

1 Pre-emergent herbicide options for annual ryegrass control in Albus Lupins, 2014

Trial Code; GOAWE02214-2

Date; Winter 2014

Location; "Edge Hill", 14km south of Narromine, NSW

1.1 Background

Annual ryegrass (ARG) is currently developing herbicide resistance to many of our in crop herbicides and in most cases multiple modes of action. In many paddocks most of the Group A Fop herbicides are no longer effective nor are the common Group B herbicides like Logran. As a result on a number of farms where ARG levels are increasing through the cereal phase of crop rotations the aim has been to reduce these weed populations in the broadleaf phases with products such as clethodim¹ which has traditionally exhibited less resistance.

However a recent herbicide resistance survey² undertaken by GOA in the Central West of NSW revealed 22% of ARG samples submitted demonstrated resistance to clethodim (and a number of other herbicides) and for many of these populations there are few effective alternative herbicide options left. The remaining effectiveness of this product must be protected as best as possible to prolong its useful life and using it to control large populations of ARG may be exposing the product to excessive resistance selection pressure.

This trial is designed to investigate a number of pre-emergent herbicide options aimed at reducing the populations that clethodim may be targeted at in-crop and hence the risk of resistance developing.

However it should be remembered that information gained through this trial will only form part of the solution or management of this issue and weed populations must be targeted at every other chance. And the lack of effective in crop selective options means that these must include pre-emergent options or other modes of control.

DISCLAIMER

Following is a report on a scientific experiment. It may contain some herbicide treatments that are not registered for the situation, manner or rate at which they are used in this trial. This document or anything else resulting from, construed or taken from this or by GOA or its representatives should not be taken as a suggestion, recommendation or endorsement of any unregistered herbicide uses.

1.2 Aim

- Compare a range of pre-emergent options and their effectiveness to reduce the populations of annual ryegrass in our key pulse crops- broadleaf lupins.

¹ Common trade names include Select, Status, Platinum

² <http://www.grainorana.com.au/documents?download=29>

- If other weeds are present in the trial assess the treatments for their effectiveness to control them

1.3 Methods

The trials used a small plot randomised complete block design with three replicates. The trials were established in growers' paddocks with known populations of ARG.

Herbicide treatments were applied ahead of growers seeding equipment by ATV mounted boom and incorporated by the growers' equipment. Any PSPE applications were applied after seeding before crop emergence.

Resultant weed control was assessed a number of times before the site was sprayed out with herbicides to prevent seed set.

Results were analysed by ANOVA and results compared by using a LSD method with a 95% confidence interval. Any references to differences between treatments should be assumed to be statistically different unless otherwise stated.

Table 1: Trial site details

Seeding date:	18 th April, 2014
Variety and seeding rate:	Luxor Albus lupins @ 100kg/ha
Seeding equipment:	Horwood Bagshaw knife point and press wheel on 9 inch spacing
Soil type:	Brown sandy loam
Paddock history:	wheat 2013, light stubble, full retention

Table 2: Herbicide treatment, incorporation method and rates applied

Treatment Table		
Treatment		Rate/ha (L/g)
1	Nil	
2	Trifluralin (IBS)	1.7
3	Simazine 900 DF (IBS)	2200
4	Terbyne (PSPE)	1000
5	Trifluralin (IBS) Simazine 900 DF (IBS)	1.7 & 2200
6	Trifluralin (IBS) Terbyne (IBS)	1.7 & 1000
7	Trifluralin (IBS) Avadex Xtra (IBS)	1.7 & 1.6
8	Trifluralin (IBS) Simazine 900 DF (IBS) Avadex Xtra (IBS)	1.7, 2200 & 1.6
9	Simazine 900 DF (IBS) Avadex Xtra (IBS)	2200 & 1.6
10	Outlook (IBS)	1.0
11	Outlook (IBS) Simazine 900 DF (IBS)	1.0 & 2200
12	Outlook (IBS) Terbyne (IBS)	1.0 & 1000
13	Boxer Gold (IBS)	2.5
14	Sakura (IBS)	118

IBS- incorporated by sowing, PSPE- Post sowing pre-emergent

Table 3: Herbicide application details for IBS and PSPE treatments

Date Applied	18/04/2014	Temp	24°C	Wind vel.	4-8 km/h	Wind Dir.	W	Humidity	34%
Start time	10.30 a.m.	Δt	10.1	% Cloud	20%				
Finish Time	1.00 p.m.	Nozzle	AITT015	Pressure	3 Bar				
Water rate	100 L/ha	Speed	7 km/h						
Equipment	ATV								

