



## Residual Herbicides Group B & C carry-over

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The aim of this demonstration was to look at the carry-over effects and symptoms of Group B and C herbicides on different crop types.

### Summary of trial

Residual herbicides can be an effective management tool in providing an extended period of weed control but careful consideration must be given to potential crop selection limitations, or crop loss, that their application may impose.

Care has to be taken with many residual herbicides to avoid potential damage to the following crops. On alkaline soils the residual effects of SU herbicides such as Glean and Ally used for summer fallowing will be severe on subsequent pulse and conventional and TT canola. Similar effects will be seen when Monza residues are present in the soil.

Plant-back limitations following the late application of Eclipse in wheat will potentially not pose an issue.

Whilst not used for summer fallowing, if residues from imidazolinone herbicides (Spinnaker and On-Duty) are present significant crop damage may occur in crop types except IT-canola, IT-wheat and faba beans.

Atrazine used for summer fallowing in dry seasons slows the growth of non-TT canola, wheat and pulses (harshes on lentils). If Atrazine residues are suspected avoid the use of additional post-sowing pre-emergent herbicides applications (eg. Do not apply Trifluralin in front of wheat if Atrazine residues are suspected).

### Why it was conducted:

Residual herbicides are effective weed control options that are often added to spring fallowing knockdowns to achieve summer weed control. Residual herbicides can create crop selection limitations in years following their application, or worse, create crop loss if they are not considered when selecting the next season's crop.

Factors effecting the length of the residual activity of herbicides vary from one product to the next, but often high soil pH and low rainfall (conditions common to the Wimmera and Mallee) will result in extended activity.

This demonstration aimed to increase grower awareness of the carry-over effects of residual herbicides on a range of different crop types – including some herbicide tolerant crops.

### How it was conducted:

A selection of Group B and C herbicides were applied at 75% of recommended label rates on 8 November 2001, except for Diuron that was applied PSPE (Table 1).

Sowing was conducted in late May at right angles to spraying direction. The different crop types sown were IT canola (Surpass 402CL), TT canola (Surpass 501TT), conventional canola (Outback), IT wheat (JNZ Clearfield), conventional wheat (Yitpi), faba beans (Fiesta VF) and lentils (Nugget). All crops were sown with 80kg/ha Mallee Mix 1.

**Table 1:** The list of herbicide treatments applied, including rate and herbicide group

Treatment No.	Product	Active Ingredient	Rate/ha	Group
1	Atrazine	<i>atrazine</i>	1L	C
2	Diuron	<i>diuron</i>	1L	C
3	Eclipse	<i>metosulam</i>	5g	B
4	Spinnaker	<i>imazethapyr</i>	150mL	B
5	On Duty	<i>imazapic+imazethapyr</i>	30g	B
6	Ally	<i>metsulfuron-methyl</i>	5g	B
7	Glean	<i>chlorsulfuron</i>	15g	B
8	Monza	<i>sulfosulfuron</i>	19g	B

### Results of the trial:

The visual effects of herbicide residues on each crop type are presented in Table 2.

**Table 2:** Visual damage score and observations of chemical on crop.

Applied November 2001								Applied PSPE 2001
	Atrazine	Eclipse	Spinnaker	On-Duty	Ally	Glean	Monza	Diuron
IT canola	2	3	1	1	1	2	1	2
TT canola	1	3	9	8	2	7	5	1
Conv. Canola	2	2	9	8	2	8	6	2
IT wheat	2	2	1	2	2	2	2	1
Wheat	2	2	6	3	2	4	3	1
Faba beans	2	2	2	3	2	5	4	1
Lentils	3	3	7	7	6	8	7	2

Scores for crop damage: 1 – no symptoms, 3 – slight symptoms, 5 – severe symptoms, 7 – heavy damage, 9 – complete loss of plants

The Sulphonylurea group of herbicides (Ally, Glean and Monza) caused significant crop damage in all crop types except for the IT-Canola and IT-canola. Ally caused the least damage whilst Glean had the impact. Lentils displayed less tolerance to these products than faba beans.

The Imidazolinone herbicides, Spinnaker and On-Duty, caused significant crop damage in all crop types except IT-canola, IT-wheat and to a lesser extent faba beans. Conventional wheat was far more tolerant to the residues of On-Duty rather than Spinnaker.

