

# Lupins Tolerate Robust Herbicide Rates When Applied In-row With a Shielded Sprayer

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**Aim:** The aim of this research was to evaluate alternative herbicide mixes for their efficacy at controlling wild radish in-row using a shielded sprayer in lupins spaced at 60cm.

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**Company:** Department of Agriculture, Geraldton



**Farmer:** Andrew Messina, Mullewa; Kim & Neil Diamond, Buntine

**Background:** One potential step forward for Lupin production in the Northern Agricultural Region is the use of tramline farming with inter-row spraying for the control of problem weeds such as wild radish. Herbicide options for weed control in lupins are becoming increasingly difficult as weeds, in particular wild radish and annual ryegrass, develop resistance to more groups of herbicide.

Recent research has demonstrated that lupins can be grown at row spacings as wide as 60cm (ie. 2 feet) with little or no yield penalty (Harries et al 2004). This, together with improvements in auto steer and tramline farming technology make shielded spraying of lupins a viable option on a broadacre scale. Shielded sprayers can be designed such that in-row nozzles direct the spray at the base of the crop plant, thus minimising herbicide contact with the leaves of the crop. This may be useful for the control of broadleaf weeds such as wild radish and doublegee where herbicide spray can target the prostrate weeds while only contacting the base of the crop plant.

## Method:

### *Site 1 – Messina (Tenindewa)*

- Simazine was applied pre sowing. A standard brew of Spray.Seed® 2.5 L/ha + Diuron 300 g/ha was used between the rows while spraying the in-row treatments.
- Belara Lupins sown at 60cm row spacing, 80 kg/ha
- In-row herbicide treatments applied at 8 leaf (some 8 to 10 leaf) stage of lupins on 15 June 04.
- 5% radish were 8 Leaf + (30cm diameter)
- 70% radish were 4 – 6 Leaf (15 – 20cm diameter)
- 25% radish cotyledon – 2 Leaf
- Before spraying: Rep1 – radish 14 /m<sup>2</sup>; Rep 2 – radish 4.6 /m<sup>2</sup> ; Rep 3 radish 37 /m<sup>2</sup>

### *Site 2 – Kim & Neil Diamond (Buntine)*

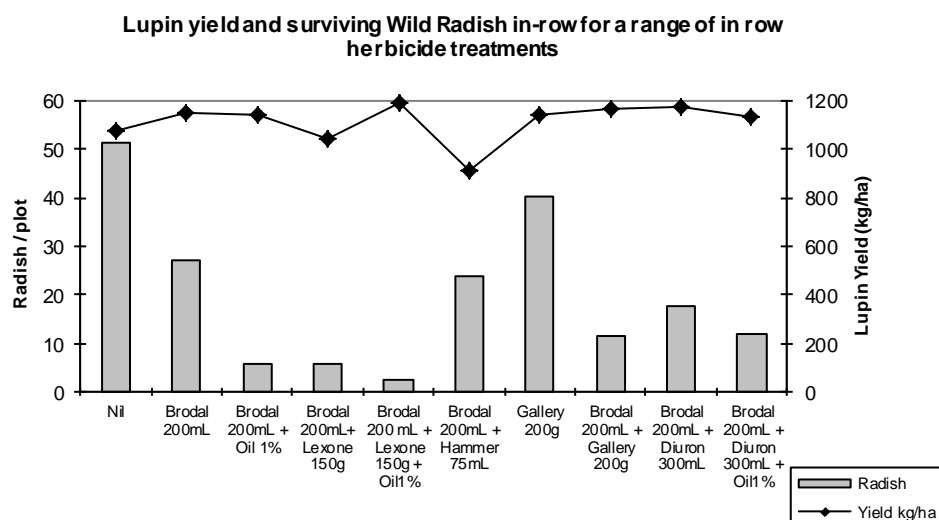
- Nil herbicide pre sowing – ie. knockdown herbicide only. A standard herbicide treatment of glyphosate 1.5 L/ha was applied between the rows.
- Belara lupins sown into moist soil at 60cm row spacing.
- In-row herbicide treatments applied at the big bud to early flowering stage of the lupins on 27<sup>th</sup> July 04. Wild radish were at the stem elongation / early flowering stage.

