Managing sorghum injury when using metolachlor herbicides.

Today’s presenter is

Mark Congreve (ICAN)

Facilitated by Mark Congreve and Erica McKay (ICAN)

This Webinar will start at the following times
9.30 AM (NSW/VIC/TAS)
8.30 AM (QLD)
Housekeeping

• On your screen on the top right you will see a small red arrow pointing to the left. If you click on this, this will open up a chat box to ask questions & audio etc.
• We are using chat box for questions, audio questions are muted to maximise sound quality. Questions will be relayed by the moderator.
• Questions (except for clarification) will be left until the end of the presentation and repeated by the moderator.
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• If you are having audio difficulties, you will see a place to select ‘telephone’ on your chat box – this will come up with the phone number and log in pin to join the webinar by phone. Phone number is 03 8644 7030, code 142-586-056 and a individual pin number.

Moderator: Erica McKay
GRDC Project code ICN00016
Weed control in sorghum

• Weed free establishment to protect yield
• Post-em options available for broadleaf weeds
  – e.g. fluroxypyr + atrazine or terbuthylazine
• No effective post-em grass control
  – Grasses require pre-emergent control
    • Metolachlor based herbicides (+/- atrazine or terbuthylazine)
    • Metolachlor based herbicides not completely safe to ‘grass’ crops
# S-metolachlor crop selectivity

<table>
<thead>
<tr>
<th>Crop</th>
<th>Maximum label rate (960g/L s-metolachlor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>250 mL/ha</td>
</tr>
<tr>
<td>Barley, oats</td>
<td>500 mL/ha</td>
</tr>
<tr>
<td>Cotton</td>
<td>1 L/ha</td>
</tr>
<tr>
<td>Sorghum (when using Concep® II treated seed)</td>
<td>2 L/ha</td>
</tr>
<tr>
<td>Maize, Summer broadleaf crops (where registered)</td>
<td>2 L/ha</td>
</tr>
</tbody>
</table>
What does metolachlor damage look like?

Source: ICAN
Source: Syngenta
Source: Trevor Philp, Pacific Seeds
Source: Syngenta
Factor affecting sorghum selectivity

- Formulation and use rate
- Herbicide location
  - Influence by soil type & rainfall
- Metabolism by seedling
  - Seedling vigour / emergence / stress
- Concep II treated seed
- Sorghum variety
- Application timing & incorporation
- Planter set up
Metolachlor herbicide isomers

Commercial metolachlor formulations

<table>
<thead>
<tr>
<th></th>
<th>720g/L metolachlor</th>
<th>960g/L metolachlor</th>
<th>960g/L s-metolachlor</th>
</tr>
</thead>
<tbody>
<tr>
<td>S:R ratio</td>
<td>50:50</td>
<td>50:50</td>
<td>88:12</td>
</tr>
<tr>
<td>S-metolachlor</td>
<td>360 g/L</td>
<td>480 g/L</td>
<td>845 g/L</td>
</tr>
<tr>
<td>R-metolachlor</td>
<td>360 g/L</td>
<td>480 g/L</td>
<td>115 g/L</td>
</tr>
<tr>
<td>Equivalent rate</td>
<td>4 L/ha</td>
<td>3 L/ha</td>
<td>2 L/ha</td>
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</tbody>
</table>
Soil & rainfall interaction

• Metolachlor solubility is moderate to high
  – Can move down to seed zone with rainfall
  – High availability for plant uptake in moist conditions
• Heavy soils = more binding. Light soils = less binding
• Lowest risk of damage
  – Heavy soil; nil or light rainfall/irrigation to wet soil to ~ 3cm
• Highest risk of damage
  – Light soils; heavy rainfall/irrigation between planting & emergence, particularly if waterlogged
Metabolism

- Germinating seedling takes up herbicide in soil water
  - Must be metabolised before injury occurs
- Stress that reduces metabolism can increase phytotoxicity
  - Waterlogging
  - Cool soil temperature
    - 16°C (and rising) at seed depth at 7am
    - 15°C = 11-14 days to emergence; 17°C = 7-10 days to emergence¹
  - Poor quality seed / low seed vigour
  - Insects and diseases
  - Nutrition
- Always ensure excellent agronomy for establishment

