AgBiome Update

• A Few Words on AgBiome
• Howler™ / Zio™ fungicide Update
AgBiome: Leading Ag Innovator

Novel microbiome-based discovery platform to develop new products

Most advanced and growing pipeline of traits and biologicals targeting large markets

Fastest pace of discovery and time to market

• Broad base of strategic investors
• Best team in the industry – team behind multiple successes
• Novel organization unlocks top performance
• **Pseudomonas chlororaphis** AFS009: 50WP formulation

• Offered on wide variety of crops - OMRI listed fungicide

• Registration: EPA Approved
  - Technical: 2017
  - T&O: 2017
  - Food use: 2017

• For use to control: *Rhizoctonia, Phytophthora* (soil), *Pythium, Fusarium, Colletotrichum* (anthracnose), *Botrytis*.

• A safe and effective fungicide
  - Exempt from US-EPA Tolerances
  - Minimal REI (4 hours) and PHI (0 day)
Howler Attacks Fungi to Prevent Infection

A: 1-day after inoculation.

B: 3-days after inoculation

C: 5-days after inoculation.

D: 7-days after inoculation

Howler Soybean Leaf Fungal Spore Scanning Electron Microscopy
Howler fungicide – Excellent Safety Profile

<table>
<thead>
<tr>
<th>Study</th>
<th>Result</th>
<th>EPA Tox Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Oral Toxicity</td>
<td>LD$_{50}$ &gt;5000 mg/kg</td>
<td>IV</td>
</tr>
<tr>
<td>Acute Dermal Toxicity</td>
<td>LD$_{50}$ &gt;5000 mg/kg</td>
<td>IV</td>
</tr>
<tr>
<td>Acute Inhalation Toxicity</td>
<td>LD$_{50}$ &gt;5.04 mg/L</td>
<td>IV</td>
</tr>
<tr>
<td>Primary Eye Irritation</td>
<td>Not irritating</td>
<td>IV</td>
</tr>
<tr>
<td>Primary Skin Irritation</td>
<td>Not irritating</td>
<td>IV</td>
</tr>
<tr>
<td>Acute Oral Tox/Pathogenicity</td>
<td>Non-toxic at 3.73 x 10$^9$ cfu/rat</td>
<td></td>
</tr>
</tbody>
</table>

At levels expected in the environment, Howler fungicide is not anticipated to be toxic or pathogenic to fish, aquatic invertebrates, birds, wild mammals or non-target plants.

*Excellent safety profile means that Howler fungicide is exempt from US tolerance and can be used the day of harvest: 4-hour REI and a 0-day PHI*
Howler can be Applied Using Multiple Application Methods for Field and Greenhouse Uses

- Foliar applications (except aerial)
- Soil drench and incorporation
- Drip
- In furrow
- Transplant spray or dip
- Hydroponic or chemigation
- Seed treatment*
- Post harvest*

* Use not currently labeled
## Howler – Partial Spectrum

<table>
<thead>
<tr>
<th>Disease Complex</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Botrytis</em></td>
<td>+++</td>
</tr>
<tr>
<td><em>Rhizoctonia</em></td>
<td>+++</td>
</tr>
<tr>
<td><em>Colletotricum</em></td>
<td>++</td>
</tr>
<tr>
<td><em>Alternaria</em></td>
<td>++</td>
</tr>
<tr>
<td><em>Pythium</em></td>
<td>++</td>
</tr>
<tr>
<td><em>Phytophthora</em> – Soil</td>
<td>++</td>
</tr>
<tr>
<td><em>Phytophthora</em> – Foliar</td>
<td>+</td>
</tr>
<tr>
<td>Powdery mildews</td>
<td>+</td>
</tr>
<tr>
<td>Downy mildews</td>
<td>+</td>
</tr>
</tbody>
</table>

### Rating and Performance

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<th>Performance</th>
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<tr>
<td>+++</td>
<td>Excellent Control</td>
</tr>
<tr>
<td>++</td>
<td>Good Control</td>
</tr>
<tr>
<td>+</td>
<td>Suppression – useful component in mixes and possible rotations</td>
</tr>
</tbody>
</table>
## Howler on Major Diseases of High Value Crops

### Grapes/Vines:
- Botrytis
- Powdery mildew*
- Downy mildew*
- *Phomopsis*, Black rot: TBD

### Strawberries/Small Fruits:
- Botrytis
- Anthracnose
- Powdery mildew*
- *Phytophthora* TBD
- Charcoal rot: TBD
- Other leaf spots and rots: TBD

### Vegetables, Trees & Potatoes:
- *Rhizoctonia*
- *Alternaria*
- Anthracnose and leaf spots
- *Phytophthora* root rots
- Late Blight/downy mildews*
- Powdery mildew*

### Turf Diseases
- Brown patch
- Pythium blight
- Dollar spot
- Anthracnose
- Powdery mildew*

* = suppression – for use in mixes and programs
Howler controls Botrytis bunch rot as well as synthetic standards and better than Biological standard under low disease pressure.

4 foliar applications, 7 day interval, 700 l/ha

Assessment 38 days after application

All treatments were significantly better than the untreated and not statistically different from each other, using AUDPC and (Fisher’s LSD, P=0.05)

Partner trial: FT-MX-27-2018
Howler – Strawberry Yield and Quality - Botrytis California 2018 - Field

Howler performs well, even at reduced rates in programs.

7 Foliar applications

All treatments were significantly better than the Untreated and not statistically different from each other (Fisher’s LSD, P=0.05)
Zio was as effective as the standard protectant reference but less effective than the systemic reference. Half rate of Systemic combined with Zio had similar efficacy as the full rate of synthetic standard alone.

Bruce Clark, 2018, Rutgers Univ, NJ In partner report
Howler Controls Soil-Born Vegetable Diseases - Drip -2019

- Burton farm, NC - 2019
- Howler applied at 5 lbs/A through Drip Irrigation
- Comments – “Howler will make the difference between having a harvest and not!”

Howler-Treated Squash+grower program

Untreated + grower program
Thank you!