Cercospora Leaf Spot in Austria

Friedrich Kempl
Milano, October 20th
# SUGAR BEET ACREAGE 2015

<table>
<thead>
<tr>
<th>Country / Acreage in ha</th>
<th>2014 actual acreage</th>
<th>2015 actual acreage</th>
<th>Modific. ‘15 to ‘14 in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>50.700</td>
<td>45.500</td>
<td>-10.3</td>
</tr>
<tr>
<td>CZ</td>
<td>14.750</td>
<td>14.000</td>
<td>-5.1</td>
</tr>
<tr>
<td>SK</td>
<td>12.800</td>
<td>12.000</td>
<td>-6.3</td>
</tr>
<tr>
<td>HU</td>
<td>10.860</td>
<td>14.900</td>
<td>+37.2</td>
</tr>
<tr>
<td>RO</td>
<td>9.000</td>
<td>8.400</td>
<td>-6.4</td>
</tr>
<tr>
<td>AGRANA</td>
<td>98.110</td>
<td>94.800</td>
<td>-3.3</td>
</tr>
</tbody>
</table>
Cercospora leaf spot in Austria

- Most important leaf disease in Austria
- Potential of yield loss: up to 40% without control
RETROSPECTIVE VIEW TO CLS IN AUSTRIA

2009: Cercospora developed to a major problem

2010-2011: Mixtures of QoI and DMI showed very good efficacy
More treatments with QoI

2012: new problems, first detection of strobilurine resistant Cercospora

2013-2014: rapid spread of strobilurine resistant Cercospora,
recommendation of Multi-site fungicides and
Thiophanate-methyl
Cercospora Leaf Spot in Austria

**FUNGICIDE ACTIVE INGREDIENTS 2015**

Triazoles  
(Difenoconazole, Cyproconazole, Epoxyconazole, Tetraconazole)  
(DMI, FRAC: G1)

Strobilurines  
(Azoxystrobin, Trifloxystrobin, Pyraclostrobin)  
(QoI, FRAC: C3)

Benzimidazoles und Thiophanates  
(Thiophanate-methyl)  
(MBC, FRAC: B1)

Inorganics  
(Copperoxychloride)  
(Multi site, FRAC: M1)

Dithiocarbamates  
(Mancozeb)  
(Multi site, FRAC: M3)

Not registered 2015

Chloronitriles  
(Chlorothalonil)  
(Multi Site, FRAC: M5)
## FUNGICIDES 2015

<table>
<thead>
<tr>
<th>Reg.Nr</th>
<th>Fungicide</th>
<th>A.I.</th>
<th>Wirkstoffgehalt</th>
<th>max. rate kg, l/ha</th>
<th>max. applications</th>
<th>Waiting periode</th>
</tr>
</thead>
<tbody>
<tr>
<td>3034</td>
<td>Cuprofor flow</td>
<td>Copperoxychloride</td>
<td>638.7 g/l (Cu: 380 g/l)</td>
<td>2,6</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>2746</td>
<td>Dithane Neo Tec</td>
<td>Mancozeb</td>
<td>750 g/kg</td>
<td>2</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>2481</td>
<td>Caddy 200 EC</td>
<td>Cyproconazole</td>
<td>200 g/l</td>
<td>0,4</td>
<td>2</td>
<td>35</td>
</tr>
<tr>
<td>3361</td>
<td>Domark 10 EC</td>
<td>Tetraconazole</td>
<td>100 g/l</td>
<td>1</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>3255</td>
<td>Score</td>
<td>Difenoconazole</td>
<td>250 g/l</td>
<td>0,4</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>2685</td>
<td>Spyrale</td>
<td>Difenoconazole + Fenpropidin</td>
<td>375 g/l + 100 g/l</td>
<td>1</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>3367</td>
<td>Opera</td>
<td>Epoxiconazole + Pyraclostrobin</td>
<td>50 g/l + 133 g/l</td>
<td>1</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>2978</td>
<td>Sphere SC</td>
<td>Cyproconazole + Trifloxystrobin</td>
<td>160 g/l + 375 g/l</td>
<td>0,35</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>3576</td>
<td>Duett ultra</td>
<td>Epoxiconazole + Thiophanate-methyl</td>
<td>187 g/l + 310 g/l</td>
<td>0,6</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>238</td>
<td>Cosan-Super Kolloid-Netzschwefel</td>
<td>Sulphur</td>
<td>800 g/kg</td>
<td>6</td>
<td>-</td>
<td>7</td>
</tr>
</tbody>
</table>
FUNGICIDE TESTS 2014, 3 SITES

Cercospora Leaf Spot in Austria
<table>
<thead>
<tr>
<th></th>
<th>Fungicides</th>
<th>1st - 4th Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Untreated</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>DMI + QoI</td>
<td>Sphere 0,35l 56 g Cyproconazole + 131,5 g Trifloxystrobin /ha</td>
</tr>
<tr>
<td>3</td>
<td>DMI + MBC</td>
<td>Duett ultra 0,6l 112,5 g Epoxiconazole + 186 g Thiophanat-methyl /ha</td>
</tr>
<tr>
<td>4</td>
<td>DMI</td>
<td>Domark 1l 100 g Tetraconazole /ha</td>
</tr>
<tr>
<td>5</td>
<td>Copper</td>
<td>Cuprofor 2l Copperoxychloride, 1000 g Cu/ha</td>
</tr>
<tr>
<td>6</td>
<td>DMI + QoI + Copper</td>
<td>Sphere 0,35l + Cuprofor 2l 56 g Cyproconazole + 131,5 g Trifloxystrobin + Copperoxychloride, 1000 g Cu/ha</td>
</tr>
<tr>
<td>7</td>
<td>DMI + MBC + Copper</td>
<td>Duett ultra 0,6l + Cuprofor 2l 112,5 g Epoxiconazole + 186 g Thiophanat-methyl + Copperoxychloride, 1000 g Cu/ha</td>
</tr>
<tr>
<td>8</td>
<td>DMI + Copper</td>
<td>Domark 1l + Cuprofor 2l 100 g Tetraconazole + Copperoxychloride, 1000 g Cu/ha</td>
</tr>
</tbody>
</table>
TRÜBENSEE, OCT. 7TH 2014

