Impact of oils tank mixed with late blight fungicides on leaf blight control in three growing seasons

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SRUC¹, Scottish Agronomy²

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Background

• Why oils?

• R449 Effectiveness of mineral & vegetable oils in minimising the spread of non-persistent viruses in potato seed crops in GB
  – Scottish Agronomy Ltd, BioSS, NIAB, SASA & SRUC

• Efficacy and crop safety of tank mixes of Olie H, Cropspray 11 E and Fortune with blight fungicides (SRUC)
Trial details

• Field trials in 2011, 2012 & 2013
• King Edward (foliar resistance rating 3)
• Auchincruive, South Ayrshire, Scotland
• 13_A2
• Rapid and stable canopy separately
## Mineral oils

<table>
<thead>
<tr>
<th>Product</th>
<th>Dose (% of spray volume)</th>
<th>Ingredient</th>
<th>Dose (litres per ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olie-H</td>
<td>3.1%</td>
<td>96% mineral oil (petroleum oil)</td>
<td>6.25</td>
</tr>
<tr>
<td>Cropspray 11 E</td>
<td>2.5%</td>
<td>99% paraffinic oil</td>
<td>5.0</td>
</tr>
<tr>
<td>Fortune</td>
<td>0.5%</td>
<td>75.0 % Oilseed derived fatty acid esters + n-butyl</td>
<td>1.0</td>
</tr>
</tbody>
</table>

1 Not yet approved in the UK
2 May be applied up to tuber initiation
## Fungicides

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Formulation</th>
<th>Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percos</td>
<td>ametocetradin + dimethomorph</td>
<td>SC</td>
</tr>
<tr>
<td>Revus</td>
<td>mandipropamid</td>
<td>SC</td>
</tr>
<tr>
<td>Invader</td>
<td>dimethomorph + mancozeb</td>
<td>WG</td>
</tr>
<tr>
<td>Ranman Top</td>
<td>cyazofamid</td>
<td>SC</td>
</tr>
<tr>
<td>Infinito</td>
<td>fluopicolide + propamocarb</td>
<td>SC</td>
</tr>
<tr>
<td>Valbon + ZinZan</td>
<td>benthiovalicarb + mancozeb</td>
<td>WG</td>
</tr>
<tr>
<td>Ranman A + B</td>
<td>cyazofamid</td>
<td></td>
</tr>
<tr>
<td>Shirlan</td>
<td>fluazinam</td>
<td>SC</td>
</tr>
</tbody>
</table>
## Structure of rapid canopy programmes (example)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate (kg or l/ha)</th>
<th>No. of sprays</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Curzate M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ranman Top</td>
<td>2.0</td>
<td>1</td>
</tr>
<tr>
<td>Quell Flo (mancozeb)</td>
<td>0.5 + 6.25</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2.8</td>
<td>5</td>
</tr>
</tbody>
</table>

3. Curzate M
- Ranman Top + Olie H
- Quell Flo
### Structure of stable canopy programmes (example)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate (kg or l/ha)</th>
<th>No. of sprays</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Curzate M</td>
<td>2.0</td>
<td>1</td>
</tr>
<tr>
<td>Consento</td>
<td>2.0</td>
<td>3</td>
</tr>
<tr>
<td>Invader</td>
<td>2.4</td>
<td>7</td>
</tr>
<tr>
<td>8. Curzate M</td>
<td>2.0</td>
<td>1</td>
</tr>
<tr>
<td>Consento</td>
<td>2.0</td>
<td>3</td>
</tr>
<tr>
<td>Invader + Olie H</td>
<td>2.4 + 6.25</td>
<td>7</td>
</tr>
</tbody>
</table>
Rapid Canopy Foliar Results 2011

Severity (%) foliar blight

29-Jul, 05-Aug, 12-Aug, 19-Aug, 26-Aug, 02-Sep, 09-Sep

LSD 26.1

Revus
Revus + Olie H
Percos
Percos + Olie H

8
Stable Canopy 2012 Foliar Results

Severity (% foliar blight)

- Untreated
- Invader
- Invader + Olie H
- Valbon + Zin Zan
- Valbon + Zin Zan + Olie H

LSD 14.5
Rapid Canopy 2013 Foliar Results

Severity (% foliar blight)

LSD 15.3

- Untreated
- Revus
- Revus + Olie H
- Revus + CropSpray 11E
- Revus + Fortune
Control of leaf blight by oil + fungicide compared with fungicide alone (n=27)
Improvement in leaf blight control from tank mixing oil with fungicide

Percentage

Improvement in leaf blight control from tank mixing oil with fungicide
Blight-free yield for oil + fungicide compared with fungicide alone (n=27)
Results

• The three oils consistently improved foliar blight control for the three fungicides Percos, Revus and Invader.

• In 12 out of the 15 comparisons involving these fungicides, the improvement in foliar blight control was statistically significant.

• The impact of oil was greatly influenced by the fungicide product tank mixed
  — Shirlan & Ranman A + B
Results

• Greater seasonal variability with added Olie H was evident in the results for Valbon + ZinZan, Ranman Top and Infinito.

• No conclusions can be drawn about the impact of fungicide and mineral oil mixtures on tuber blight: however, no evidence of tuber blight control being poorer.
# Phytotoxicity for Shirlan + Olie H

<table>
<thead>
<tr>
<th></th>
<th>AUDPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>1827</td>
</tr>
<tr>
<td>Shirlan</td>
<td>747</td>
</tr>
<tr>
<td>Shirlan + Olie H</td>
<td>1250</td>
</tr>
</tbody>
</table>
Phytotoxic symptoms using 6.2% v/v Olie H cv Maris Piper
Shirlan plus Olie H at rosette stage, cv Estima, Fife 2014
Beading of rain led to delayed drying of leaf surfaces. Enhancement of leaf infection, if it occurred, must have been relatively small.
Water beading from using 1% v/v Olie H
Concluding remarks

• Subsequent Agrii-sponsored testing in 2014 confirmed the improved control of foliar blight for Cropspray 11E added to Invader.
• Oil tank mixes not recommended so far: Shirlan
• Common fungicide properties determining the response to oil (positive, neutral or negative) were not clear.
Concluding remarks

• Tank mixes of individual products need to be tested to generate recommendations
  – Active ingredient and formulation
• Future testing should include 3-way mixes of blight fungicide, insecticide and mineral oil.
  – Wider experience has highlighted phytotoxic effects from tank mixes of Biscaya (oil dispersible formulation) and mineral oil.
• Results support work with other adjuvants
  – Addition of specific adjuvants to specific fungicide products can very substantially improve control.
NB: Use of Shirlan in sequence with oil shortened internodes and reduced vegetative growth.
Acknowledgements

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