### Trial Details

	Site 1	Site 2
Property	Messina's, Tenindewa Nth Road	Kim & Neil Diamond, Buntine
Plots / replication	10 treatments x 3 reps, 20m long plots, harvested with plot harvester	5 treatments x 2 reps, 800m long plots, yield measure with yield monitor
Soil type	Red sandy loam	Yellow loamy sand
Herbicides	Post emergent – in-row Brodal® – diflufenican 500 g/L Lexone® - metribuzin 750 g/kg Hammer® - carfentrazone 240 g/L Gallery® - isoxaben Diuron – diuron 500 g/L Oil – Hasten	Post emergent – in-row Brodal® 200 mL/ha– diflufenican 500 g/L Lexone® 150 g/ha - metribuzin 750 g/kg Diuron 300 mL/ha – diuron 500 g/L Oil 1% – Hasten

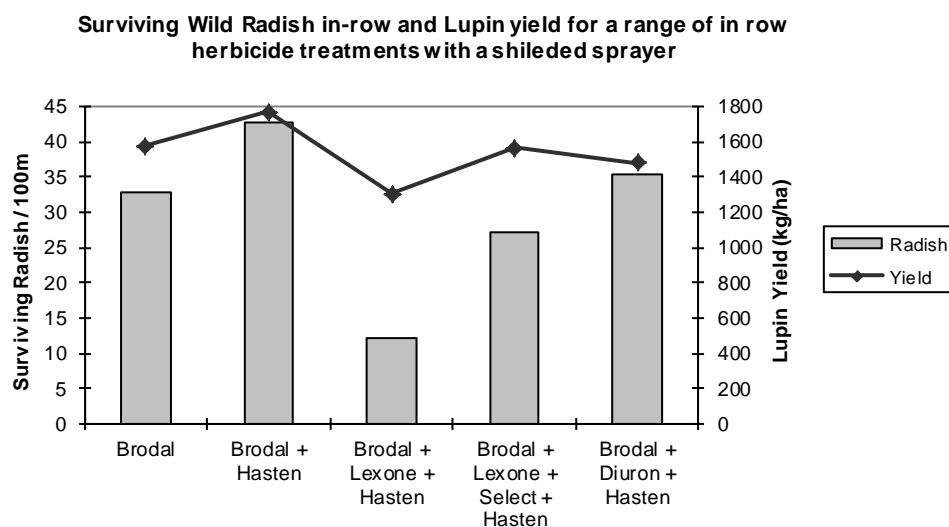
### Results:

#### Site 1: Messina's property, Tenindewa



- The Brodal + Hammer treatment was significantly lower yielding than all other treatments (LSD 149 kg/ha)
- There were significant differences in wild radish control between treatments (LSD 18.24 wild radish / plot)

#### Site 2: Kim & Neil Diamond, Buntine



There was no significant difference in yield between treatments ( $p>0.05$ ). However, there was a trend of reduced yield for the Brodal + Lexone + Hasten treatment. Wild radish control with the Brodal + Lexone + Hasten treatment was significantly better than all other treatments (LSD 19.31)

#### **Summary:**

- Lupins tolerated robust in-row herbicide rates well at site 1. This trial was sprayed early (ie. 8 leaf) with the in row nozzles directed at the base of the lupin plant. Spraying lupins with herbicide mixes such as Brodal® + Lexone® + Oil is very damaging when sprayed with a conventional boom spray over the entire foliage of the leaf to the point where the lupins are unlikely to survive. There was little visible phyto-toxicity of the lupin, and no yield penalty when this herbicide mix was applied at the base of the lupin plant at site 1.
- In-row weed control was excellent at site 1 despite the wild radish suspected as being resistant to Brodal®. At the time of spraying, wild radish plants were small and prostrate enabling excellent spray coverage with in row nozzles.
- Spraying Brodal® 200 mL/ha at the base of the lupin at site 1 achieved approximately 45% control of wild radish. The addition of 1% Oil (ie. Hasten) to Brodal® significantly improved wild radish control to 89%. The addition of Oil is clearly not an option for the conventional spraying of lupins due to crop phyto-toxicity. This is an example of how shielded spraying can improve the diversity of herbicide options in lupins.
- The herbicide treatment Gallery® (ie. isoxaben) is an experimental herbicide. Gallery® is capable of excellent control of cotyledon to 2 leaf Wild Radish. However, the wild radish in this trial were too large to expect good control with Gallery®.
- The Brodal® + Lexone® + Oil (Hasten) treatment at site 2 achieved the best weed control but appears to have reduced lupin yield. There was no significant reduction in lupin yield, however, the lupins were visibly less bulky and there was a trend of decreased yield. It is possible that applying a ‘hot’ herbicide mix such as this at the big bud stage of lupins may have affected the basal branching of the lupins. The in-row nozzles at site 2 sprayed the bottom half of the lupin stem. It is also possible that this amount of spray contact may be too much for the lupin plant.
- The weed control at site 2 was relatively poor compared to site 1. This result is likely to be due to the late time of spraying at site 2 and the fact that there was no pre-sowing herbicide at site 2 to limit weed growth. Therefore, the weeds were possibly too large for the rate of herbicide applied. It is also likely that wild radish at the stem elongation stage may be tolerant to herbicides applied at the base of the stem. The ideal timing of spraying is likely to be when wild radish are small and prostrate and the lupin crop has at least 8 true leaves.

**Technically reviewed by:** Dave Minke & Abul Hashem

#### **ACKNOWLEDGEMENTS**

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