## U2 Herbicide tolerance, Wanilla (Lower Eyre Peninsula), Tooligie (Upper Eyre Peninsula, South Australia

Co-authored by Andrew Ware, South Australian Research & Development Institute – Port Lincoln

### Aim

To determine the crop safety of applying metribuzin herbicide to commercial lupin varieties.

Wild Radish (*Raphanus raphanistrum*) is becoming an increasingly significant weed in the lupin growing areas of eastern Australia. Metribuzin (in combination with diflufenican) is registered for post-emergent (PE) control of Wild Radish in WA. These trials aim to build a case towards obtaining a permit for its use in the eastern states.

### Treatments

| | |
|---|---|
| Varieties: | Jenabillup, Jindalee, Mandelup, Wonga and potential release 01A012R67 |
| Treatments: | Nil herbicides |
| | Low Metribuzin (100g/ha – label rate for light soil type) |
| | High Metribuzin (200g/ha) |
| | Low Metribuzin (100g/ha) plus Diflufenican (100ml/ha) |
| | High Metribuzin (200g/ha) plus Diflufenican (100ml/ha) |
| Timing: | 27th July (8-10 leaf) |
| Fertiliser: | Map + Zn @ 100kg/ha at sowing |
| Sites: | Wanilla (high rainfall Lower Eyre Peninsula, sand over light clay) |
| | Tooligie (medium rainfall Upper Eyre Peninsula, sand over medium clay) |

### Results and Interpretation

- Early season growth – As for the Wanilla sowing date trial, waterlogging throughout June and July resulted in variable growth and generally poor and variable yields in the Wanilla lupin metribuzin trial. The trial at Tooligie escaped early damage from waterlogging, but sustained extensive hail damage immediately after metribuzin treatment. The site recovered well, however post-treatment visual damage scores were not measured at this site due to hail damage.
- Visual Damage Score – Early damage scores taken at Wanilla showed a treatment effect (Table U2.1), but no variety effect indicating all varieties performed similarly to metribuzin and brodal treatments.
  All herbicide treatments showed visual damage symptoms compared to the untreated control. High Metribuzin + Diflufenican showed the highest level of herbicide damage, while Low Metribuzin, High Metribuzin and Low Metribuzin + Diflufenican showed similar levels of damage.
  No damage scores were taken at Tooligie due to severe post-treatment hail damage.
- Grain Yield – A significant Treatment x Variety interaction was seen for grain yield at Wanilla (Figure U2.1). The potential release 01A012R67 was the highest or equal highest yielding variety for all treatments. Untreated plots of the advanced breeding line 01A012R67 were higher yielding than all other varieties except for the Wonga Nil.
  While yield losses ranged from 0-38% across all treatments, the addition of diflufenican with either rate of metribuzin showed no further yield loss in any of the five varieties.
  Jindalee and Mandelup showed no significant difference in grain yield between the five herbicide treatments. Wonga was the most sensitive variety to the four herbicide treatments, showing the highest yield loss from herbicide treatments of all varieties tested. A 27% yield loss was observed from the two low metribuzin treatments and a 38% yield loss from the High Metribuzin treatment.
  Jenabilup displayed no yield loss from the two Low treatments, however a significant yield loss (averaging 26%) occurred from the high metribuzin treatments.
  The breeding line 01A012R67 showed a significant yield loss from all treatments except Low Metribuzin + Diflufenican. An 18% yield loss was observed from Low Metribuzin, while the two high metribuzin treatments averaged 23% yield loss.

Grain yields at Tooligie show a herbicide treatment effect (Table U2.2), but no variety interaction. This means that all varieties behaved similarly for each treatment at this site. All treatments reduced grain yield except for Low Metribuzin. The High Metribuzin plus Diflufenican treatment incurred the highest level of grain yield loss, yielding 21% lower than the Nil, but was not significantly different to the High Metribuzin treatment.

**Table U2.1.** Effect of various herbicide treatment combinations on visual damage score (0-5) of lupins at Wanilla, Lower Eyre Peninsula 2011. 0= no leaf burn, 1= 20% leaf burn, 5= 100% death.

| Treatment | Nil | Low Met | High Met | Low Met + Diflufenican | High Met + Diflufenican |
|---|---|---|---|---|---|
| **Visual Damage Scores (0-5)** | 0.1 [c] | 0.7 [b] | 0.9 [b] | 0.7 [b] | 1.3 [a] |

