



Cereal options following Clearfield canola

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The aim of this trial was to investigate the impact of On-Duty residues, both in the presence and absence of an in-season Glean application, on the subsequent wheat or barley crop and in doing so test for varietal tolerance differences.

Summary of trial

On-Duty residues may affect the performance of subsequent susceptible crops. Cereals are considered a safe crop option following Clearfield canola as long as the On-Duty has been applied prior to the end of August and that rainfall between spraying and sowing the next winter crop has been at least 250mm.

This demonstration indicated that cereal type and variety tolerance differences do occur. Wheat displayed greater tolerance to On-Duty residues than barley – 18% and 26% yield loss respectively. Wheat displayed high levels of tolerance to in-season Glean applications regardless of whether On-Duty residues were present or not. Glean is not registered for use in barley and when applied a 20% yield loss occurred in the absence of On-Duty residues and a 52% yield loss in the presence of On-Duty residues.

In wheat, the most tolerant to least tolerant varieties to On-Duty residues were:
Mitre>Silverstar>JNZ Clearfield>>Yitpi>H45>>>Annuello

In barley, the most tolerant to least tolerant varieties to On-Duty residues were:
Gairdner>Sloop>>Vic Sloop>Barque>>>Schooner

If On-Duty residues are suspected then wheat will be a safer crop choice than barley and an IT-tolerant wheat variety should provide the highest levels of tolerance.

Why it was conducted:

Under conditions that do not favour the breakdown of On-Duty (*imazapic* + *imazethapyr*), soil residues may affect the performance of a subsequent susceptible crop. Breakdown of On-Duty (and the other imidazolinone herbicides) occurs primarily via microbial activity – soil moisture and warmth drive this process. Spring 2001 through to autumn 2002 was dry and therefore On-Duty residue breakdown was suspected to be low providing an ideal opportunity to test the susceptibility of six wheat and five barley varieties.

How it was conducted:

In 2001 a commercial canola paddock on Trevor Grogan's property (Curyo) was split and sown to two different varieties: an IT-canola (Surpass 402CL) and a conventional canola (Mystic). On-Duty was applied at 45g/ha with Lontrel 100mL/ha to the IT-canola on the 25 July 2001. Lontrel at 130mL/ha and Verdict 520 at 70ml/ha was applied on the 15 August 2001 to the conventional canola.

In 2002 wheat and barley varieties were sown across both the IT and conventional canola stubble using a nearest neighbour plot design. Sowing occurred on the 28 May with Mallee Mix 1 at 30kg/ha. Urea and Mallee Mix 1 were pre-sown on the 2 February at 50kg/ha and 30kg/ha respectively.

Glean was sprayed perpendicular to the sowing direction of the wheat and barley in a 20m strip at 15g/ha on the 28 May and incorporated-by-sowing.

Plant establishment counts, seedling shoot and root weights and yield, protein and screenings were recorded from the trial.

Results of the trial:

In the absence of Group B herbicides the average wheat and barley yields were 0.71t/ha and 0.78t/ha respectively.

Table 1 indicates that the presence of On-Duty residues had on average a yield penalty of 18% across the six wheat varieties tested. The On-Duty residues had the least effect on Mitre, Silverstar and JNZ Clearfield. Yitpi and H45 showed moderate yield penalties in the presence of On-Duty residues whilst Annuello suffered the greatest damage (52% yield reduction). On average, the addition of an in-season Glean application carried no yield penalty in either the presence or absence of On-Duty residues. Individually, H45 displayed the least tolerance for Glean.

Table 1: Yield response of six wheat varieties to 3 different herbicide residue treatments expressed as a percentage of the control (no Group B herbicide in the past two years) for each variety.

Background	Yitpi	Mitre	Silverstar	JNZ Clearfield	H45	Annuello	Average
Conv	100	100	100	100	100	100	100
Conv + Glean	101	112	101	131	83	95	104
IT	78	105	97	88	74	48	82
IT + Glean	81	95	100	76	60	79	82

Table 2 indicates that on average the five barley varieties tested suffered a 26% yield penalty in the presence of On-Duty residues. Gairdner and Sloop showed the highest levels of tolerance. Schooner barley was greatly effected by On-Duty residues. On average, the addition of an in-season Glean application carried a 20% yield penalty in the absence of On-Duty residues and a 26% yield penalty in its presence. Interestingly, Sloop was least sensitive to Glean whilst Vic Sloop was the most sensitive. Glean is not registered for use in barley.

Table 2: Yield response of five barley varieties to 3 different herbicide residue treatments expressed as a percentage of the control (no Group B herbicide in the past two years) for each variety.

Background	Schooner	Gairdner	Sloop	Barque	Vic Sloop	Average
Conv	100	100	100	100	100	100
Conv + Glean	83	80	91	75	69	80
IT	55	88	81	72	73	74
IT + Glean	51	26	38	54	72	48

Interpretation:

On-Duty (*imazapic* + *imazethapyr*) is a Group B herbicide belonging to the Imidazolinone sub-group. On-Duty has residual activity that can result in crop loss in the following season if the crop or variety sown is susceptible to these residues. Microbial activity is required to breakdown these residues and in order for microbial activity to be stimulated moisture and warmth is required.

Wheat displayed greater tolerance to On-Duty residues than barley – 18% and 26% yield loss respectively. Wheat displayed high levels of tolerance to in-season Glean applications regardless of whether On-Duty residues were present or not. Glean is not registered for use in barley and when applied a 20% yield loss occurred in the absence of On-Duty residues and a 52% yield loss in the presence of On-Duty residues.

Varietal tolerance differences were found to occur in wheat and barley to both On-Duty residues and in-season applications of Glean.

In wheat, the most tolerant to least tolerant varieties to On-Duty residues were:

Mitre>Silverstar>JNZ Clearfield>>Yitpi>H45>>>Annuello

In wheat, the most tolerant to least tolerant varieties to in-season Glean applications were:

JNZ Clearfield>>Mitre>>Yitpi/Silverstar>Annuello>>H45

JNZ Clearfield's reaction to On-Duty residues was unexpected and can not be explained. It is expected that it would display the highest levels of tolerance to On-Duty residues as it is bred to be tolerant to Midas (*imazapic* + *imazethapyr* + *MCPA*) another Imidazolinone product.

In barley, the most tolerant to least tolerant varieties to On-Duty residues were:

Gairdner>Sloop>>Vic Sloop>Barque>>>Schooner

In barley, the most tolerant to least tolerant varieties to Glean residues were:

Sloop>>Schooner>Gairdner>Barque>>Vic Sloop

A negative interaction between On-Duty residues and Glean occurred and had the greatest impact on Gairdner, Sloop and Barque.

Commercial practice:

On-Duty herbicide coupled with IT-tolerant canola varieties offers broad-spectrum weed control allowing canola to be grown in paddocks where conventional canola could not. Carry-over soil residues can affect susceptible crops in the following season under conditions that do not favour residue breakdown.

The label clearly states that when sowing wheat (except IT-tolerant varieties), barley or triticale during the next winter season the following requirement apply:

- Do NOT apply On-Duty later than the end of August
- Do NOT use On-Duty in areas where rainfall from spraying to sowing of cereals is expected to be below 250mm.

If On-Duty residues are suspected then wheat will be a safer crop choice than barley.

Although not seen in this trial an IT-tolerant wheat variety such as JNZ Clearfield would be most suited. Of the conventional wheat varieties Mitre and Silverstar displayed the greatest tolerance. It is not recommended to sow Annuello or H45 in paddocks suspected of carrying On-Duty residues.