Eclipse, the only Sulfonamide tested in this demonstration, caused the least crop damage of the Group B herbicides tested.

As expected, Atrazine caused low levels of crop damage in all crop types tested except for TT-canola,

Diuron used post-sowing pre-emergent had very little impact on any of the crop types. In 2000/0 diuron used as an over summer fallow option had a negative effect on conventional and TT canola.

### Notes on Group B herbicides:

The group B herbicides are categorised into three sub-groups:

- i) Sulphonylureas – includes Ally, Glean and Monza. This group breaks down primarily through hydrolysis, which is dependent on soil pH – this is why these herbicides persist longer on alkaline soils. Secondary break down can occur through microbial activity.
- ii) Sulfonamides – includes Eclipse and Broadstrike. This group breaks down primarily by microbial activity. Break down is most rapid after summer rainfall as the moist, warm conditions that follow are conducive to rapid build up microbes.
- iii) Imidazolinones – includes Spinnaker, On Duty and Midas. Microbial activity is the primary form of residue break down. Unlike the sulphonylurea sub-group, the imidazolinones tend to persist longer on acid soils.

Ally - Registered in wheat, barley, triticale and cereal rye. Activity by foliar translocation but also root absorption after rain. Plant-back recommendations on alkaline soils are wheat 10 days, barley 6 weeks and pulses, oats and medic 9 months after application.

Glean – Registered in wheat, triticale, oats and cereal rye. Activity occurs through root and foliar uptake. Plant-back recommendations on alkaline soils are wheat and triticale none, cereal rye 3 months, barley and oats 9 months and beans, peas, medic and clover 22 months after application.

Monza – Registered in wheat only. Activity occurs primarily through root uptake but foliar uptake may occur. Plant-back recommendations on alkaline soils are triticale 10 months and canola, barley, oats, pulses and medics 24 months after application on soils. Where Monza is used on soils pH >8 and less than 350mm of rainfall has occurred between spraying and sowing wheat is the only safe option.

Eclipse – Registered in wheat, barley, oats, triticale and lupins. The plant-back recommendation for canola, pulses and medics is 9 months after application. Primary activity occurs via foliar uptake so soil residues should not present great problems.

Spinnaker – Registered in field peas, faba beans and chickpeas. It has both root and foliar uptake. Plant-back recommendations are barley, triticale, wheat, vetch and lupins 10 months, oats and safflower 22 months and canola 34 months after application. Do not use Spinnaker in areas where rainfall from spraying to sowing of cereals is expected to be below 300mm.

On Duty – Registered in canola carrying Clearfield Technology. Label plant-back recommendations are Clearfield canola, chickpeas, faba beans and field peas 0 months, barley, triticale, wheat, oats and lupins 8 months, safflower 22 months and conventional and TT canola 34 months after application. Do not apply On Duty later than the end of August and 250mm of rainfall is required from spraying to sowing the following crop.

### Notes on Group C herbicides:

Group C is very diverse but all herbicides within it act as inhibitors of photosynthesis.

Atrazine – has both a knockdown and residual action by being absorbed by roots and shoots, the latter being of minor importance. Under dry or cold conditions atrazine will persist longer. Atrazine has a shorter residual life than simazine.

Diuron – is largely root absorbed. At cereal rates of use no plant-back period required. At higher rates allow up to 12 months before planting crops other than cereals and perennial crops.

### **Commercial Practice**

Care has to be taken with many residual herbicides to avoid potential damage to the following crops. On alkaline soils the residual effects of Glean and Ally used for summer fallowing will be severe on pulse and conventional and TT canola. Similar effects will be seen when Monza residues are present in the soil.

Plant-back limitations following the late application of Eclipse in wheat will potentially not pose an issue.

Whilst not used for summer fallowing, if residues from imidazolinone herbicides (Spinnaker and On-Duty) are present significant crop damage may occur in crop types except IT-canola, IT-wheat and faba beans.

Atrazine used for summer fallowing in dry seasons slows the growth of non-TT canola, wheat and pulses (harshes on lentils). If Atrazine residues are suspected avoid the use of additional post-sowing pre-emergent herbicides applications (eg. Do not apply Trifluralin in front of wheat if Atrazine residues are suspected).