WHY USE BIOPESTICIDES IN AN IPM PROGRAM?

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BARRIERS TO BIOPESTICIDE DEVELOPMENT / ADOPTION

- Snake oil image.
- Small companies. Recognition, Prestige $.
- Don’t necessarily stand out in university trials.
- Why risk an unknown?
- Lack distribution network – Handle small volumes.
DO BIOPESTICIDES WORK
OR ARE THEY JUST SNAKE OILS?
Products do fail……………………
Excerpts from biopesticide reports

- Phytophthora following _______ and _______ treatment were not different than the untreated control.
- Botrytis infection was similar to the control when treated with _______ or _______.
- _______, ____________, ____________ did not control blueberry midge.

Can you guess the product names-Fill in the blanks?
Products Do Fail

- Phytophthora following Subdue and Truban treatment were not different than the untreated control.
- Botrytis infection was similar to the control when treated with Daconil or Insignia.
- Malathion, Thiamethoxam, Spinosad did not control blueberry midge.

The point is that all products have variable performance.
<table>
<thead>
<tr>
<th>Rank</th>
<th>Common name</th>
<th># of pesticides</th>
<th>chem. groups</th>
<th>first report</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Two-spotted spider mite</td>
<td>70</td>
<td>7</td>
<td>1943</td>
</tr>
<tr>
<td>2</td>
<td>Diamond-back moth</td>
<td>68</td>
<td>8</td>
<td>1953</td>
</tr>
<tr>
<td>3</td>
<td>Peach/Potato aphid</td>
<td>67</td>
<td>4</td>
<td>1955</td>
</tr>
<tr>
<td>4</td>
<td>Colorado potato beetle</td>
<td>40</td>
<td>8</td>
<td>1955</td>
</tr>
</tbody>
</table>
Chronological Increase of Resistant Weeds World & USA

Source: [http://www.weedscience.com](http://www.weedscience.com)
## Documented cases of disease resistance to turf fungicides

<table>
<thead>
<tr>
<th>Disease</th>
<th>Fungicides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dollar spot</td>
<td>Rubigan, Bayleton, Banner, Chipco 26019, Vorlan</td>
</tr>
<tr>
<td>Pythium</td>
<td>Subdue and related products</td>
</tr>
<tr>
<td>Pink snow mold</td>
<td>Dicarboximides (Chipco 26019, Vorlan)</td>
</tr>
<tr>
<td>Anthracnose</td>
<td>Heritage, Compass, thiophanate-methyl (Cleary’s 3336, Fungo)</td>
</tr>
<tr>
<td>Gray leaf spot</td>
<td>Heritage, Compass</td>
</tr>
</tbody>
</table>
AF36- Atoxigenic Aspergillus flavus reduce aflatoxin in cottonseed
Growers Aren’t Interested in Biopesticides
Arizona Cotton Research and Protection Council - Registrant, Manufacturer and Distributor of AF36

MANUFACTURED BY GROWERS - FOR GROWERS
Why don’t the major companies work with Natural products?
Major companies work with natural products—Natural leads

Wow. All of the newer strobilurin fungicides are based on a mushroom!

*Strobilurus tenacellus*

Wow. All of the newer strobilurin fungicides are based on a mushroom!
INTEGRATED BIOPESTICIDE MANAGEMENT
GROWER CONCERNS ABOUT BIOPESTICIDES

DOES IT WORK?

HOW MUCH DOES IT COST?

DOES IT WORK?

Maybe the real question is ........ DO WE KNOW HOW TO MAKE THEM WORK?
DO WE KNOW HOW TO MAKE BIOPESTICIDES WORK?

FACT: Biopesticides work best in rotational programs.

If you test them as head to head comparisons versus conventional products, most may not perform as well as conventional products. This is misinterpreted as they are not useful.

REPEAT: Biopesticides work well in rotational programs.

So rotate-rotate-rotate.

ACTION: If you run field trials try biopesticides in rotational programs.

It’s not Conventional versus Biopesticide.

It’s Biopesticides and Conventionals
How should I interpret results? *The glass is half empty.* Hypothetical data

- Conventional alone - 83% a
- Conv-Biopest rotation - 79% a
- Control - 0% b

There was no advantage to rotating the conventional treatment with a biopesticide
How should I interpret results? *The glass is half full*

- Conventional alone - 83% a
- Conv-Biopest rotation - 79% a
- Control - 0% b

The level of control was maintained while gaining the following:

- **Resistance management**—Conventional weak-resistance prone
- **Re-entry period**—Flexibility labor intensive operations
- **Reduced time to harvest**—Multiple harvest
- **Residue management**—Don’t produce illegitimate fruit!

Rotations/integrations are delivery mechanisms for biopesticides in that they enable their utility—are delivery mechanisms important to biopesticide adoption?

Can delivery mechanisms revolutionize grower adoption?
Bt is a biopesticide that is used by many growers.
Proposal Statistics

Total 113 Proposals Received

<table>
<thead>
<tr>
<th>Category</th>
<th>Received</th>
<th>Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>Adv</td>
<td>64</td>
<td>21</td>
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<tr>
<td>Demo</td>
<td>28</td>
<td>15</td>
</tr>
</tbody>
</table>
WHY USE BIOPESTICIDES?

1. Resistance management
2. Re-entry period
3. Reduced time to harvest
4. Residue management
Integrate Biopesticides and Conventionals
It’s not Biopesticides versus Conventionals

A BALANCED SYSTEM IS IMPORTANT!
Remember: Think Big Blue

Integrated Biopesticide Management