

# PLAYING IT SAFE: CLETHODIM (SELECT®) USE IN CANOLA

Kelly Angel and Cameron Taylor (BCG)

## TAKE HOME MESSAGES

- Late application and/or higher rates of clethodim pose a high risk to canola yields.
- Split applications at lower rates do not appear to cause as much damage as a single higher rate.
- Varieties appear to differ in their tolerance of high rates, but further investigation is required.

## KEYWORDS

Canola, Clethodim®, resistance, Select® management, split application, variety tolerance.

## BACKGROUND

Clethodim (e.g. Select®) herbicides have an important role to play in the management of grass weeds (particularly ryegrass) in broadleaf crops such as canola. However, Wimmera and Mallee growers have raised concerns about crop safety when using clethodim in canola paddocks. Growers have suggested the herbicide may be affecting crop yields, especially when used a little later in the spray window.

Factors behind this observation seem to be twofold. Firstly, an increase in clethodim rates being used to target ryegrass populations may have led to resistance development. Further to this, multiple applications of clethodim could have a cumulative effect on the crop (e.g. two applications of 500ml/ha may be equivalent to a single application of 1L/ha). Secondly, there are questions being raised about the tolerance of some new canola varieties to clethodim products compared with older varieties.

Based on industry and member feedback, BCG undertook a trial comparing the tolerance of commonly grown canola varieties to different rates and timings of clethodim application.

## AIM

To identify whether certain canola varieties are more sensitive to clethodim (Select®) at different timings and rates.

## METHOD

Location:	Horsham
Replicates:	Four
Sowing date:	9 May
Target plant density:	40 plants/m <sup>2</sup>
Crop types:	Clearfield tolerant canola (CLF) - 44Y84, 45Y82, Hyola 575 Triazine tolerant canola (TT) - 555TT, Crusher, ATR Stingray
	Clethodim (240g/L active ingredient) treatments were:
	1. Nil
	2. Clethodim (500ml/ha) at 5 leaf only
	3. Clethodim (500ml/ha) at 5 leaf and early budding
	4. Clethodim (500ml/ha) at early budding only
Fertiliser:	at sowing MAP (55kg/ha) (10% N, 21.9% P, 1.5% S)
	20 June GranAM (90kg/ha) (20% N, 24% S)
	13 August Urea (90kg/ha) (46% N)
Herbicide/Insecticide:	

Date	Clearfield varieties	TT Varieties
9 May	TriflurX® (2L/ha) + Weedmaster®DUO (1.8L/ha)	
20 June	Targa® (200ml/ha) + Verdict® (50ml/ha) + Hasten (1%)	
2 July	Clethodim (500ml/ha) + Hasten (1%) (treatment 2 and 3 only)	
8 July		Atrazine (1.1kg/ha)
1 Aug	Clethodim (500ml/ha) + Hasten (1%) treatment 3 and 4 only	
16 Aug	Verdict® (125ml/ha) + Lontrel (170ml/ha) + Hasten (1%)	Verdict® (125ml/ha) + Lontrel (170ml/ha) + Intervix® (750ml/ha) + Hasten (1%)
30 Sep	Alpha Duo® (300ml/ha)	

Seeding equipment: BCG cone seeder (knife points, press wheels, 30cm row spacing)

The trial was dry sown at the BCG and Agritech Rural research and demonstration site on Geodetic Road, located three kilometres northwest of Horsham. A split plot design in which each treatment was randomly allocated to main plots was used. Varieties were randomised within each of the main plots.

Harvest was carried out with a plot harvester and samples from plots processed in the lab. Results were analysed to determine whether there were any significant differences between treatments and varieties.

## RESULTS AND INTERPRETATION

### *Clethodim timing/rate and impact on yield*

Clethodim application at all timings this season in Horsham had no significant impact on yield (Table 2). It is, however, worth noting that application windows were varied, with uneven plant development noticed within plots, as is normal for canola. The late application treatment (budding stage) was made when the first green buds appeared. There may have been a large number of plants less advanced when the clethodim was applied, which may have reduced the severity of potential damage.

The total rate of clethodim applied to the crop over the season also had no significant impact on yield. Two split applications of 500ml/ha at the five-leaf stage and at budding did not appear to have a more severe effect than a single application either early or late.

