2014 YWTG

Disease and Insects
Sugarbeet Root Aphid
What we learned in 2013

• Symptoms include:
  • plant wilting and leaf chlorosis, flaccid and rubbery roots, severely injured plants collapse and die
  • yield loss both within field (in RRV mid-90’s, decrease in sucrose =30%, loss recoverable sugar =55%) and losses in storage
  • whitish-gray, waxy substance or “frass” excreted by wingless aphid in the soil immediately adjacent to the roots
  • variably sized circles or elliptical patches appear in fields showing these symptoms.
Life Cycle

• Overwinter as eggs under bud scales on poplar/cottonwood trees
• Hatches to wingless ‘stem mother’
  • produces gall on the petiole of leaf and reproduces asexually, daughters continue feeding in gall and producing more daughters
• After a few generations, a winged generation is created, which flies to beets
• Lay live nymphs directly on exposed roots
  • Worse in dry years because of access to roots via cracks in soil - also other mortality factors (e.g. predators, parasitoids, disease) which are not as effective in dry conditions
Life Cycle Continued…

- Feed on root hairs
- Reproduce Asexually all summer (daughter clones)
- Return to poplar/cottonwood trees in the fall
- Some become males and mate and the wingless offspring lay overwintering eggs back onto the bud scales of these trees
2013 Oddities

• Aphids on petioles!
• Different color
  • Brown, grey or even black
Recommendations

• Resistant varieties definitely the best bet for now.
• We may be able to predict flights of adults to fields (July) in the future by using suction traps (potato industry) whereby we could spray insecticides in a timely manner.
## Root Aphid Tolerant Varieties

### HIGHLY TOLERANT

<table>
<thead>
<tr>
<th>Variety</th>
<th>Cry Gene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta 89RR83</td>
<td>Cry 093RR</td>
</tr>
<tr>
<td>Beta 89RR10</td>
<td>Cry 101RR</td>
</tr>
<tr>
<td>Beta 80RR32</td>
<td>Cry 765RR</td>
</tr>
<tr>
<td>Beta 81RR78</td>
<td>Cry 768RR</td>
</tr>
<tr>
<td>Beta 82RR22</td>
<td>Cry 981RR</td>
</tr>
<tr>
<td>Beta 82RR33</td>
<td>Cry 246RR</td>
</tr>
<tr>
<td>Beta 82RR80</td>
<td>Cry 247RR</td>
</tr>
<tr>
<td>Beta 82RR28</td>
<td></td>
</tr>
</tbody>
</table>

### MODERATELY TOLERANT

<table>
<thead>
<tr>
<th>Variety</th>
<th>Cry Gene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta 80RR52</td>
<td></td>
</tr>
<tr>
<td>Beta 81RR17</td>
<td></td>
</tr>
<tr>
<td>Beta 89RR50</td>
<td></td>
</tr>
<tr>
<td>Cry 986RR</td>
<td></td>
</tr>
</tbody>
</table>

- Highly Tolerant varieties all performed over 110% of the mean in Rev/A in the Hendrum Coded trial (Root Aphid and Drought conditions)
Impact on Storage
2012 Nielsville, MN
Postharvest Respiration Rate

Days after Harvest

- Low
- High

30
90
2012 Nielsville, MN
Sugar & Extractable Sugar

Aphid damage: Low  High

AG GOLD STANDARDS
2013 Ada, MN
Sugar, 30 Days after Harvest

<table>
<thead>
<tr>
<th>Harvest date</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 13</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Sept. 27</td>
<td>16</td>
<td>6</td>
</tr>
</tbody>
</table>

Aphid damage
- Low
- High
2013 Scottsbluff, NE -- 30 DAH

Single sample observation!

- **Respiration**
  - No aphids: 2 mg CO₂/kg/hour
  - Aphids: 6 mg CO₂/kg/hour

- **Sugar**
  - No aphids: 15 mg CO₂/kg/hour
  - Aphids: 12 mg CO₂/kg/hour

Aphid damage
- **No aphids**
- **Aphids**
Fusarium
Fusarium

• Usually found in wet, poorly structured soils
• First appears as interveinal yellowing on older leaves.
• Optimum soil temp above 75 degrees F
• Can be confused with Verticillium Wilt
Fusarium Management With Disease Resistant Varieties

- 2 yr. Disease root rating of 3.0 or less.
- Crystal - 658RR
- Beta- 82RR28, 82RR33, 82RR17
QUESTIONS?
2014 Rhizoctonia Management

