DISEASE AND INSECTS

2016 YWTG
Sugarbeet Root Maggots (SBRM)

- Maggots overwinter as larvae, pupate and emerge in spring as flies in previous years beet fields
- Adult flies are monitored in current year beet fields with sticky stakes
(SBRM)

• Peak fly activity can occur anytime after 600 DD’s are accumulated, on average, this occurs at 650 DD’s
  • This is monitored at each NDAWN site in the RRV
  • NDSU monitors sticky stakes
• It is important to know that warm weather (around 80°F), and calm to low wind conditions are most conducive for fly activity
• Flies will remain fairly inactive in cool, rainy, or windy conditions
Root Maggot Populations are Rising!

Flies Per Trap in RRV: 2007 – 2015
High risk:
- Ada
- Auburn
- Borup
- Grafton
- Grand Forks
- Nash
- St. Thomas

Moderate risk:
- Cavalier
- Crystal
- Euclid
- Fisher
- Oakwood
- Reynolds
- Thompson

*Based on fly counts & root maggot feeding injury ratings
Economic Risk based on Sugarbeet Root Maggot Fly Counts on Sticky-stake Traps

<table>
<thead>
<tr>
<th>Daily Capture (flies per stake)</th>
<th>Cumulative Capture (flies per stake)</th>
<th>Risk Level*</th>
<th>Suggested Management Tactic**</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25</td>
<td>0-50</td>
<td>Low</td>
<td>Monitor fields closely.</td>
</tr>
<tr>
<td>26-50</td>
<td>51-100</td>
<td>Slight</td>
<td>A postemergence insecticide may be needed if an at-plant insecticide was used at a low rate or no at-plant material was applied.</td>
</tr>
<tr>
<td>51-75</td>
<td>101-150</td>
<td>Moderate</td>
<td>A postemergence insecticide is probably justified, even if an at-plant insecticide was applied to the field at a moderate or high rate (a granular insecticide can be used if 7 or more days before expected peak fly activity; use a liquid insecticide if within 4 days of peak fly).</td>
</tr>
<tr>
<td>76-100</td>
<td>151-200</td>
<td>Elevated</td>
<td>Apply a postemergence LIQUID insecticide as soon as possible (repeat if daily fly counts exceed 100 per trap.).</td>
</tr>
<tr>
<td>101-150</td>
<td>201-300</td>
<td>High</td>
<td><strong>Apply a postemergence LIQUID insecticide immediately.</strong></td>
</tr>
<tr>
<td>151+</td>
<td>301+</td>
<td>Extreme</td>
<td>Apply a postemergence LIQUID insecticide at high labeled rate immediately (consider a 2nd application if daily counts resurge).</td>
</tr>
</tbody>
</table>

*Risk will vary based on actual peak fly activity date in a given field. Risk categories and corresponding management tactics in these tables are based on historical population levels and associated insecticide performance in research trials. Management suggestions are offered as general guidelines to assist growers with making informed management decisions; however, no guarantee can be made on whether economic return will be achieved from management tactics.

**Consult the “Sugarbeet Production Guide” (viewable on the internet at http://www.sbreb.org/Production/production.htm) for this year’s sugarbeet root maggot forecast and management recommendations. Contact your local agriculturist or Mark Boetel, NDSU Entomologist (701-231-7901), for assistance with specific pest management decisions.

Updates on root maggot development and expected peak fly activity dates will be released on NDSU’s Crop & Pest Report and the “Sugarbeet Growing Tips” program on several area radio stations (visit http://www.ag.ndsu.nodak.edu/aginfo/sugar/radio.html for a list of stations and broadcast scheduling).
Root Maggot Control
Recommendations 2016

• **Moderate Risk area**
  • **Counter 20G @ 7.5# at-plant** (preferred)
    • Or Poncho Beta/NipsIt/Cruiser Maxx at-plant (least preferred)
  • Planned post emerge **Lorsban @ 2pts/a**
    • At or just prior to peak fly

• **High Risk area**
  • **Counter 20g @ 8.9# at plant**
  • Planned post emerge **Lorsban @ 2pts/a**
    • At or just prior to peak fly
Root Maggot - Summary

- Populations are increasing
  - Proper management control measures are necessary
- Aggressive control is a must in areas of high risk and rising populations
- **Counter 20G**: better root protection & yield than any seed treatment (in high pressure)
- **POST**: Seed treatments or low rates of at-plant granules are not sufficient w/out a post insecticide
- **POST**: control tools may be key to success
ROOT MAGGOT

QUESTIONS?
Rhizoctonia Impact on your Beet Payment

- In the Field
- Storage Pile
- Factory
Rhizoctonia Impact In the Field

- Reduced Tonnage
- Reduced Sugar Content
Rhizoctonia big patches in a field
Rhizoctonia infects individual plants randomly throughout the field.
ACS Growers Field Data
5 year summary

<table>
<thead>
<tr>
<th></th>
<th>Yield</th>
<th>Sugar %</th>
<th>SLM</th>
<th>Rec Sugar/Ton</th>
<th>Rec Sugar/Acre</th>
<th>$/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Quadris Applied</td>
<td>24.8</td>
<td>17.87</td>
<td>1.18</td>
<td>334</td>
<td>8,283</td>
<td>1,286</td>
</tr>
<tr>
<td>Quadris Applied</td>
<td>25.6</td>
<td>18.13</td>
<td>1.19</td>
<td>339</td>
<td>8,678</td>
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Quadris return $80 per Acre
Rhizoctonia effect on Sugar %

Before Storage

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<tr>
<th>% of beets infected with Rhizoctonia</th>
<th>Sugar %</th>
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<tbody>
<tr>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>60</td>
<td>14</td>
</tr>
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<td>80</td>
<td>13</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
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Rhizoctonia Impact In the Storage Piles