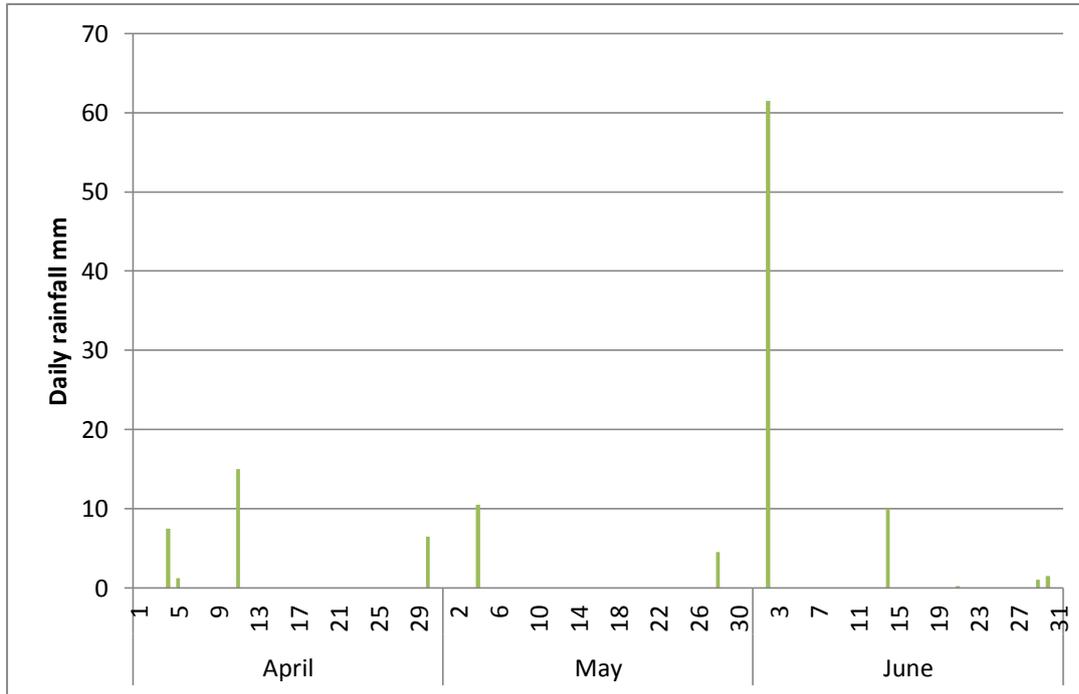


Figure 1: Daily rainfall from April to June, Narromine trial site 2014

1.4 Results

There was no statistically significant impact on crop establishment by the different treatments compared to the Nil treatment.

All treatments applied resulted in a reduction in the ARG population measured 118 days after treatment. This was correlated well with assessed weed biomass levels as shown in Figure Error! Bookmark not defined. below.

