New SDHI Fungicides: Outlook for Cherry Disease Control in 2012

George W. Sundin

NW O&V Show; January 24, 2012
Fungal Disease Epidemics

% Disease

Date

Harvest
Fungal Disease Epidemics

% Disease

Date

Harvest

The vital role of respiration – a target for newer fungicides and pesticides

complex III Qi (inside) inhibitors like cyazofamid (Ranman)

complex III Qo (outside) inhibitors like Famoxate™, strobilurins, Group 11

complex II inhibitors like penthiopyrad, boscalid, Group 7

complex IV inhibitors like cyanide, nitric oxide

electron transport inhibitors

oxidative phosphorylation inhibitors
Commercial succinate dehydrogenase (SDHI) Fungicides

- Boscalid – a.i. of fungicide **Endura**
  - Tree fruit – sold in a premix with pyraclostrobin (**PRISTINE**)

- **To be registered in 2012:**
  - Fluopyram -- Luna
  - Fluxapyroxad -- Merivon
  - Penthionyl -- Fontelis
Commercial SDHI Fungicides

• Boscalid – a.i. of fungicide Endura
  – Tree fruit – sold in a premix with pyraclostrobin (PRISTINE)

• To be registered in 2012:
  • Fluopyram – Luna
    – + QoI (Strobilurin); + DMI; or + AP
  • Fluxapyroxad – Xemium
    – + QoI (Strobilurin)
  • Penthiopyrad -- Fontelis
Commercial SDHI Fungicides for Cherry

• Boscalid – a.i. of fungicide Endura
  – Tree fruit – sold in a premix with pyraclostrobin (PRISTINE)

• To be registered in 2012:
  • Fluopyram – Luna
    – + QoI (trifloxystrobin) – LUNA SENSATION
  • Fluxapyroxad – Xemium
    – + QoI (pyraclostrobin) -- MERIVON
  • Penthiopyrad -- Fontelis
Commercial SDHI Fungicides

• **What you will hear about these fungicides:**

  • Luna Sensation and Merivon are premixes of 2 active ingredients for built in resistance management

• **What you need to remember about these fungicides:**

  • Both of these fungicides are at risk of resistance development AND they have been used for CLS control in Michigan for several years
Fungal Disease Control Chemistries, 2012

- Chlorothalonil – Bravo and generics
- Pristine – contains an SDHI component
- Strobilurins – Gem, Adament
- Syllit
- Copper
- Captan
  - Sterol-inhibitors

- SDHIs – succinate dehydrogenase inhibitors
Fungal Disease Control Chemistries, 2011

• New SDHI chemistries
  – Luna Sensation (Bayer) – stroby + SDHI
  – Merivon (BASF) – stroby + SDHI
  – Fontelis (Dupont)

  – Q8Y78 (Dupont) – stroby + SDHI
Cherry Disease Control Experimental Trials

• Trials run at NWMHRS
  – Bill Klein, Myron Anderson
• Montmorency & Balaton; Montmorency
• 16 treatments; 8 treatments
• Petal fall, shuck split, 1st - 4th covers
• Ratings on July 15, August 25
**Penthiopyrad Efficacy – Leaf Spot**

<table>
<thead>
<tr>
<th>Year</th>
<th>Nontreated Control</th>
<th>14 fl oz/A</th>
<th>20 fl oz/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>90.9 a</td>
<td>76.6 b</td>
<td>45.9 c</td>
</tr>
<tr>
<td>2007</td>
<td>81.6 a</td>
<td>59.9 b</td>
<td>35.7 c</td>
</tr>
<tr>
<td>2008</td>
<td>47.2 a</td>
<td>16.9 b</td>
<td>11.4 c</td>
</tr>
<tr>
<td>2009</td>
<td>91.0 a</td>
<td>72.7 b</td>
<td>76.4 b</td>
</tr>
<tr>
<td>2011</td>
<td>58.5 a</td>
<td>41.1 b</td>
<td>45.4 b</td>
</tr>
</tbody>
</table>

*Late August, early September defoliation*
# Penthiopteryrad Efficacy – Leaf Spot

<table>
<thead>
<tr>
<th>Year</th>
<th>Nontreated Control</th>
<th>14 fl oz/A</th>
<th>20 fl oz/A</th>
<th>Dodine</th>
<th>Late August, early September defoliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>90.9 a</td>
<td>76.6 b</td>
<td>45.9 c</td>
<td>32.6 d</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>81.6 a</td>
<td>59.9 b</td>
<td>35.7 c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>47.2 a</td>
<td>16.9 b</td>
<td>11.4 c</td>
<td>1.9 de</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>91.0 a</td>
<td>72.7 b</td>
<td>76.4 b</td>
<td>4.5 e</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>58.5 a</td>
<td>41.1 b</td>
<td>45.4 b</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Fluopyram Efficacy – Leaf Spot
(Evaluated using a premix with trifloxystrobin)

