

Adjuvants for use with Select herbicide and mixtures with atrazine

David Howey¹ and Mark Sumner²

¹ Sumitomo Chemical Australia Pty. Ltd., PO Box 3023, Mandurah East, Western Australia 6210, Australia

² Serve-Ag Research, 14 Elizabeth Street, South Perth, Western Australia 6151, Australia

Summary Four trials conducted at two sites during 2001, using Select® showed the effect that environmental and crop conditions can have on weed control, and gave some indication of adjuvants that might be useful in dealing with application in less than perfect conditions.

Keywords Clethodim, Select, atrazine, ammonium sulphate, adjuvants, annual ryegrass.

INTRODUCTION

This paper reports a series of four trials carried out in Western Australia during 2001. Clethodim, sold under the trade name of Select®, is a major herbicide in the post-emergent annual ryegrass control market in Australia. Atrazine forms the basis of weed control programs in Triazine Tolerant Canola crops.

In spite of timing conflicts between Select and atrazine application, there are occasions when the two products are tank mixed. There have also been instances when these mixtures have failed to provide adequate weed control, while split applications have been effective.

There were two primary objectives for the trials; (a) to examine the adjuvants used in combination with Select, and identify possible ways to improve the adjuvant system used with the product, and (b) to examine the adjuvants recommended for use with Select and atrazine tank mixtures, again with the aim of improving the efficacy of those mixtures.

The targeted weeds were populations of annual ryegrass (*Lolium rigidum*), which were suspected to be resistant to the 'fop' herbicides.

MATERIALS AND METHODS

All trials were established with four replicates. One site was at Piawaning (Site 1) in the Western Australian wheat belt, while the second site was at Bindi Bindi (Site 2). There were two trial protocols used, one incorporating atrazine mixtures, and one focused on Select in combination with various adjuvants.

The strategy behind the trial protocols was to deliberately use lower rates than normal of Select, as a means of identifying differences between the performance of the adjuvants tested. Seasonal conditions in 2001 also had a significant impact on the trials.

Both plans were repeated at the two sites. Site 1 had very poor growing conditions prior to application, whereas Site 2 had good growing conditions prior to application.

All treatments were applied using a wheelbarrow mounted boom spray, operating at 200 kPa pressure, through Tee Jet 11001 nozzles at 3.6 km h⁻¹. This provided a total water volume of 107 L ha⁻¹.

The atrazine formulation used was a 500 g L⁻¹ flowable. Liase™ is a liquid formulation of ammonium sulphate. Hasten™, Uptake™, Enhance™, Freeway™ and Hot-up™ are all commercially available adjuvants from various manufacturers.

Table 1. Adjuvants used with Select for control of annual ryegrass (2001).

Products	Rates	Site 1 – Piawaning (50 DAT)		Site 2 – Bindi Bindi (51 DAT)	
		Annual ryegrass count m ⁻²	% control	Annual ryegrass count m ⁻²	% control
Untreated		77.50	–	207.2	–
Select + Hasten	200 mL + 1.0%	44.25	42.9	7.2	96.5
Select + Uptake	200 mL + 0.5%	29.75	35.8	7.8	96.3
Select + Uptake	200 mL + 1.0%	34.50	55.5	4.2	98.0
Select + Enhance	200 mL + 1.0%	38.75	50.0	5.0	97.6
Select + Hot-up	200 mL + 0.25%	58.00	25.2	19.5	90.6
Select + Freeway	200 mL + 0.02%	58.50	24.5	81.0	61.9
Select + Hasten + Liase	200 mL + 1% + 2%	40.25	48.1	4.7	97.8
LSD 95%		32.357		37.983	

Table 2. Select and atrazine tank mixtures: adjuvants and effect on annual ryegrass control.

Products	Rates	Site 1 – Piawaning (50 DAT)		Site 2 – Bindi Bindi (51 DAT)	
		Annual ryegrass count m ²	% control	Annual ryegrass count m ²	% control
Untreated		120.25	–	30.75	–
Select + Hasten	200 mL + 1.0%	51.75	57.0	0	100
Select + atrazine + Hasten	200 mL + 1000 mL + 0.5%	75.25	37.4	0.25	99.2
Select + atrazine + Hasten	250 mL + 1000 mL + 1.0%	40.00	66.7	0.5	98.4
Select + atrazine + Hasten + Liase	200 mL + 1000 mL + 1.0% + 2.0%	32.25	73.2	0.75	97.6
Select + atrazine + Hot-up	200 mL + 1000 mL + 0.25%	78.75	34.5	1.25	95.9
Select + atrazine + Uptake	200 mL + 1000 mL + 1.0%	77.50	35.6	0	100
Select + atrazine + Uptake + Liase	200 mL + 1000 mL + 1.0% + 2%	50.75	57.8	0	100
LSD 95%		38.725		11.185	

Assessments All trials were assessed for weed control and crop phytotoxicity. Annual ryegrass control was assessed using (a) a visual brown out scale (b) a biomass rating relative to untreated plots and (c) population counts at pre-treatment, then 19 and 50 DAT (20 DAT and 51 DAT on Site 2).

RESULTS

Clethodim and adjuvants – general The trial concluded that under good spraying and weed control conditions, there were no differences between the various adjuvants used in the trial, nor between the rates of the various adjuvants.

When moisture stressed weeds were sprayed, the higher rates of adjuvant (1%) initially demonstrated superior control to the lower rates (0.5%), but this difference was not observed in final weed counts.

Two of the adjuvants trialed did not provide adequate grass control under good spraying and control conditions. These were the organosilicone penetrant (Freeway), and a product containing a proprietary mixture of crop oil and ammonium sulphate (Hot-up).

Clethodim and atrazine mixtures Mixtures of clethodim and atrazine were trialed also. Under good spraying conditions these mixtures performed as well as the standard. A reduction in ryegrass control was noted when moisture stressed weeds were sprayed.

In difficult spraying conditions, there was a trend for the addition of Liase (2%) to improve the final

weed control. None of the treatments gave commercial weed control at Site 1 due to the difficult weed control conditions before application (e.g. moisture stress). In contrast all treatments provided excellent weed control at Site 2 due to the more favourable weed control conditions.

DISCUSSION

The conditions at Site 1 were an example of what can be expected if spraying in less than ideal conditions. However, the addition of Liase to Select based mixtures can be beneficial based on the data in these trials. Increasing adjuvant rates may also be beneficial when conditions are less than ideal.

This work was commissioned because there was a desire to revisit the established data on the standard adjuvant recommendations for use with Select. There was also a need to find a way to improve the reliability of Select and atrazine mixtures. This trial indicates some useful trends for farmers and advisers.

CONCLUSIONS

Based these trials, and field observations, Sumitomo Chemical has altered its recommendations for Select. These now include the use of Liase when a Select + atrazine mix is being used, or when conditions are less than ideal.

It is also a recommendation of Sumitomo Chemical that a mineral based oil such as Uptake is preferable to a canola based oil such as Hasten, but only when a mix with atrazine is being considered.