Unravelling factors affecting Sclerotinia stem rot in canola particularly in the light of fungicide spray decisions

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Outline

1. Sclerotinia levels
2. Epidemiology
3. 2014 Petal testing
4. Case studies
5. Key messages

Photo: Kith Jayasena, DAFWA
Sclerotinia Stem rot incidence in WA in 2014

• Widespread but not severe
• Few crops still suffered economic losses
• Early development of apothecia
• Less favourable conditions post flowering
• Sclerotinia caused an estimated loss of $23M in 2014
Sclerotinia Life Cycle

- **Growing Season**: Wet and humid conditions required for the disease progression.
- **SUMMER**: Initiation of infection. Apothecia produced from sclerotia in moist soil.
- **Spring**: Sclerotia form inside infected stem. Severe stem rot.

Key steps in the life cycle:
- **GROWING SEASON**: Initial infection by ascospores produced in ascocarps.
- **SUMMER**: Sclerotia survive in the soil, ready for the next season.
Epidemiology of SSR: Pre-infection

- Spore trapping
- Apothecia monitoring
- Petal testing
Petal Testing

- 2010-2014
- 6 sites
- Daily temperature, rainfall and relative humidity recorded
Petal testing – Key findings

• Timing and frequency of petal infection depended on
  – Rainfall*
  – Relative humidity*

• Air and soil temperature not significant
Conditions prior to max petal infection

Conducive year

Non conducive year
Conditions after max petal infection

Conducive year

Non conducive year
Mean air temperature (Chapman)

**Chart Description:**
- **Y-axis:** Temperature (°C)
- **X-axis:** Dates from 11-Jun to 9-Oct

Key:
- Diamond: Mean T 2010
- Red square: Mean T 2011
- Green triangle: Mean T 2012
- Purple cross: Mean T 2013
- Blue triangle: Mean T 2014

The chart illustrates the mean air temperature (°C) from 11 June to 9 October for the years 2010 to 2014.
Large scale petal testing in 2014

- Southern/South Coastal region
  - 10 shires
- >200 samples
  - 10 varieties
- sclero selective medium
Mean Petal infection in different shires

- Katanning
- Gnowangerup
- Kojonup
- Cranbrook
- Williams
- Wagin
- Arthur River
- S. Stirlings
- Kendenup
- Frankland

Mean PPI

- a
- ab
- ab
- abc
- abc
- abc
- abc
- bcd
- cd
- d
Percent petal infection - TOS

![Graph showing percent petal infection over time of sowing](image-url)
From 20 of 200 paddock validated for stem infection
Case study 1: Moora

<table>
<thead>
<tr>
<th>Product A @ 1.5L/ha</th>
<th>Product A @ 1 L/ha</th>
<th>Prosaro @ 450ml/ha</th>
<th>Nil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield (Kg/ha)</td>
<td>Disease incidence</td>
<td>Rain (mm), mean RH (%)</td>
<td>PI (%)</td>
</tr>
</tbody>
</table>

Yield (Kg/ha):
- Product A @ 1.5L/ha: 1700 Kg/ha
- Product A @ 1 L/ha: 1800 Kg/ha
- Prosaro @ 450ml/ha: 2000 Kg/ha
- Nil: 2100 Kg/ha

Disease incidence:
- 0
- 20
- 40
- 60
- 80
- 100

Rain (mm), mean RH (%), PI (%):

- 14/07/14: 20 mm, 80%, 40%
- 21/07/14: 10 mm, 70%, 30%
- 28/07/14: 15 mm, 60%, 20%
- 4/08/14: 10 mm, 50%, 10%
- 11/08/14: 15 mm, 40%, 0%
- 18/08/14: 20 mm, 30%, 0%
Case study 2: Wagin

- Product A @ 1.5L/ha
- Product A @ 1L/ha
- Prosaro @ 450ml/ha
- Sumisclex @ 1L/ha
- Nil

**Yield (Kg/ha)**

**Disease incidence**
### Row spacing, Prosaro and Density

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Disease incidence</th>
<th>Isd</th>
<th>Yield/ha</th>
<th>S.E.</th>
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</thead>
<tbody>
<tr>
<td>Prosaro @ 450ml/ha</td>
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<td>Nil</td>
<td>24</td>
<td>12</td>
<td>2359</td>
<td>75</td>
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<tr>
<td>Treated @ 30% bloom</td>
<td>13*</td>
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<td>Variety</td>
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<td>Cobra</td>
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<td>Hyola 404</td>
<td>21</td>
<td></td>
<td>2725*</td>
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<td>Row spacing</td>
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<td>22cm</td>
<td>18</td>
<td>4</td>
<td>2452</td>
<td>51</td>
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<tr>
<td>44cm</td>
<td>19.5</td>
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<td>2520</td>
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<tr>
<td>Plant density</td>
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<tr>
<td>15 plants /m²</td>
<td>17.7</td>
<td>4</td>
<td>2418</td>
<td>41</td>
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<tr>
<td>30 plants /m²</td>
<td>19.7</td>
<td></td>
<td>2554*</td>
<td></td>
</tr>
</tbody>
</table>

Estimated ROI from using Prosaro $50/ha

![Graph showing rainfall, mean air temperature, and mean relative humidity over time.]
Decision to spray

>40mm rain, >75% RH
Where to from here?

- Regional risk forecast
- Validation
- Yield loss model
- Sclerotinia e-guide
Key Messages

– Breakthrough in understanding the triggers
– >40mm rain and >75% RH in the 3 week period before and after early bloom
– Temperature doesn’t seem to be a limiting factor
– WA’s first Sclerocast is on the way
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Thank You
Questions?

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