Biopesticide Market and Opportunities in North American.

Michael Braverman
Manager, Biopesticide Program
IR-4 Project
Rutgers University
Market Characterization

- Publicly available data
- Shared private reports
- IR-4 Biopesticide database survey-Label database
What is a biopesticide in North America?

- **Microbial** - Fungi, bacteria, virus, Not inoculants
- **Biochemical** – Pheromones, plant extracts - Canada new set regulations same as U.S.
- **Transgenic** (Plant incorporated Bt’s) Canada under Seeds Act – Not included in data presented today
- Doesn’t include beneficial insects or nematodes
Comparison – Biopesticide to total N.A. Market

2006  2.5%

2.5% = 260 Million

Predicted  4% by 2010
Comparison – Biopesticide use in N.A. Market

3% used in organic agriculture

Organic
Conventional
Bt to the total Biopesticide use N.A. Market

Bt (Sprayed) 75%
Label Database Search Criteria

- **Crop** (Commercial/Residential, Food /Non-Food)
- **Pest**
- **State**
- **Option- Limit to Organic products**
Label Database Output

- Trade names
- Labels- PDF or link
- EPA Registration Number
- Company name, contact person, email, phone, website.
- REI, PHI
- Organic status
- Active ingredient
- Efficacy (blank-New Grant)
Initial 469 labels- EPA Registered.  
230 products actively marketed

- Insecticides
- Fungicides
- Plant Growth Regulators
- Herbicides
- Nematode
- Animal

Bt's, Pheromones
Database-Crops with the most labeled products

<table>
<thead>
<tr>
<th>Crop</th>
<th>Number of biopesticide labels registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grapes</td>
<td>27</td>
</tr>
<tr>
<td>Tomato</td>
<td>25</td>
</tr>
<tr>
<td>Pepper</td>
<td>22</td>
</tr>
<tr>
<td>Potato</td>
<td>22</td>
</tr>
<tr>
<td>Lettuce</td>
<td>14</td>
</tr>
</tbody>
</table>
Database Statistics

• **User statistics** - Crop, Pest, State
  Front end - Sample size >8,000

**Survey Statistics** - Farm size, Conventional product replacement, intention of using database output
Back end Sample size = 49
Database Statistics

• **User statistics** - Crop, Pest, State
  Front end - Sample size >8,000

  **Survey Statistics** - Farm size,
  Conventional product replacement,
  intention of using database output
  Back end Sample size = 49
Use Statistics by Crop

- Residential Turf and Ornamental: 10%
- Strawberry: 4%
- Residential Food Crops: 14%
- Apple: 8%
- Other: 12%
- None Selected: 52%

Residential total = 24%

N>8,000

www.ir4.rutgers.edu/Biopesticides/LabelDatabase/index.cfm
Use Statistics by Pest

- Insect: 16%
- Disease: 6%
- Snail: 2%
- Not Selected: 76%

N > 8,000

www.ir4.rutgers.edu/Biopesticides/LabelDatabase/index.cfm
User Statistics by State

None Selected: 28%
Other: 14%
CA: 4%
NY: 4%
ME: 4%
LA: 4%
PA: 10%
WA: 8%
OR: 4%
FL: 20%

N>8,000

www.ir4.rutgers.edu/Biopesticides/LabelDatabase/index.cfm
Survey - Farm Size

- 100+ acres: 11%
- 51-100 acres: 6%
- 11-50 acres: 6%
- 6-10 acres: 0%
- 1-5 acres: 14%
- Unknown: 63%

Farm size X hits = Impact >600,000 acres
Use Statistics - Limited to Organic Products

Compare: Organic production specialty crops 3-6%.
Database fact: 16% of biopesticide products are organic
Survey - Products Normally Used

- None Selected: 32%
- Sevin: 6%
- Lannate V: 4%
- 3336 Plus WP: 4%
- Bifenthrin: 6%
- Captan 50 WP: 4%
- Other: 44%

www.ir4.rutgers.edu/Biopesticides/LabelDatabase/index.cfm
Will Use or Recommend Biopesticide

- Yes: 88%
- No: 12%
• **EPA Region 2** – Grant funding support project

• **Registrants** – Information and letters of support

• **Student worker** - Brian Switek
New Product Registrations

- US Environmental Protection Agency (EPA)
- Canada-Pest Management Regulatory Authority (PMRA)
<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Use</th>
<th>IR-4 submission to EPA</th>
<th>IR-4 funded efficacy studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZYMV-WK</td>
<td>Virus</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>TMGMV EUP</td>
<td>Herbicide</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S. viarum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspergillus flavus AF36</td>
<td>Aflatoxin</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>pistachio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chenopodium ambrosioides</td>
<td>insecticide</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Chitosan hydrolysate</td>
<td>Bactericide fungicide</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

Green = Pending
### 2007 EPA Registrations USA

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<th>IR-4 funded efficacy studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quillaja extract</td>
<td>Nematicide</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Aspergillus flavus AF36</td>
<td>Aflatoxin-corn</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Salicylic acid</td>
<td>Bactericide fungicide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viral coat protein</td>
<td>Plum pox resistance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Green = Pending
Regulatory support – AAFC Canada

- Agriphage
- BlightBan A506
- BlightBan C9-1
- BioSave
- BloomTime
- Botanigard ES / 22WP
- Contans WG
- Messenger STS

Work underway

Sub. # 2007-1394
Reg. # 28392
Sub. # 2006-0696 & 0697
Sub. # 2007-4323 & 4328
Regulatory support – AAFC Canada

- **Met-52**  
  Sub. # 2006-4033 & 4035
- **Prestop**  
  Sub. # 2006-2302
- **Rhapsody / Serenade**  
  Reg # 28626-28629, 28549
- **Root Shield**  
  Sub. # 2006-7124 & 6806  
  (Label expansion subm.)
- **Sonata**  
  Work underway
- **Surround**  
  Reg. # 28436
Opportunities- Unmet needs

• IR-4 Food Use Workshop- National prioritization process- Growers, Research, Extension
2008 Grant Priorities

- Greenhouse grown vegetables - Biopesticides with zero day PHI
- All thrips (especially chilli thrips) management with bioinsecticides
- *Phytophthora capcisi* control with biofungicides
- Citrus canker, greening and Septoria citri
- Potato tuber moth management
- Integrated biopesticide systems for replacement of Azinphos-methyl.
- Weed management in organically grown crops.
- Management of varroa and tracheal mite in honeybees.
- Postharvest pest management to solve export residue concerns.

2008 Priorities - Continued

- Utilization of biopesticides in high profile or environmental concerns (Childhood dietary concerns, urban-farm interface, farm-natural area interface, etc.). *Primarily Demonstration Stage*
- Black Rot in Eastern grapes that are grown organically.
- Ascochyta complex fungal diseases, Sclerotinia or white mold in peas, lentils, and chickpeas.
- Downy mildew control on cucurbits and other crops with biofungicides
- Whitefly (Q-biotype and others) management with bioinsecticides
- Plant bugs - Lygus, Stink bug, etc.
- Aquatic weed management with bioherbicides
US growers want new effective tools

- IR-4 has submitted 30% of all new active ingredients to EPA over the last 2 years and had some involvement in about 74% of all new active ingredients.