. Other more sensitive varieties may behave very differently, as may the damage inflicted under different tank mixes. These aspects are being investigated by GOA in ongoing trials.

This trial is one of a series of trials investigating clethodim damage and should not be considered in isolation, nor any of the experimental timings or rates used in this trial as a suggestion, recommendation or otherwise to use such rates or timings.

## Acknowledgements

The research undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC, the authors would like to thank them for their continued support. Special thanks goes out to the Paspaley Farms who hosted this trial.