Helping the Canola Industry Meet Canola Quality Demands

Dr Rod Mailer, Wagga Wagga Agricultural Institute, Wagga Wagga, NSW – 28 July 2010
Canola Breeding History

- Rapeseed – 1969
- State Government breeding programs – 1970s
- First Canola - 1979
  - Low erucic (40% → < 2%)
  - Low glucosinolates (140 → < 30 µM/g meal)
- Government breeding to Private industry
  - Pre-Breeding lines for Private Industry cultivars
## Quality Traits (oil & meal)

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<thead>
<tr>
<th>PRIORITIES</th>
<th>Oil content</th>
<th>Erucic acid</th>
<th>Glucosinolates</th>
<th>Consistency</th>
<th>Energy</th>
<th>Sinapine / Condensed tannins</th>
<th>Phytate</th>
<th>Fibre - Crude / NDF / ADF</th>
<th>NSP (non-starch polysac)</th>
<th>α- and γ- Tocopherols</th>
<th>Amino acids - Cystine / Methionine / Lysine</th>
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Oil content

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range 36 - 48%
Influence of Oil on Meal Protein - 2009

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Glucosinolates in meal

Range 2009 Seed 4 - 16
Meal 7 – 28 µM

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Min: 50%
Ave: 60%
Max: 70%
DESIGNER OILSEED RAPE

* varieties already available using classical plant breeding; ** varieties under development, but no transgenic plants available yet; .lazy varieties where transgenic plants are available; .lazy transgenic varieties available and under field trialing.

Denis Murphy  John Innes Centre, Norwich

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Australian Oilseed Crush Plants and Size

- Large
  >100,000 t p.a.
- Medium
  >20-100,000 t p.a.
- Small
  <20,000 t p.a.

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## Vegetable meal use

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<tr>
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<th>04/05</th>
<th>05/06</th>
<th>06/07</th>
<th>07/08</th>
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<tr>
<td>Domestic</td>
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<tr>
<td>Canola</td>
<td>282</td>
<td>275</td>
<td>246</td>
<td>315</td>
<td>357</td>
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<tr>
<td>Cotton</td>
<td>197</td>
<td>240</td>
<td>179</td>
<td>87</td>
<td>80</td>
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<tr>
<td>Soy</td>
<td>42</td>
<td>38</td>
<td>27</td>
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<td>Sun</td>
<td>31</td>
<td>42</td>
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<td>Imported</td>
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<tr>
<td>Soy</td>
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<td>369</td>
<td>620</td>
<td>540</td>
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<tr>
<td>PKE</td>
<td>14</td>
<td>11</td>
<td>294</td>
<td>148</td>
<td>120</td>
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<td><strong>TOTAL</strong></td>
<td><strong>828</strong></td>
<td><strong>975</strong></td>
<td><strong>1393</strong></td>
<td><strong>1156</strong></td>
<td><strong>1152</strong></td>
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</table>
The industry must ensure varieties meet consumer requirements

- Determine which traits are important for each industry – ruminants, monogastrics
- Investigate effects of processing on canola meal
- Bonification on Quality Traits
- AOF Produce a list of Recommended Cultivars

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Canola Meal Quality

Processing

By-pass Protein
Reactive lysine
Glucosinolates

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AOF – Australian Canola Quality

Annual Publication

Australia’s canola crop

Dr Rod Mailer, Wagga Agricultural Institute, Wagga, NSW – 28 July 2010
Improved Canola Quality

Plant Breeding Proposal
for
Grains Research & Development Corporation
&
Australian Oilseed Federation
Sinapine: NVT 2005 & 2006

Sinapine (mg/kg in oil free meal)

Year / Variety:
- 2005 BravoTT
- 2005 ATR Subby
- 2005 AG Outback
- 2005 ATR Beacon
- 2005 ThunderTT
- 2005 Pioneer 44C73
- 2005 TornadoTT
- 2005 Pioneer 46C76
- 2005 AV Sapphire
- 2006 ATR Subby
- 2006 AG Outback
- 2006 ATR Beacon
- 2006 Pioneer 44C73
- 2006 BravoTT
- 2006 ATR Summit
- 2006 ThunderTT
- 2006 TornadoTT
- 2006 Pioneer 46C76
- 2006 AV Sapphire

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Seed Size – NVT Trials

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Breeding for lower fibre levels results in energy levels of up to 10 per cent higher in pigs and 14 per cent higher in poultry.
Summary

- Industry direction in canola quality
- Financial returns for quality improvements
- Breeding programs to deliver better quality traits

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