lsd (P<0.05) = 0.38

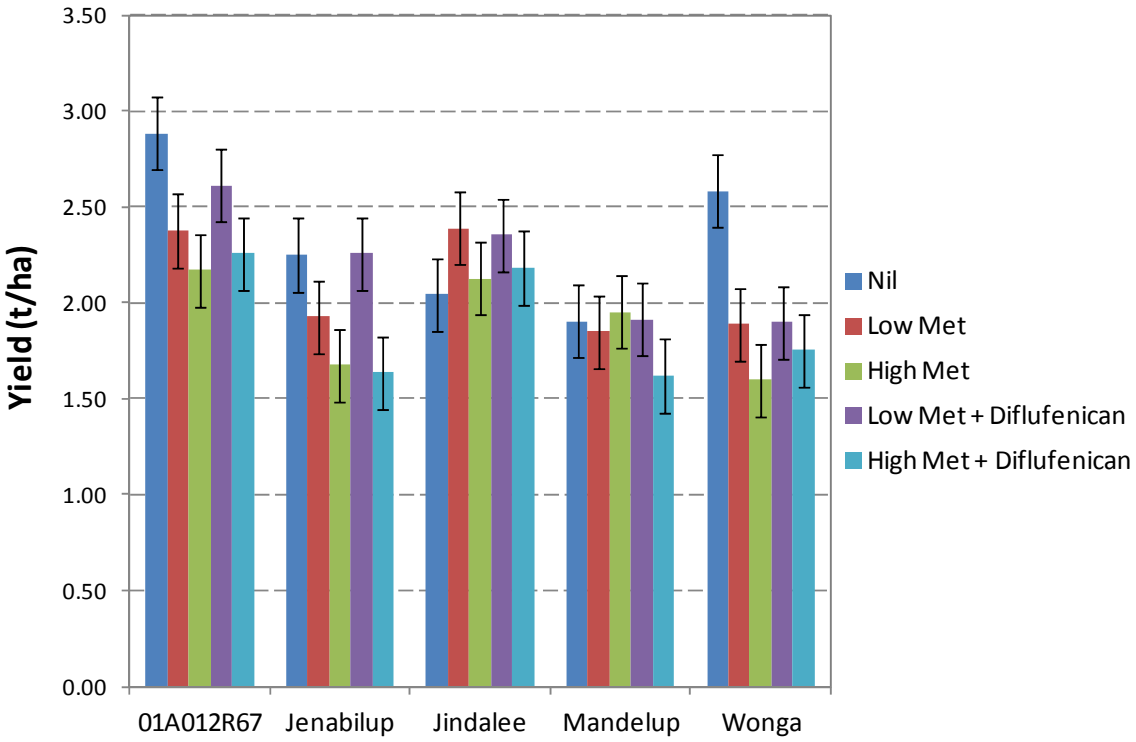


**Figure U2.1.** Effect of various herbicide treatment combinations on grain yield (t/ha) of five lupin varieties at Wanilla, Lower Eyre Peninsula 2011.

**Table U2.2.** Effect of various herbicide treatment combinations on grain yield (t/ha) of lupins at Toologie, Lower Eyre Peninsula 2011.

| Treatment | Nil | Low Met | High Met | Low Met + Diflufenican | High Met + Diflufenican |
|---|---|---|---|---|---|
| **Yield (t/ha)** | 1.69 [a] | 1.61 [ab] | 1.44 [cd] | 1.54 [bc] | 1.33 [d] |

lsd (P<0.05) = 0.12

**Key Findings and Comments**

The early season climatic events of waterlogging (Wanilla) and hail damage (Tooligie) were not conducive for small scale field trial studies, but reflected wide scale industry issues from these regions. Although this meant that some measurements could not be taken, reasonable results were still gained from these trials.

The potential release 01A012R67 performed well across all herbicide treatments, and shows high yield potential. This line was chosen as a potential release for its earlier flowering and high yield potential, particularly in eastern states, however it has now been surpassed by other advanced breeding lines and will no longer be released.

Metribuzin applied post emergence (PE) (8-10 leaf) resulted in significant yield losses at both sites at the high rate and yield loss in some varieties at Wanilla at the low rate. Yield losses from use of

metribuzin, particularly at high rates, were seen in Wonga, Jenabilup and the advanced breeding line 01A012R67 at Wanilla. The highest yield losses at this site were seen in the sensitive variety Wonga, with up to 38% yield loss compared to the control. Mandelup and Jindalee showed no yield loss from any of the herbicide treatments in 2011, and may have sufficient tolerance at this site. However, results at Tooligie were similar to results from 2010 trials, demonstrating that all varieties performed similarly and show yield losses from PE use of metribuzin, particularly at the higher rate. It is likely that the response from PE use of metribuzin in lupins is similar to the response observed in lentils, and hinges on the climatic conditions around the time of application. Varietal differences in tolerance to post emergent metribuzin exist and any potential registration is likely to be only for specific varieties.

In all four of the trials that have been conducted (2010 and 2011), the addition of Diflufenican did not significantly decrease grain yield further than the corresponding rate of metribuzin alone. This result appears promising, and would allow additional broadleaf weed control in specific lupin varieties if registration for use of PE metribuzin could be sought in the eastern states as it has been for Western Australia. Further work will be required to support these results.