Concep II treated seed

• Concep II (oxabetrinil) enhances speed of metabolism
  – Induces glutathione S-transferase (GST)
• Does not provide 100% protection. Sorghum seedling still needs to be metabolising

**Sorghum tolerance. Buster**
Mt Tyson. Planted and applied 7/9/2011.
Source: Syngenta Unpublished

<table>
<thead>
<tr>
<th>% Biomass reduction (42 DAA)</th>
<th>Premium (no Concep® II )</th>
<th>Elite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual® Gold @ 0.5L/ha (below label rate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual® Gold @ 1L/ha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual® Gold @ 2L/ha</td>
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<td></td>
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</tbody>
</table>
Sorghum variety

- Variety does not usually effect selectivity
- Vigour of individual seed lines

Source: Pacific Seeds / Syngenta

Emergence

Vigour

% Compared to Nil Herbicide

Dual Gold 1L/ha  Dual Gold 2L/ha
NGA Trial – Hermitage 2015/16

• 14 sorghum varieties

• Dual Gold Treatments
  – Nil
  – 1L/ha 26 days prior + 1L/ha one day after planting
  – 1 L/ha one day after planting
  – 2 L/ha one day after planting

• Planted into moisture, 16mm 3DAP, 17mm 6DAP, 13mm 7DAP

• Odd seedling in 2L/ha rate showed minor damage (< 2% of plants)

• No difference in emergence

• Practically no difference NDVI
  – One variety just significant at 2L/ha rate
Application timing & incorporation

• For best results incorporate within 10 days to prevent photodegradation and volatility losses
  – Shallow (3-4cm) mechanical incorporation
  – Light rainfall (or overhead irrigation) to wet soil to ~3-4cm
  – Don’t use flood irrigation for incorporation

• At sorghum use rates – expect 6-10 weeks residual
Planter set up

- Herbicide application prior to planting
  - Can remove herbicide from the planting row
  - May result in escapes in the crop row
Planter set up

- Herbicide application prior to planting
  - Leaving an open furrow with shallow seed placement

- Following rainfall may concentrates herbicide into furrow, increasing the risk of injury
Planter set up

- Herbicide application prior to planting
  - Closing seed slot
    - e.g. use of press wheels, covering harrows and/or chains
      - Assists with herbicide incorporation / binding to soil
Carry over of Concep II treated seed

• May reduce seed vigour over time
  – Re-test germination before use
  – If possible, use in paddock that doesn’t require metolachlor
  – Don’t store for > 18 months
  – If using metolachlor
    • Target heavier soil types
    • Ensure good soil temperature and moisture
    • Avoid early stress – especially waterlogging
    • Application rate
In Summary

| Key points influencing sorghum safety when using metolachlor based herbicides |
|---------------------------------|---------------------------------|
| **Factors increasing the chance of injury** | **Factors reducing the chance of injury** |
| • Rainfall/irrigation between planting and emergence wetting down to the seed zone, especially where waterlogging results | • Use high quality seed, treated with Concep II seed safener |
| • Light/sandy/gravelly soils | • Concep II seed safener applied within the past 18 months |
| • Germinating seedling under stress | • Good planting slot closure |
| • Maximum application rates | • Excellent crop agronomy |
| • Marginal soil temperature at planting |  |
| • Defined planting furrows that with rainfall, act to concentrate herbicide over the crop row |  |
| • Shallow planting depth |  |
Thanks to Syngenta, Pacific Seeds and Northern Grower Alliance who have provided their expertise and made their data available to assist ICAN in delivering this webinar as part of GRDC northern region Integrated Weed Management extension training (project code ICN00016).
## Further resources

<table>
<thead>
<tr>
<th>GRDC Tips &amp; Tactics fact sheet</th>
<th>Available soon from the GRDC website</th>
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<tbody>
<tr>
<td>Keeping sorghum safe when using metolachlor-based herbicides</td>
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