Understanding Group A herbicides and maximising grass control in canola

Grass control in cereal crops is very important, and this specifically is one of the advantages of planting canola as a rotation crop. Effective grass control, especially ryegrass (*Lolium* spp.) should start with a pre-plant application, but a follow-up foliar application with a selective grass herbicide is usually a necessity.

These foliar applications of Group A herbicides, with clethodim being the most well known, will be the last opportunity to manage escaped grass weeds and to stop new seeding for that specific season. This application in canola is therefore probably the most important application other than a fungicide spray for *Sclerotinia* spp. later in the season.

For Group A herbicides to work effectively, they need to land on target, be taken up by the plant and translocated to the growing point of the plant where cell division occurs. These herbicides disrupt an enzyme pathway at the growing point that stops the production of cell division (new leaves). This can be tested by pulling out the main leaf 10-14 days after application to see if the herbicide has translocated and worked effectively.

However, there are several factors that can be adjusted to increase the efficacy of these Group A herbicides.

Weed size and state

It is known that Group A herbicides have a poor phloem mobility. Due to this weak translocation, the less the distance the herbicide needs to move to the growing point, the quicker and more effective it will be. The longer it takes to reach the growing point, the more time there will be for the weed to metabolise the herbicide and therefore a smaller amount will reach the site of action.

The most important factor in ensuring effective control is therefore to spray Group A herbicides on smaller weeds. Efficacy declines drastically once weeds start to tiller. Therefore, always treat smaller weeds and do not delay applications to wait for any further weed germinations. The state of the weed with relation to any type of stress, will further decrease the translocation to the growing point. By spraying during moisture stress, waterlogging, and particularly after frost, will significantly decrease efficacy.

Water quality and uptake

It is well known and proven that dissolved cations (Na^+, $Ca2^+$, Mg^{2+}) in spray water antagonise clethodim. It has also been shown that ammonium sulphate adjuvants will bind these cations and improve uptake that will increase efficacy. PM McMullin, a Canadian researcher, also proved that above-mentioned salt antagonism can only be totally overcome by applying ammonium sulphate in combination with an oil adjuvant concentrate.

There is a tendency in South Africa to only apply one adjuvant with herbicides. This will be a mistake with clethodim. A registered crop oil concentrate is therefore also necessary with clethodim to ensure that droplets stay on target and do not bounce off, increasing spreading and uptake at the end.

Coverage

The implications of poor coverage are underestimated, especially with Group A herbicides. Higher water volume (at least 150ℓ/ha) will increase coverage on the leaf and can even assist in getting droplets into the sheath, closer to the growing point where the site of action is. Medium to medium-coarse droplets with higher carry volumes will also assist in providing higher efficacy. More on-target droplets mean more effective weed control.

Group A mixes

A common strategy that has been growing over the past two years is to apply two different Group A herbicides together. An example of such mixes are clethodim plus haloxyfop. The advantage of having haloxyfop as a mixing partner is that the phloem mobility of haloxyfop is higher than that of clethodim. The quicker it moves to the site of action, the less chance there will be for metabolic breakdown. This may result in haloxyfop reaching the growing point easier and therefore increasing control.

Make sure to spray a registered product with the above-mentioned mixtures to ensure excellent control and no damage to the canola crop.

Factors for maximum efficacy

To maximise the efficacy of Group A herbicides, especially clethodim, the following factors must be understood:

- Remember that cation antagonism is a reality and that spray grade ammonium sulphate needs to be used in combination with a registered oil adjuvant.
- Weed size matters, especially in ryegrass, and spraying before tillering is crucial in ensuring that the herbicide reaches the site of action (growing point).
- With poor environmental conditions (wind, humidity, or temperature) throughout the season, water volume is one of the only factors that can be controlled to ensure more effective coverage on the target.
- Lastly, use a registered herbicide that includes more than one Group A herbicide to increase the chances of efficacy and reduce the selection pressure for new resistant biotypes.

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