BioControl in the Greenhouse

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e-GRO Electronic Grower Resources Online

3:00 to 3:25 Eastern

CASE STUDIES OF USING BIOCONTROL FOR DISEASE CONTROL IN GREENHOUSE CROPS

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Overview

Our Goal:

- *Learn how to develop your own disease management program with biopesticides*
  - *Foliar Disease Management*
  - *Soilborne/Root Disease Management*
  - *Evaluating Biopesticides in your operation*

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Biopesticide Basics

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Why Growers Start and Continue to Use Biopesticides

1. Low REIs and PHIs
2. Safer for workers, consumers, & environment
   - Many exempt from tolerances and MRLs
3. Reduce development of resistance to synthetic pesticides – no known resistance to multiple-MOA biopesticides
4. Improve efficacy of chemical- and bio-pesticides
5. Some can provide cost-effective disease control
6. Improve plant, soil and environmental health over time with continued use

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Biopesticide Basics

What do they do?

1. Suppress plant diseases and pests via one or more of modes of action (MOAs)
2. Act **preventively** rather than curatively (most)
3. Are effective at low to moderate disease pressure
4. Frequently provide other beneficial effects

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Biopesticide Basics

What they don't do

1. Offer 100% protection – no pesticide does
2. Cure diseases (few exceptions)
3. Work in environmental extremes
4. Work at high disease pressure
5. Last indefinitely
   - most have defined shelf lives and storage conditions
   - may require frequent application, especially on foliage
6. Make a bad grower good

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Biopesticide Best-Use Practices for Integrated Disease Management

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General Best-Use Practices

1. *Think **proactive** or **preventive**: exclusion, sanitation, environment*
2. *Obtain accurate diagnosis of the problem*
3. *Select the right product for the right disease*
4. *Follow label instructions: rates, safety, storage*
5. *Appropriate formulation for the job:*
   - *WP, WDG, ES, EC (spray, sprench, dip or drench)*
   - *Granular or WP (soil or seed treatment)*
6. *Test new products on a smaller scale before going "all out"*
   - *Set-up a good comparison*
   - *Integrate vs. replace*

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General Best-Use Practices

7. *Proper application*
   - *Select the most appropriate application method*
   - *Select the right equipment for the job*
     - *Calibration and maintenance of equipment are critical*
   - *Know when and how often to apply*
8. *Pay attention to shelf life and storage conditions/ limits – **Many biopesticides are living organisms***
9. *Consider compatibility with other products and practices*
   - *Tank-mix or rotational compatibility can help economize programs and increase efficacy*
   - *Find alternatives or time applications to overcome incompatibilities*

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Opportunities with Compatibility

Use Compatibility to your advantage

- *Types:*
  - *Tank mix: sprays, drenches, **dips***
  - *Short-term post application*
  - *Rotation/alternation*
- *Resistance management (conventional chemistries and antibiotics)*
- *Reduced input programs (reduced chemical exposure)*
- *Clean-up/quick knock-down of chemical and extended protection by biopesticide*
- *Increased efficacy and cost efficiency (labor)*

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Foliar/Fruit Biopesticides

General Characteristics of Foliar Biopesticides

- *Act or respond immediately to many fungal and bacterial pathogens*
- *Good coverage and proper concentration are critical*
  - *Typically not systemic*
- *Require frequent reapplication or rotation with other products during disease periods*
  - *New growth of plant parts*
  - *Lack nutrients for sustained growth on aerial plant surfaces*
  - *Environmental degradation or loss (UV, precipitation, etc.)*
- *Compatible with many chemical- and bio-pesticides*

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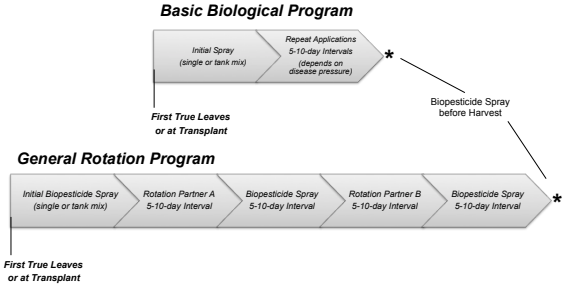
Foliar Programs (Preventive)



Soil/Root Biopesticides

General Characteristics of Soil/Root Biopesticides

- *May act quickly or after a lag period*
- *Typically act via 2 or more modes of action*
- *Good distribution and proper concentration are critical – typically not systemic*
  - *Bacterial require nutrients and free moisture to move, grow*
  - *Fungal are less dependent on moisture to move but still require nutrients for growth in absence of pathogen*
- *Activity for 2-12 weeks, depending on the AI*
  - *Reapplication may still be needed to keep at effective levels*
- *Compatible with many chemical- and bio-pesticides*

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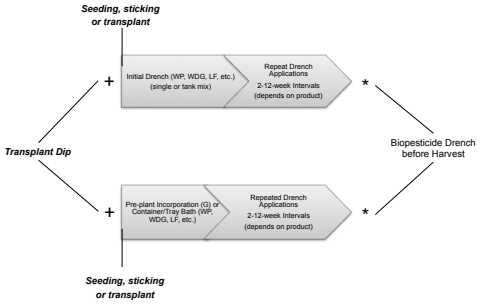
Soilborne Programs (Preventive)



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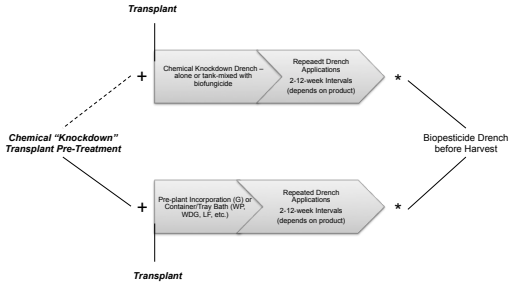
Soilborne Programs ("Knockdown" + Preventive)



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Tips for Developing Your Own Program

1. *Think **proactive** or **preventive**: exclusion, sanitation, environment*
2. *Properly identify the disease issues (don't assume)*
3. *Determine which products, practices, and timings you are currently using for these and their costs in use: be wary of unregistered products*
4. *Identify gaps in your current program:*
   - *Efficacy*
   - *Resistance*
   - *Compatibility*
   - *Safety*
   - *Convenience*
   - *Market*
   - *Labor*

   How do you measure these?

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Tips for Developing Your Own Program

5. *Define what success looks like*
6. *Contact manufacturer and extension for advice: a lot of great application information is not on the label*
7. *Test new products on a smaller scale before going "all out"*
   - *Set-up a good comparison*
   - *Integrate vs. replace*
8. *Document your tests*
   - *Keep track of what, how and when*
   - *Record what you and your staff see and experience*
   - *Photos: the good, the ugly, and the surprises*

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