Ecology and management of wild oats

Today’s presenter is

Mark Congreve (ICAN)

Facilitated by Mark Congreve and Georgia Rose (ICAN)

This Webinar will start at the following times

8.30 AM (NSW/VIC/TAS/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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Moderator: Georgia Rose
GRDC Project code ICN00016
Agenda

Biology & Ecology
Resistance update
Management tactics
Questions
Biology & Ecology

• Two main species
  – *Avena fatua* & *Avena sterilllis* subsp. *Ludoviciana*
  – Fatua tends to germinate & shed earlier

Biology & Ecology

• Seed production
  – Up to 225 seeds/plant or 20 000 seeds/m² produced in dense infestations

• Staggered germination
  – Main flush autumn/early winter (~40%)
  – Late germinations (~10-30%) replenish seedbank

• Depth of germination
Seedbank persistence

- ~75% reduction in year 1
- Requires 2-3 years with no seedbank replenishment
- A few ‘escapes’ are enough to replenish seedbank

Soil samples were collected at regular intervals from a farmer’s paddock in North Star district. (Source: S Walker, QLD DPI&F, Toowoomba)
Cultivation

• Full cut systems
  – Seed will be mixed through the profile
  – Incorporation works well for trifluralin & tri-allate. Mixes herbicide with buried seed
  – Seed persistence increases

• Zero till
  – 3 years to convert to zero till (surface seeds)
  – Newer label claims
    • Avadex via IBS at high rates (some crops only)
    • Trifluralin (high rates) or Sakura via IBS - suppression
Ecology

• Highly competitive

Source: O’Donovan et al (1985)
QDAF Glasshouse trial – 2015

Wheat (cv. Spitfire) density 115 plants/m²
Wild oat density ~8/m² (1 plant per 40x30cm tray)

Source: Bhagirath Chauhan. QAAFI, UQ
QDAF Glasshouse trial – 2015

Wheat (cv. Spitfire) density 115 plants/m²
Wild oat density ~8/m² (1 plant per 40x30cm tray)

Source: Bhagirath Chauhan. QAAFI, UQ
Resistence

Differences cf ryegrass

<table>
<thead>
<tr>
<th>Annual ryegrass</th>
<th>Wild oats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploid (2 copies of each gene)</td>
<td>Hexaploid (six copies of each gene)</td>
</tr>
<tr>
<td>Obligate out-crosser (must cross pollinate)</td>
<td>99% self-pollinating</td>
</tr>
<tr>
<td>Highly genetically diverse</td>
<td>Lower genetic diversity</td>
</tr>
<tr>
<td>Widespread sowing for stock feed</td>
<td>Never sown</td>
</tr>
</tbody>
</table>

Source: AHRI. Australian Grain July 2015
Resistance status

Source: Charles Sturt University
Herbicide Resistance Testing Service Reports
2015 Resistance status

Source: Charles Sturt University
Herbicide Resistance Testing Service Reports
Management requires multiple tactics

Highly competitive (early) combined with late season germinations requires

*Early season control (pre or early post herbicide) +
  Crop competition +
  Late season control

or

*Clean up with winter fallow (& summer crop)
Reliant on glyphosate / paraquat (no resistance to date!)

to drive down seedbank
Crop selection

- Crop competition assists in cereals
- Chickpeas are poor competitors (esp. early)
  - Reliant on pre-em + Group A
  - Often leads to escapes

Source: Walker et al. (1998)
Pre-emergents

- Large seed; Seed depth; Staggered germinations
  - => unlikely to provide 100% control

- Stubble binding / Incorporation / Soil type / Moisture

- Generally requires a follow up tactic
  - Limited post-em options in pulses leads to escapes

- Multiple MOA’s
  - Group C / D / J / K
<table>
<thead>
<tr>
<th></th>
<th>Cereals</th>
<th>Canola</th>
<th>Pulses</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Conventional or Clearfield</td>
<td>TT</td>
</tr>
<tr>
<td>Atrazine – pre or PSPE</td>
<td>C</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Simazine – pre or PSPE</td>
<td>C</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Terbuthylazine – pre or PSPE</td>
<td>C</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Terbyne (terbuthylazine) – IBS</td>
<td>C</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Terbuthylazine – early post</td>
<td>C</td>
<td></td>
<td></td>
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<tr>
<td>Pendimethalin – IBS or PSPE</td>
<td>D</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Rustler (propyzamide) – IBS</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trifluralin – full disturbance</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trifluralin – IBS</td>
<td>D</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Tri-allate – full disturbance</td>
<td>J</td>
<td></td>
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</tr>
<tr>
<td>Avadex (tri-allate) – IBS</td>
<td>J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sakura (pyroxasulfone) – IBS</td>
<td>K</td>
<td>S</td>
<td></td>
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</tbody>
</table>