- Increases Respiration
- Increases Pile Temperature
- Decreases Extractable Sugar
The Good vs The Bad

Rhizoctonia
Rhizoctonia
30 DAH Storage Pile

Sugar %: 17.3
Respiration (mg CO2/kg/hr): 3.54
Extractable Sucrose (lb/T): 307

Larry Campbell USDA-ARS, Carol Windels U of M
Rhizoctonia Financial Impact

307 lb sugar per ton no disease

241 lb sugar per ton rhizoctonia present

66 lb sugar loss 21.5 % loss

Can you take a 21.5% deduction in your beet payment?
Rhizoctonia in the Factory

• Increase in Inverted Sugar
• Decrease in Raw Juice Quality
• Reduction in Slice
• Increase Factory Operation Cost
Inverted Sugar

Sucrose

Fructose

Glucose

This makes us money

This increases our factory cost
Invert Sugar in the Factory

• For every 1 lb of invert, the factory loses at least 1.5 lbs of good sugar to molasses
• Inverted sugar creates more color in the juice purification process
• Elevated color forces the centrifuges to work harder – more factory cost
Invert Sugar from Rhizoctonia
30 DAH

Disease Rating (0-7)

Grams / 100 g sucrose

Larry Campbell USDA-ARS, Carol Windels U of M
ACS Recommendation
Rhizoctonia Control

1. CROP ROTATION
   - Break up infection cycle and reduce inoculum buildup
   - Rhizoctonia will survive on corn and bean residue

2. VARIETY SELECTION
   - Rhizoctonia traits kick in later in the season
ACS Recommendation
Rhizoctonia Control

3. SEED TREATMENT
✓ Improves stand establishment, crop vigor, and Yield
✓ (Kabina, Metlock Suite, Rizolex, Vibrance)

4. POST APPLICATION OF QUADRIS
✓ (4-5 weeks after planting)
✓ Band preferred method, broadcast is still beneficial
Cercospora
Conditions for disease

• Favored by warm, humid, rainy weather
• Cercospora spores form most readily at 68-79°F at relative humidities of 90-100% (spores do not form at temperatures less than 50°F)
• Spores germinate and infect leaves through stomata (natural openings) at daytime temperatures of 77-95°F, night temperatures above 60°F, and high relative humidities (90-95%) or free moisture. Infection is reduced or inhibited at temperatures less than 59°F or when leaves are wet for less than 11 hours
• Leaf spots develop from 5 to 21 days after infection, depending on amount of inoculum, temperature, and duration of wet period. Leaf spots typically occur first on lower, older leaves and progress to younger leaves
When do losses start to occur?

- If leaf spots cover at least 3% of the foliage by harvest, economic losses occur through reduced root tonnage and sucrose content and increased impurities. Also, roots of infected plants do not store as well as roots of healthy plants.

Figure B: Cercospora Leaf Spot Damage Categories

Category 1
1-5 spots/leaf
0.1% severity

Category 2
6-12 spots/leaf
0.35% severity

Category 3
13-25 spots/leaf
0.75% severity

Category 4
26-50 spots/leaf
1.5% severity

Category 5
51-75 spots/leaf
2.5% severity

Category 6
3% severity
PROVEN ECONOMIC DAMAGE

Category 7
6% severity

Category 8
12% severity

Category 9
25% severity

Category 10
50% severity
2015 Cercospora leaf sampling resistance maps
Eminent
Inspire
Cercospora Sensitivity/Resistance - 2015
For Headline

Headline

Incidence of sensitivity and resistance are summarized by township.

Legend:
- Dark green (100%)
- Medium green (80% - 99%)
- Light green (60% - 79%)
- Yellow (40% - 59%)
- Slight (< 30%)
SUCCESSFUL CERCOSPORA RESISTANCE MANAGEMENT INVOLVES EVERYONE

- Timely Applications
- Grower Education
- Informed Consultants
- Retail Resources
- Ag Staff Support
- Research Universities
2016 Cercospora Control Recommendations

Mid to Late July (4 Spray Program)
Application 1 - TPTH* + Benzimidazole**
Application 2 - Triazole
Application 3 - TPTH*
Application 4 - Headline or Priaxor (apply Aug 25 through 1st week of September)

Late July to Early August (3 Spray Program)
Application 1 - Triazole or TPTH* + Triazole
Application 2 - TPTH* or TPTH* + Benzimidazole**
Application 3 - Headline or Priaxor + TPTH* (apply Aug 25 through 1st week of September)

* TPTH should NOT be used more than twice per season
** Benzimidazole should be used only once per season and never alone
*** In tank mixing order, dry formulations go in first followed by liquids
2016 Cercospora Control Recommendations

Early to Mid-August (2 Spray Program)
Application 1 - TPTH* + Triazole or TPTH* + Benzimidazole**
Application 2 - Headline or Priaxor + TPTH* (apply Aug 25 through 1st week of September)

Late August (1 Spray Program)
Headline or Priaxor + TPTH* (apply Aug 25 through 1st week of September) or
Headline or Priaxor + Triazole (apply Aug 25 through 1st week of September)

* TPTH should NOT be used more than twice per season
** Benzimidazole should be used only once per season and never alone
*** In tank mixing order, dry formulations go in first followed by liquids
Summary

• Scout fields diligently / Contact ACSC staff
• Use DIV alerts
• Monitor weather – models not perfect
• Get it right
  – Product – rotating chemistry and tank mixes
  – Rate – proper rates alone or in tank mixes
  – Timing – start on time and stay on schedule
  – Method - Ground versus aerial – both can work well
• Use correct nozzles, boom height and speed
Questions?