- Kabina seed treatment is not meant to be a stand alone fungicide. A second post application may be needed in moderate to severe pressure disease.
<table>
<thead>
<tr>
<th><strong>2014 ACSC RHIZOCTONIA MANAGEMENT</strong></th>
<th><strong>AT-PLANT</strong></th>
<th><strong>AT-PLANT</strong></th>
<th><strong>POST</strong></th>
<th><strong>POST</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>METHOD</strong></td>
<td>T-BAND (4”)</td>
<td>IN-FURROW</td>
<td>BAND (7-11”)</td>
<td>BROADCAST</td>
</tr>
<tr>
<td><strong>TIMING</strong></td>
<td>At-plant</td>
<td>At-plant</td>
<td>Just prior to 65° F 4” soil temp/≥ 2 leaf</td>
<td>Just prior to 65° F 4” soil temp/≥ 2 leaf</td>
</tr>
<tr>
<td><strong>RATE</strong></td>
<td>10 oz/Acre</td>
<td>9 oz/Acre</td>
<td>10 oz/Acre</td>
<td>15 oz/Acre</td>
</tr>
<tr>
<td><strong>TANK-MIXES</strong></td>
<td>None</td>
<td>Starter Fertilizer</td>
<td>Glyphosate w/ min. surfactant</td>
<td>Glyphosate w/ min. surfactant</td>
</tr>
<tr>
<td><strong>WATER VOLUME</strong></td>
<td>8 gal/acre</td>
<td>&gt;1 gal/acre</td>
<td>10-20 gal/acre</td>
<td>10-20 gal/acre</td>
</tr>
<tr>
<td><strong>NOTES</strong></td>
<td>• T-banding is the safest option for at-plant applications, Do not reduce rate&lt;br&gt;• Applying in-furrow is risky&lt;br&gt;• Less risk with in-furrow if planting late in warm soils&lt;br&gt;• More phytotoxic in cool soils</td>
<td>• Some stand loss may occur, adjust seeding rate accordingly&lt;br&gt;• Mix with water prior to adding to starter fertilizer&lt;br&gt;• Need good agitation&lt;br&gt;• May separate if left more than 4 hours without agitation&lt;br&gt;• Apply with minimum of 2.5gal/A of carrier</td>
<td>• Do not mix with conventional herbicides/insecticides&lt;br&gt;• Apply Quadris at midpoint between micro-rates&lt;br&gt;• Do not add deposition aids when mixing with glyphosate&lt;br&gt;• Narrower bands are most effective, do not reduce rate</td>
<td>• Do not mix with conventional herbicides/insecticides&lt;br&gt;• Apply Quadris at midpoint between micro-rates&lt;br&gt;• Do not add deposition aids when mixing with glyphosate&lt;br&gt;• This is our least preferred method, but still beneficial</td>
</tr>
</tbody>
</table>

(see reverse side)
# RHIZOCTONIA MANAGEMENT OPTIONS

<table>
<thead>
<tr>
<th>DISEASE SEVERITY</th>
<th>RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slight</td>
<td>Post Quadris or other fungicide only</td>
</tr>
<tr>
<td>Moderate</td>
<td>Increase Crop Rotation Length, Tolerant Variety, Kabina seed treatment/T-band/In-furrow, Post Quadris or other fungicide 1x</td>
</tr>
<tr>
<td>Severe</td>
<td>Increase Crop Rotation Length, Tolerant Variety, Kabina seed treatment/T-band/In-furrow, Post Quadris or other fungicide 1x or 2x</td>
</tr>
</tbody>
</table>

## ADDITIONAL NOTES:

- Tank-mixing Headline or Quadris with starter fertilizer can cause compatibility issues, use good agitation and apply the mixture promptly.
- Headline is generally more compatible with other products compared to Quadris.
- Stand losses may occur with in-furrow applications, adjust seeding rates accordingly (be sure equipment is calibrated correctly).
- At-plant applications or seed treatments may be a better option with a late May planting or if soil temperatures are close to 60°F at the 4” depth.
- Tank-mixing Mustang Max with either product, for in-furrow treatments, is not recommended (consider using injection system).
- Consider using Kabina or other seed treatment in place of an in-furrow fungicide to prevent stand losses.
- Kabina or other seed treatments do not provide season long control and should be coupled with post Quadris.
- Seed treatments are generally less costly per acre than In-furrow or T-band fungicide applications.
QUESTIONS?