<table>
<thead>
<tr>
<th>Year</th>
<th>Nontreated Control</th>
<th>Fluo + tri 14 fl oz/A</th>
<th>Pristine 10.5 oz/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>47.2 a</td>
<td>0.8 e</td>
<td>2.6 de</td>
</tr>
<tr>
<td>2009</td>
<td>91.0 a</td>
<td>17.1 d</td>
<td>19.4 d</td>
</tr>
<tr>
<td>2011</td>
<td>58.5 a</td>
<td>8.9 c</td>
<td>9.0 c</td>
</tr>
</tbody>
</table>

2 chlorothalonils; 4 cover sprays of test chemistries
Late August, early September defoliation
# Leaf Spot Control, Highlights

## % Defoliation, Aug 25

<table>
<thead>
<tr>
<th>Product Description</th>
<th>% Defoliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pristine, 12 oz</td>
<td>4.5 g</td>
</tr>
<tr>
<td>Bravo (AB); Gem, 3 fl oz (CDEF)</td>
<td>7.2 g</td>
</tr>
<tr>
<td>Bravo (AB); Luna Sensation 5 fl oz (CDEF)</td>
<td>8.9 g</td>
</tr>
<tr>
<td>Control</td>
<td>58.5 ab</td>
</tr>
</tbody>
</table>
Leaf Spot Control, Highlights

% Defoliation, Aug 25

Fontelis, 14 fl oz  41.1  def
Fontelis, 20 fl oz  45.4  cde
Q8Y78, 18 fl oz    32.1  f
Pristine, 12 oz    4.5   g
Control            58.5  ab

Q8Y78 – stroby + Fontelis
# Leaf Spot Control, Highlights Defoliation, Aug 25

<table>
<thead>
<tr>
<th></th>
<th>Product Description</th>
<th>Letters</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Merivon 500SC 4.5 fl oz</td>
<td>ABCDEF</td>
<td>13.9 e</td>
</tr>
<tr>
<td>2</td>
<td>Merivon 500SC 5.5 fl oz</td>
<td>ABCDEF</td>
<td>7.5 e</td>
</tr>
<tr>
<td>3</td>
<td>Merivon 500SC 6.5 fl oz</td>
<td>ABCDEF</td>
<td>11.2 e</td>
</tr>
</tbody>
</table>
| 4 | Pristine 38WG 12.5 oz +  
   Latron B-1956 7.7 fl oz | ABCDEF | 30.3 c |
| 5 | Gem 500SC 3.8 fl oz + 
   Latron B-1956 7.7 fl oz | ABCDEF | 48.8 b |
| 6 | Bravo Ultrex 82.5% WDG 3 lb + 
   Pristine 38WG 10.5 oz 
   Syllit FL 24 fl oz + 
   Captan 80WDG 2.5 lb 
   Pristine 38WG 10.5 oz | AB        
   C          
   DE         
   F          |       |
| 7 | Syllit FL 24 fl oz | ABCDEF | 14.0 e |
| 8 | Untreated control |         | 88.4 a |
Leaf Spot Control – Pristine (2010)

% Leaf Spot Defoliation

Pristine, 12 oz
Equus, 52.7 fl oz  AB
Pristine, 10.5 oz  CF
Syllit, 24 fl oz  DE
Equus, 52.7 fl oz  AB
Syllit, 24 fl oz  CDEF

Aug 24 rating
July 27 rating
News and Notes; Cherry Disease Control

- Level of leaf spot infection on July 15 was similar on Merivon, Pristine, Gem treatments in this block.
- However, level of infection did not increase in Merivon treatments between July 15 and Aug 25.
- Infection increased and defoliation did as well in Gem and Pristine treatments in this block.
## Brown Rot Control, Sweet Cherry ‘Ulster’ Highlights

<table>
<thead>
<tr>
<th>Pristine 38WG 14.5 oz</th>
<th>AB</th>
<th>55.4 a*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadris Top 2.71SC 14 fl oz</td>
<td>AB</td>
<td>16.4 b</td>
</tr>
<tr>
<td>Inspire XT 4.17 EC 7 fl oz</td>
<td>AB</td>
<td>21.1 b</td>
</tr>
<tr>
<td>Inspire Super 2.82 EW 20 fl oz</td>
<td>AB</td>
<td>25.9 b</td>
</tr>
<tr>
<td>Untreated control</td>
<td></td>
<td>51.8 a</td>
</tr>
</tbody>
</table>