Rates chosen throughout this trial were deemed to reflect industry-standard practice in the area. However, the outcome of no significant result should not automatically suggest that higher rates at late timings would have the same outcome. In order to make this assumption, a wider range of rates and timings would be required. In addition to this, it should be noted that a wide range of other herbicides were also used in this trial. Dry sowing led to the emergence in the crop of a large number of volunteer cereals that required early treatment to maintain the validity of the trial. Broadleaf weeds also required management, and although these additional herbicides could be seen to affect trial results, it also reflects farmer practice given the same circumstances.

**Table 2. Yield of canola varieties treated with clethodim at different timings.**

Variety	Yield (t/ha)			
	Nil	Clethodim 500ml/ha @ 5 leaf	Clethodim 500ml/ha @ budding	Clethodim 500ml/ha @ 5 leaf & budding
44Y84 (CLF)	1.59	1.51	1.40	1.47
45Y82 (CLF)	1.50	1.50	1.41	1.34
Hyola 575 (CLF)	1.58	1.49	1.46	1.61
555 (TT)	1.50	1.41	1.51	1.52
Crusher (TT)	1.62	1.45	1.45	1.59
Stingray (TT)	1.42	1.43	1.31	1.44
<b>Sig. diff.</b>			<b>NS</b>	
Variety			<b>NS</b>	
Timing			<b>NS</b>	
Variety x timing			<b>NS</b>	
<b>CV%</b>			<b>10.1</b>	

Climatic conditions at the time of, and following, spraying must also be considered: frost, heat and moisture stresses can increase the crop's susceptibility to herbicide damage because its metabolism slows under such conditions. The addition of different adjuvants and wetters can also change the outcome.

### *Variety tolerance to clethodim*

There were no significant differences between varieties and their tolerance to clethodim at the rates and timings used. Despite this, the concern expressed by growers and advisors in the region, led BCG to look to outside work to determine whether there was anything to suggest that clethodim affected canola yields. South Australian Grains Industry Trust (SAGIT) recently funded similar work in South Australia. The results are summarised below.

### *Clethodim in canola: the SA Experience*

South Australian Research and Development Institute (SARDI) initiated a research project funded by SAGIT in 2013 to undertake trials considering clethodim tolerance in canola. Clethodim was applied at two rates, 500ml/ha and 1L/ha at different timings: 4-leaf, 8-leaf, 4 and 8-leaf split and budding. Results convincingly showed that a combination of high rates and late application caused a greater degree of crop damage. This resulted in grain yield losses of over 50 per cent (%) in some canola varieties. Varieties assessed included ATR Gem (open-pollinated TT), AV Garnet (open-pollinated conventional) and Hyola 474CL (hybrid CLF). It appeared that there were some variations in variety tolerance at the 1L/ha rate. Of the varieties included in all SA trials, AV Garnet appears the most tolerant to clethodim.

SA trials also showed that split applications of lower rates (i.e. 2 x 500ml) did not appear to cause as much damage as a single application of a higher rate (i.e. 1 x 1L). There may be a small cumulative effect, but not to the extent of complete rate transfer (i.e. 2 x 500ml  $\neq$  1L).

Spray applications took place at the same time for all varieties, regardless of their individual stages of development. Although all varieties were of very similar maturity, actual yield penalties from clethodim could be partly confounded by variety maturity, particularly under late spray conditions, as was also the case in the BCG trial. The results from this work had not been fully reviewed at the time of writing and will be subject to further analysis (Zerner, M. 2013).

## COMMERCIAL PRACTICE

Grass management in canola crops is crucial to maximise yield and reduce weed seed banks. However, with greater reliance on herbicides in Wimmera and Mallee farming systems, especially on group A herbicides such as clethodim, application rates and timings required for optimum weed control have increased to levels that may, in turn, compromise crop safety.

From a commercial perspective, growers should be aware that herbicide label guidelines take into account not only weed control, but also crop safety. Clethodim, if timing is not correct, can cause damage to canola through delayed flowering and distorted flower buds, resulting in potential yield suppression.

Anecdotal evidence and work done by SARDI in the past season suggest there may be some validity in speculation about varietal differences and their tolerance to clethodim. However, it is important to note that these trials were designed to achieve damage. If applications remain at label rates and the product is sprayed within the correct application window, there does not appear to be any significant impact on crop yield, as was shown in the BCG trial.

The bottom line when using clethodim products is to aim to avoid spraying too late and understand that intolerance of clethodim does become more likely at high rates and when it is applied late.

## REFERENCES

Pers. Comm. Michael Zerner (SARDI 2013), data yet to be published.

## ACKNOWLEDGMENTS

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