Variety: Gladiator, high susceptible to CLS
4 fungicide applications
## FUNGICIDE TESTS
### RESULTS 2014, 3 SITES

<table>
<thead>
<tr>
<th>O.Nr.</th>
<th>Treatment</th>
<th>n</th>
<th>root yield [t/ha]</th>
<th>sugar [%]</th>
<th>sugar yield [t/ha]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Untreated</td>
<td>11</td>
<td>95,02</td>
<td>F</td>
<td>13,17</td>
</tr>
<tr>
<td>2</td>
<td>DMI + QoI</td>
<td>11</td>
<td>100,33</td>
<td>E</td>
<td>13,66</td>
</tr>
<tr>
<td>3</td>
<td>DMI + MBC</td>
<td>11</td>
<td>118,65</td>
<td>A</td>
<td>15,21</td>
</tr>
<tr>
<td>4</td>
<td>DMI</td>
<td>11</td>
<td>101,26</td>
<td>E</td>
<td>13,95</td>
</tr>
<tr>
<td>5</td>
<td>Copper</td>
<td>11</td>
<td>106,11</td>
<td>CD</td>
<td>14,05</td>
</tr>
<tr>
<td>6</td>
<td>DMI + QoI + Copper</td>
<td>11</td>
<td>109,65</td>
<td>BC</td>
<td>14,75</td>
</tr>
<tr>
<td>7</td>
<td>DMI + MBC + Copper</td>
<td>11</td>
<td>117,30</td>
<td>A</td>
<td>15,29</td>
</tr>
<tr>
<td>8</td>
<td>DMI + Copper</td>
<td>11</td>
<td>107,94</td>
<td>C</td>
<td>14,62</td>
</tr>
</tbody>
</table>

The table shows the root yield, sugar percentage, and sugar yield for different treatments. Each treatment is tested at 11 sites. The results are ranked based on the root yield, with the highest yield labeled with an A and the lowest with a G. The sugar percentage and sugar yield follow the same ranking system.
FUNGICIDE TESTS
2015 AFTER 2 APPLICATIONS

Treatments
1 Untreatet
2 DMI + QoI 56 g Cyproconazole + 131,5 g Trifloxystrobin /ha
3 DMI + MBC 112,5 g Epoxiconazole + 186 g Thiophanat-methyl /ha
4 DMI: Tetraconazole 100 g Tetraconazole /ha
5 DMI: Epoxiconazole 125 g Epoxiconazole /ha
6 Copper High Dose 950 g Cu /ha (Copperoxychloride)
7 Copper Low Dose 425 g Cu /ha (Copperoxychloride)
8 Mancozeb 1500 g Mancozeb /ha
9 DMI + MBC + Copper 112,5 g Epoxiconazole + 186 g Thiophanat-methyl + 425 g Cu /ha
10 DMI + Copper 100 g Tetraconazole + 425 g Cu /ha

affected leaf area [%]
Trübensee, Aug. 11th 2015

affected leaf area [%]
St. Andrä, Aug. 13th 2015
RESISTENCE TESTS
2012 - 2014
FREQUENCY OF STROBILURINE RESISTENCE (G143A TARGET SITE MUTATION REL. FOR QOI RESISTANCE, CERCOSPORA BETICOLA)

Frequency of G143A target site mutation in %

- 2012: 20 sites, 33 samples
- 2013: 40 sites, 94 samples
- 2014: 7 sites, 7 samples
FREQUENCY OF STROBILURINE RESISTENCE (G143A TARGET SITE MUTATION REL. FOR QOI RESISTENCE, CERCOSPORA BETICOLA)

Cercospora Leaf Spot in Austria
RECOMMENDATIONS
CERCOSPORA MONITORING
TIMING OF SPRAYINGS

• ~ 50 Monitoring Sites
• Very susceptible sugar beet variety
• Assessment once per week
• Begin: two weeks after row closure
• End: Mid of September

• thresholds: 1/5/15/45 leaves with spots from 100
  (until 15.7. / 1.8. / 15.8. / later)
• After application threshold shifts to the next step
FUNGICIDE STRATEGY 2015

• 2nd application: Duett ultra (Thiophanate-methyl + Epoxyconazole) + Multi Site fungicide (Copper or Mancozeb)

• All other applications: Full rate of Triazole + Multi Site fungicide (Copper or Mancozeb)

• → No efficacy of Strobilurines to Cercospora

• Addition of sulphur

• Multi Site fungicides (Copper or Mancozeb) for late last applications (End of Aug. to Sept.)
FURTHER RECOMMENDATIONS

• Use of high susceptible varieties should be avoided!

• Planning of sufficient distances to surrounding beet fields of previous year!

• Cleaning of irrigation pipes
AVAILABILITY OF FUNGICIDES

- **Copper**
  - Up to 2014: Cuprofor 500 g Cu/l (Copperoxychloride)
  - 2015: Cuprofor flow 380 g Cu/l (Copperoxychloride)

- **Chlorothalonil**
  - 2013-2014 Balear 720 SC (Emergency registration)

- **Mancozeb**
  - 2015 Dithane NeoTec (Emergency registration)

- **Thiophanate-Methyl**
  - 2014-2015 Duett ultra (Emergency registration)
    regular registration Oct. 2015
Thanks for your attention!