Trees inoculated; one branch in each quadrant
Two sprays, July 1 and July 8
Rating on July 15 – 200 fruit per tree
Brown Rot Control, Sweet Cherry
‘Emperor Francis’ Highlights

<table>
<thead>
<tr>
<th></th>
<th>Product Description</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fontelis 1.67 SC 14 fl oz</td>
<td>AB 55.0 b</td>
</tr>
<tr>
<td>2</td>
<td>Indar 2F 6 fl oz</td>
<td>AB 33.9 cd</td>
</tr>
<tr>
<td>3</td>
<td>Fontelis 1.67 SC 20 fl oz</td>
<td>AB 51.4 bc</td>
</tr>
<tr>
<td>4</td>
<td>YT669 2.08SC 20 fl oz</td>
<td>AB 40.1 bcd</td>
</tr>
<tr>
<td>5</td>
<td>YT669 2.08SC 8 fl oz</td>
<td>AB 41.5 bcd</td>
</tr>
<tr>
<td>6</td>
<td>YT669 2.08SC 8 fl oz + Regulaid 0.25% v/v</td>
<td>AB 42.8 bcd</td>
</tr>
<tr>
<td>7</td>
<td>Q8Y78 SC 18 fl oz</td>
<td>AB 25.1 d</td>
</tr>
<tr>
<td>8</td>
<td>Merivon 6.5 fl oz</td>
<td>AB 37.1 bcd</td>
</tr>
<tr>
<td>9</td>
<td>Luna Sensation 500 SC 5 fl oz</td>
<td>AB 38.1 bcd</td>
</tr>
<tr>
<td>10</td>
<td>Control</td>
<td>80.5 a</td>
</tr>
</tbody>
</table>

Trees inoculated; one branch in each quadrant
Two sprays, July 1 and July 8
Rating on August 1 – 200 fruit per tree
Powdery Mildew Control, Highlights

Pristine, 12 oz  
Equus (AB); Syllit, 24 fl oz (CDEF)  
Equus (AB); Captan (CDEF)  
Control

0.9  f  
18.1  bc  
26.5  a  
19.1  b
# Powdery Mildew Control, Highlights

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equus (AB); Syllit, 24 fl oz (CDEF)</td>
<td>18.1 bc</td>
</tr>
<tr>
<td>Equus (AB); Pristine (CF)</td>
<td></td>
</tr>
<tr>
<td>Syllit, 24 fl oz (DE)</td>
<td>1.9 ef</td>
</tr>
<tr>
<td>Control</td>
<td>19.1 b</td>
</tr>
</tbody>
</table>
Powdery Mildew Control, Highlights

Program treatments with Luna, Fontelis, Pristine, Gem
News and Notes; Cherry Leaf Spot Control

• New SDHIs – Merivon and Luna Sensation; Fontelis
  – Captan should be added for resistance management

• Syllit FL – excellent leaf spot control; limiting defoliation
  – Syllit + Captan – recommended for resistance management

• Copper – excellent leaf spot control; limiting defoliation (1.2 lbs metallic/A)
News and Notes; Brown Rot Control

• New SDHIs – Merivon and Luna Sensation; Fontelis
  – Will control brown rot

• Indar remains the best option
News and Notes; Cherry Leaf Spot Control

- Pristine and Gem – tank mix with Captan
- Might be some shifting happening in MI orchards
- We are examining boscalid sensitivity this winter
Resistance status of *B. jaapii*: DMI resistance widespread
QoI resistance – not yet
SDHI’s – of concern due to Pristine use
Summary

• SDHI’s are coming out in 2012
• Pristine has been used in apple and cherry
• Exposure of key pathogens has already occurred
• Efficacy:
  – Apple scab – G to VG
  – Leaf spot – VG to E
  – Powdery mildew – VG to E
  – Amer brown rot – G to VG
Tyre J. Proffer -- MSU
Gail Ehret -- MSU
Kim Lesniak – MSU
Cory Outwater -- MSU

Nikki Rothwell -- NWMHRS
Erin Lizotte – NWMHRS
Karen Powers -- NWMHRS
Bill Klein – NWMHRS
Myron Anderson – NWMHRS

Michigan Cherry Committee