Diuron for Pre-emergent Weed Control in Lupins

Aim: To evaluate Diuron as a broadleaf weed killer pre sowing of lupins and to evaluate some mixing partners to improve the control of grass weeds.

Research Officer: Peter Newman and Glenn Adam
Company: Department of Agriculture, Geraldton

Farmer: Keith and Wes Morcombe
Location: Coorow

Background: Wild Radish that develops resistance to the triazine herbicides (eg. Simazine & Atrazine) poses a significant threat to the lupin industry of W.A. Simazine was chosen over Diuron as a lupin herbicide in the early 80's due to its efficacy as a grass killer. However, Diuron is believed to have similar if not better efficacy on broadleaf weeds such as wild radish and doublegee. Diuron is a group C herbicide (as is Simazine) but is a different sub group to Simazine. To date, there has been no documented cross-resistance between the two herbicides. Therefore, in theory, if wild radish develops resistance to triazine herbicides, Diuron may be a useful alternative.

Trial Details:

Plot size and replication	40m x 5m * 3 replicates
Soil type	Red / brown gravely loam
Sowing date	22nd May 2003
Seeding rate	100 kg/ha Belara Lupins
Paddock rotation	2002 = Wheat, 2001 = Wheat
Herbicides	22nd May 2003 Knockdown – Spray.Seed 1.5 L/ha in 80 L water / ha 22nd May 2003 All herbicide treatments applied. Herbicides Used: Simazine 500 g/L; Diuron 500 g/L; Trifluralin 480 g/L; Dual Gold® (S-Metolachlor 960 g/L)

Results:

Table 1: Ryegrass and Radish density (plants /m^2), and Lupin yield (kg/ha) for a range of herbicide treatments.

Treatment	**Ryegrass / m^2**	**Radish / m^2**	**Lupin Yield (kg/ha)**
1. Simazine 2 L/ha	41.7	0.5	1649
2. Diuron 2 L/ha	17.9	0.9	1661
3. Diuron 2 L/ha + Trifluralin 1.6 L/ha (768 gai)	3.4	1.6	1792
4. Diuron 2 L/ha **Pre**+ Dual Gold 500 mL/ha **PSPE**	18.8	1.4	1630
5. Diuron 2 L/ha + Trifluralin 1.6 L/ha **Pre** + Dual Gold 500 mL/ha **PSPE**	2.1	1.5	1761
6. Diuron 2 L/ha + Trifluralin 1.6 L/ha **Pre** + Dual Gold 500 mL/ha **Pre Sowing**	1.7	0.9	1797
LSD 0.5%	23.4	n.s.	99

Note: n.s. refers to not significantly different $p > 0.05$, PSPE = Post Sowing, Pre Emergent

Summary:

- Diuron appears to be safe when applied pre-sowing of lupins at label rates, as there was no difference in yield between the Simazine alone and Diuron alone treatments. Diuron is registered for use at 2 L /ha (500gai product) pre sowing of lupins in W.A.
- In this trial, ryegrass control was superior where Diuron was applied alone compared to Simazine. Past trial results over a number of years have shown that Simazine is a better grass killer than Diuron.
- There was no difference in wild radish control between any treatments. This result is encouraging as it suggests that perhaps Diuron is as effective as Simazine for pre-em radish control (where the radish is unlikely to be resistant to Group C herbicides). However, low radish numbers were experienced at this trial site so it is dangerous to make optimistic conclusions.
- Diuron was compared to Simazine at another site on sand plain soil where the radish is known to be resistant to Simazine. Unfortunately the Diuron was no more effective than Simazine at controlling the very large wild radish population. This result shows that Diuron is not a universal panacea for resistant wild radish.
- Adding Trifluralin to Diuron appears to have improved ryegrass control (no signif. diff. $p>0.05$), which in turn led to a significant yield increase. There may be a temptation to use Trifluralin exclusively for ryegrass control in every phase of the cropping rotation. However, this is a dangerous practice as it will no doubt lead to wide spread trifluralin resistance.
- Dual Gold® appears to have had little effect on ryegrass control (no signif. diff. $P>0.05$) but appears safe for lupins in this trial. The loamy soil at this site would have contributed to the safety of Dual Gold®. Lupins have demonstrated good tolerance to Dual Gold® at other sites on sandy soils, however this is unregistered. Ryegrass control with this herbicide is variable depending on soil moisture, soil type and method of application.