Always check labels for individual crop registrations
Source: How Herbicide Work (Hall 1999)
Group A

• Broadleaf crops
  – ‘Fops’ e.g. haloxyfop (Verdict®), propaquizafop (Shogun®), quizalofop (Targa®)
  – ‘Dims’ e.g. clethodim (Select®), sethoxydim (Sertin®)

• Cereals
  – ‘Fops’ e.g. clodinafop (Topik®), diclofop (Hoegrass®), fenoxaprop (Foxtrot®)
  – ‘Dims’ e.g. tralkoxydim (Achieve®)
  – ‘Dens’ e.g. pinoxaden (Axial®)

Always check labels for individual crop registrations. Tradenames are example only
Crop type and competitive ability

Source: Walker et al. (1998)
Group A - Resistance status 2015

Source: Charles Sturt University
Herbicide Resistance Testing Service Reports
Northern Grower Alliance - 2014

Source: Adapted from “NGA chickpea herbicide trials”
Goondiwindi GRDC Updates 2014

ICAN
Independent Consultants Australian Network

GRDC
Grains Research & Development Corporation
Northern Grower Alliance - 2014

Source: Adapted from “NGA chickpea herbicide trials”
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Source: Adapted from “NGA chickpea herbicide trials” Goondiwindi GRDC Updates 2014
Maximising Group A performance

• Resistance test
• Maximise coverage
  – Small weeds
  – High water rates, medium spray quality
  – Correct adjuvant
• Full label rates
• Avoid broadleaf herbicide tank mixes where possible
• Don’t rely on as the only tactic
## Group B

<table>
<thead>
<tr>
<th></th>
<th>Wheat</th>
<th>Triticale</th>
<th>Barley</th>
</tr>
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<tbody>
<tr>
<td>Atlantis®</td>
<td>Mesosulfuron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crusader®</td>
<td>Pyroxsulam</td>
<td>Not durum</td>
<td></td>
</tr>
<tr>
<td>Hussar®</td>
<td>Iodosulfuron</td>
<td></td>
<td>Expect injury</td>
</tr>
</tbody>
</table>

**Crop**
- Growth stage / Adjuvants / Tank mix partners

**Wild oats**
- Small weeds / Good conditions / Low densities
- Best use => clean up following pre-emergent
2015 Resistance status

![Graph showing the number of samples for Atlantis, Intervix, Crusader, and Hussar]

Source: Charles Sturt University
Herbicide Resistance Testing Service Reports
HT Crops

• Clearfield (canola, barley, wheat)
  – Early post Group B (imi) options
    • Imazapyr/imazamox (Intervix®) or imazapyr/imazapic (OnDuty®)

• TT canola
  – Option to include Group C
  – Pre or PSPE applications (suppression) - atrazine, simazine, terbuthylazine
  – Terbyne also has a claim for early post-emergent control
Spray Topping

- **Flamprop (Group Z)**
  - Flamprop requires warm temperatures
  - Cereals GS40 (start of booting)
  - Wild oats GS30-40 (preferably when 20% are at GS31)

- **Pinoxaden (Group A)**
  - Cereals GS49 (end of booting)
  - Wild oats GS30-47 (stem elongation to flag leaf sheath opening)

Source: Syngenta. AXIAL® Wild Oats Selective Spray Topping Summary of 15 trials across WA, SA, VIC, NSW and QLD.
Potential for Harvest Weed Seed Capture

QDAF Glasshouse trial – 2015

Wheat (cv. Spitfire) density 115 plants/m²
Wild oat density ~8/m² (1 plant per 40x30cm tray)

Seed number/tray at wheat maturity

Wild oat emergence (days) after wheat emergence

Source: Bhagirath Chauhan. QAAFI, UQ
Thanks to NGA & QAAFI 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).

Public domain data used in this presentation is also duly acknowledged (AHRI, Charles Sturt University, Hall, O’Donovan et al, Syngenta, Walker et al).