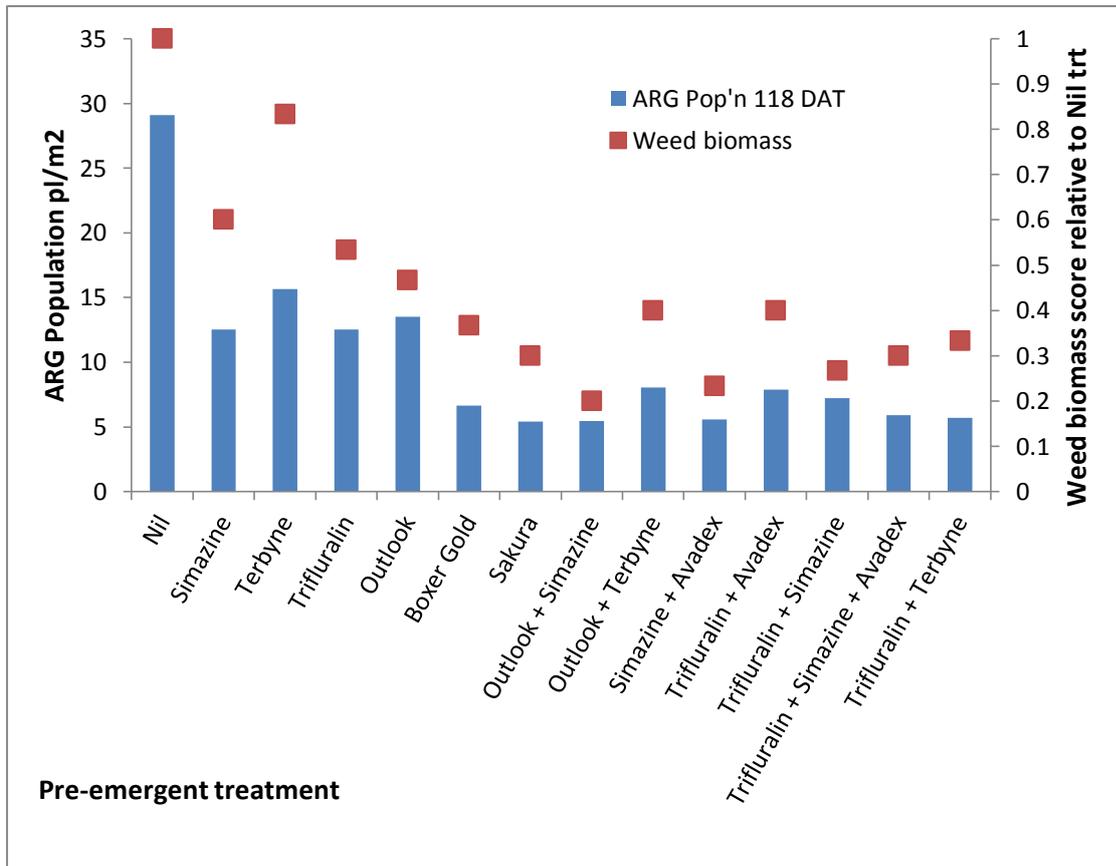


Figure Error! Bookmark not defined.: ARG populations and relative weed biomass at 118 days after application in response to various pre-emergent herbicide treatments.

1.5 Discussion

It should be noted that following the establishment of the trial there was limited rainfall. Only 17mm of rain was recorded in the 16 days following application (two falls of 6.5mm and 10mm). The next major fall did not occur until 60mm fell on the 1st June. This lack of incorporating or activating rainfall may have reduced the effectiveness of many of the herbicides. Potentially the post sowing pre-emergent (PSPE) application of Terbyne may have been most disadvantaged due to the lack of rain.

Despite this the trial has demonstrated that using any of the pre-emergent herbicides tested significantly reduced ARG populations, however there were differences between the treatments in their level of control.

An application of simazine alone, which in the past has probably been the most common pre-emergent herbicide used in lupins in this region, reduced ARG populations by more than half however still leaving a weed population of 12 plants/m². Terbyne, trifluralin and Outlook all resulted in a similar level of residual weeds population resulting in an average level of control of 54%.

The newer herbicides in Boxer Gold and Sakura were the best performing options as single product treatments with around 80% control.

Tank mixed or multiple product herbicide treatments provided statistically similar reductions to the ARG population of approximately 80% with residual weed population of around 6-7 plants/m².

The resultant control achieved by the use of multiple products was often greater than that achieved when the products were used alone. In many cases the mixing or use of multiple products resulted in almost an additive effect, as can be seen in Figure 1 and for example:

- Adding trifluralin to either simazine or Terbyne increased control from ~50% to ~75% nearly halving the residual weed numbers,
- Outlook applied with either simazine or Terbyne nearly doubled ARG control,
- Avadex combined with trifluralin resulted in approximately 73% control compared to only 57% control from trifluralin alone.

1.6 Conclusion

This trial has demonstrated that the use of pre-emergent herbicides can reduce ARG populations which in turn will reduce the “pressure” growers would be applying for the development of resistance to clethodim.

This trial has demonstrated that the common practice of just simazine provides only moderate control of ARG populations, and that there are a number of other options that are far more effective.

In this trial the newer herbicides Sakura and Boxer Gold showed improved weed control over that of common practice. It also demonstrated the advantage or improved control that can be achieved through combinations of products, for example the addition of trifluralin to simazine resulted in control that matched that of Boxer Gold and Sakura (with a significantly lower cost).

Growers and advisors should not base their pre-emergent ARG control options solely on the results presented in this report. Consideration should also be given to results from other trials and should also take into account the following:

- What other weeds are present and the effectiveness of the alternatives are on these?
- What is the cost of these alternatives in comparison to each other?
- Any varietal differences in crop tolerances of the particular alternatives?
- Plant back or residue considerations?
- Herbicide rotations and resistance management?
- The herbicide resistance status of the weeds you are targeting

1.7 Acknowledgements

GOA would like to thank the Corderoy family of Narromine for their hosting of this trial.