

Cross resistance within Group A herbicides

THE RESEARCH VIEW

By Chris Preston, CRC for Australian Weed Management

Group A herbicides have been widely used for grass weed control in crops in southern Australia for nearly three decades. As a result, extensive resistance to the Group A herbicides has occurred in grass weeds, particularly in annual ryegrass. Recent random surveys in South Australia and Victoria indicate that more than 50 per cent of all cropped fields contain annual ryegrass with resistance to Hoegrass (diclofop-methyl). The general rule of thumb used is that resistance to Hoegrass is likely after six years of use.

It has become apparent that cross-re-

sistance patterns among annual ryegrass populations resistant to the Group A herbicides, provide opportunities to continue to use some Group A herbicides. In particular, there are some marked differences between the Group A 'fop' herbicides and the 'dim' herbicides.

Not all populations resistant to the fop herbicides are resistant to the dim herbicides. Also, there are differences among ...ii▷

Consultants' Corner



Consultants' Corner is a new initiative by *Australian Grain*. This series of articles will highlight current GRDC-funded research with a particular focus on the commercial implications of adopting cutting-edge research.



Dr Chris Preston.

Want a Better Built Auger?

No. 1 IN
KONDRIN
2002 TESTS



CAPACITY
TO 250 tonnes
per hour

FROM THE NAME YOU'VE GROWN TO TRUST

WESTFIELD

Being the leading global auger manufacturer for over 50 years we've become pretty good at it. Each and every Westfield auger is "Job Sized" – engineered, designed and built from the ground up so components get heavier and stronger as the auger gets bigger. That means each and every model offers superior performance and durability.

And that adds to more value for you. From our smallest to our mighty 13" MK, you simply get more for your money. And Westfield offers a combination of lengths, diameters and drive styles that give you more size and capacity options than any other auger. Want value in an auger? See you local Westfield dealer now.

Available in 4, 8, 10 or 13" diameters in lengths from 26 to 111 feet with a choice of PTO, engine or electric drives

WESTFIELD AUGERS (AUSTRALIA) PTY LTD
Freecall 1800 635 199

<i>...CROSS RESISTANCE

TABLE 1: Frequency of annual ryegrass populations resistant to various Group A herbicides

Herbicide	Fops	Achieve	Select	Axial
Populations resistant %	78	47	11	31

From a collection of 108 populations tested by Plant Science Consulting

the dim herbicides. The recent introduction of new Group A chemistry has clouded the issue slightly.

Axial (pinoxaden) is a Group A 'den' herbicide for annual grass weed control. While Axial has different chemistry to the

fops and dims, recent studies have identified that its resistance profile in annual ryegrass is similar to Sertin and Achieve (Table 1). This means Axial is unlikely to control dim-resistant annual ryegrass.

Our current best information about cross-resistance patterns among Group A herbicides in annual ryegrass would place the herbicides in the following order:

Fops > Sertin/Achieve/Axial > Aramo/Select > Factor

Fop-resistant annual ryegrass may be controlled by any of the dim or den herbicides. Annual ryegrass resistant to Sertin, Axial or Achieve may be controlled by Aramo or Select. Annual ryegrass resistant to Aramo or Select may be controlled by Factor.

This pattern of cross-resistance suggests there is value in using Group A herbicides in a particular order on annual ryegrass populations, limiting dim herbicide use until fop resistance occurs.

Occasionally we observe populations that do not fit this order, so a resistance test can be a useful way of determining which Group A herbicides remain effective. Group A-resistant populations of wild oats and other grass weeds do not necessarily follow this pattern and should be tested to determine their cross-resistance pattern.

More informatin: Chris Preston

E: christopher.preston@adelaide.edu.au

Ph: (08) 8303 7237

THE COMMERCIAL VIEW

By Bill Long, Consultant, Ardrossan, SA

I consult mainly on the Yorke Peninsula and throughout the Lower and Mid North districts of South Australia, and in this region Group A herbicide resistance is very widespread. Most growers have a high level of Group A fop-resistant ryegrass, to the extent where we are no longer able to use fops for ryegrass control. We now use more of the dims, like Select, but we are gradually seeing increasing levels of resistance to Select across this region.

Current practice is to use higher-than-label rates of Select to combat the rising levels of resistance. Instead of the 250 ml standard rate we use up to double, adjusting the rate depending on the population of ryegrass we are dealing with and by making an assessment of the likely resistance level based on experience with the level of ryegrass control in the paddock previously. Occasionally we will test the population in the paddock to get a better handle on the resistance status of that population.

At this stage, and in most cases, the higher rates are keeping ryegrass resistance at bay. By increasing the rate of Select and getting as close as possible to 100 per cent control with the dose, we are working to extend the life of Select and preserve this important herbicide.

Reducing seed set

We use a variety of techniques to reduce seed set wherever possible. For example, in pea crops we use Select at 250–500 ml and we also apply paraquat late in the season to control any ryegrass that may have survived. In some cases, we sacrifice a little yield from late pea pods in order to control the ryegrass.

In canola we use non-selective herbicides under the windrower, and in other uncompetitive crop types like lentils we use weed wipers with glyphosate to control survivors. We try to utilise a whole range of herbicides in a crop, so that we are not just relying on Select to do the job. For example, many growers are now using herbicides like tri-allate (Avadex) for ryegrass control in pulses as well as cereals



Bill Long.
(Photo: Ag Consulting Co Pty Ltd)

in order to keep ryegrass populations as low as possible. This helps reduce the selection pressure of Select on that population.

Eventually we will not be able to control ryegrass with Select. Once failures are identified with this herbicide we hope we will be able to control those populations with another dim herbicide, Factor, where we might exploit the slight differences in the chemistry of these products. Limited experience has shown this might provide another 'shot' but realistically we expect poorer results with this.

After that – who knows? We will have then finally run out of options unless another group of chemistry comes along. As a consequence of this, wherever possible, we aim for 100 per cent control of ryegrass in each crop type using a variety of techniques.

Whole-farm approach

We take a whole-farm approach to minimising ryegrass resistance in this region. We monitor resistance levels and plan our cropping rotations accordingly. Rotations and crop selection are largely being determined by the level of ryegrass and the resistance status of that ryegrass we see in the crop.

There is increasing interest in physical weed seed removal techniques as well. Crops such as oaten hay provide excellent control of ryegrass, reducing seed-banks over time and have become an important part of the system for many growers to combat ryegrass resistance. Others who prefer not to grow hay are now investing in chaff carts in order to collect ryegrass seed and keep numbers down.

As such, ryegrass resistance is still a key driver of the farming system in this region. I see real difficulties in the near future when these herbicides are no longer able to control ryegrass populations in pulses and oilseed crops. Unless growers are prepared to change their approach and adopt physical seed removal techniques, they face serious and rapid yield losses as ryegrass populations increase as a result of herbicide resistance.