Successful Adoption of Biopesticides in IPM Programs

www.biopesticideindustryalliance.org

- Welcome and agenda - Pam Marrone (AgraQuest/BPIA)
- BPIA mission/vision/accomplishments - Bill Foster (BPIA Chair; Bioworks)
- Why Use Biopesticides?- Mike Braverman (IR-4)
- Examples of successful biopesticides in insect and nematode control programs - Jim Chambers (Valent Biosciences)
- Examples of successful adoption of biopesticides in disease control programs - Pam Marrone
- Examples of successful adoption in structural pest IPM - Steve Bessette (EcoSmart)

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From last IPM symposium, Barriers to Adoption Workshop

- Grower demos required for adoption (in real-world programs, not just stand alone)
  - Company funded; increase IR-4/EPA funding
- Show profit and value of biopesticides (yield/quality)
- Promote biopesticides as solutions not just as “bio”
- Promote biopesticides for resistance and residue management and IPM programs (to preserve beneficials)
- Educate growers about biopesticides and how to use them
- BPIA move forward with certification/standards to weed out “snake oils”
- More research on basic biology of pests

Benefits of Biological Pesticides

- Reduce pest resistance through novel, multiple modes of action - can extend life of conventional products
- Better yields and quality when incorporated into pest or disease management program
- Can be sprayed up until harvest - leave no chemical residues (ideal for export markets)
- Short re-entry - safe to workers, saves labor
- Have an accelerated time to market (~3 yrs)

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Examples of Successful Adoption of Biological Fungicides

- **Rootshield® and PlantShield® (Bioworks, Inc.)**
  - ***Trichoderma*** **harzianum strain T-22**
  - **Ornamental penetration 12.5% (horticulture soil fungicides)**
  - **Thoroughly tested and recommended by Chase Research Gardens, among others**
  - **As good as chemical fungicides on several root pathogens; has become a standard**

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

Examples of Successful Adoption of Biological Fungicides

JMS Stylet Oil®

- Eradicant for powdery mildew in grapes, cherries and other crops
- Recommended use early in season
- WFS sells $2 million of Stylet Oil (CA) and sales are growing quickly
- Efficacy validated by Dr. Doug Gubler (UCD)
- OMRI listed

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Examples of Successful Adoption of Biological Fungicides

Kaligreen®

- Eradicant for powdery mildew in grapes, cherries and other crops
- OMRI listed
- Widely used on grapes - tens of thousands of acres

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Examples of Successful Adoption of Biological Fungicides

- Serenade® (AgraQuest), *Bacillus subtilis* strain 713 (has unique combination of lipopeptides)
- Premium Wine grapes - 15% CA
- Lettuce - 17% CA/AZ for *Sclerotinia* leaf drop
- Tomatoes - 80% FL fresh mkt acres, 10% of all sprays (bacterial spot and fungal diseases)
  - Tank mixed with 1/2 rate of Serenade+Copper rotated with Maneb+Copper

AGRA QUEST

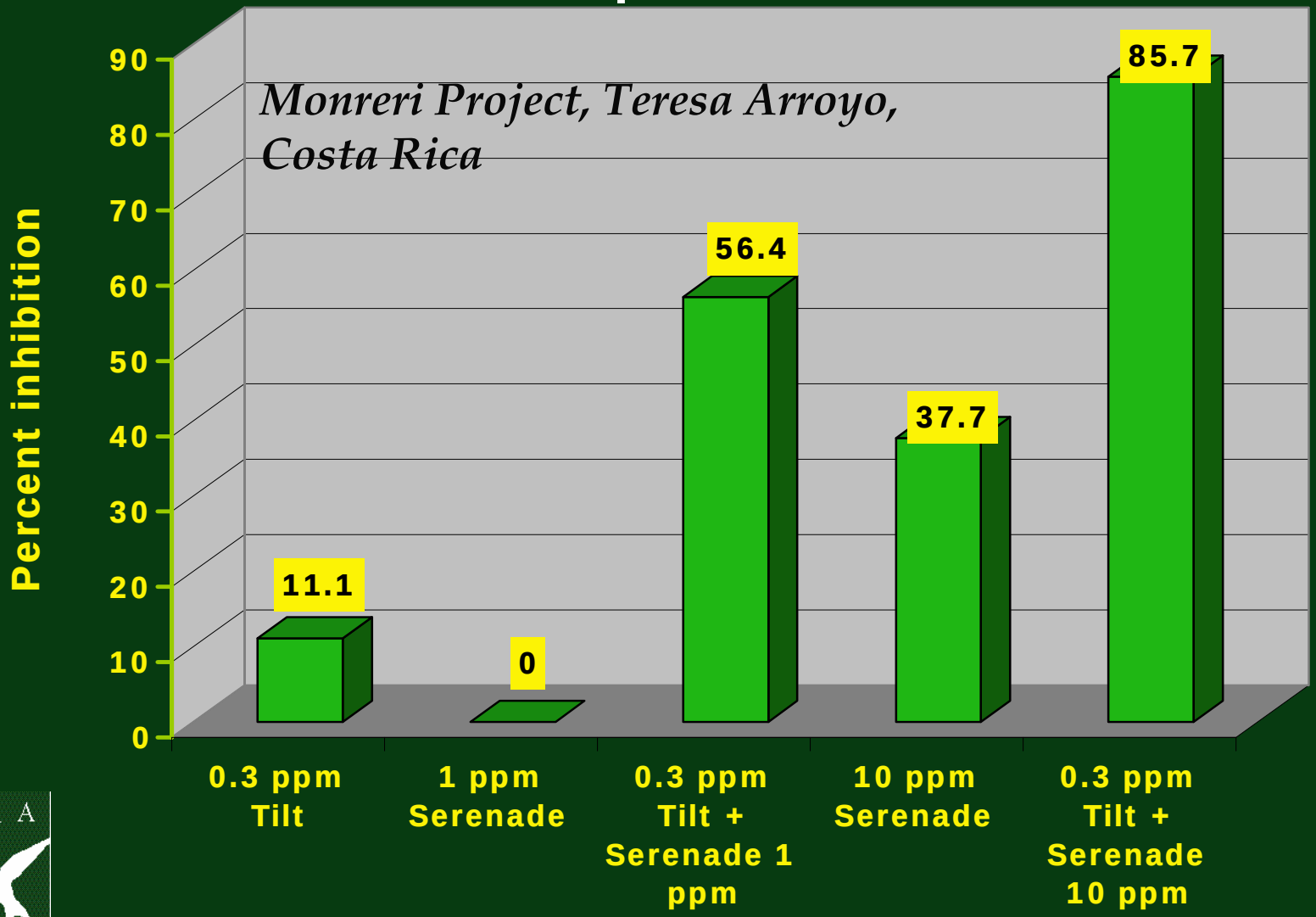
Serenade synergizes many classes of synthetic chemistry : EBDCs (e.g., dithane, maneb), Topsin, and strobilurin chemistry

- Combining Serenade in tank mix or rotation with lower rates of chemicals provides better results than chemical only programs

Proven examples:

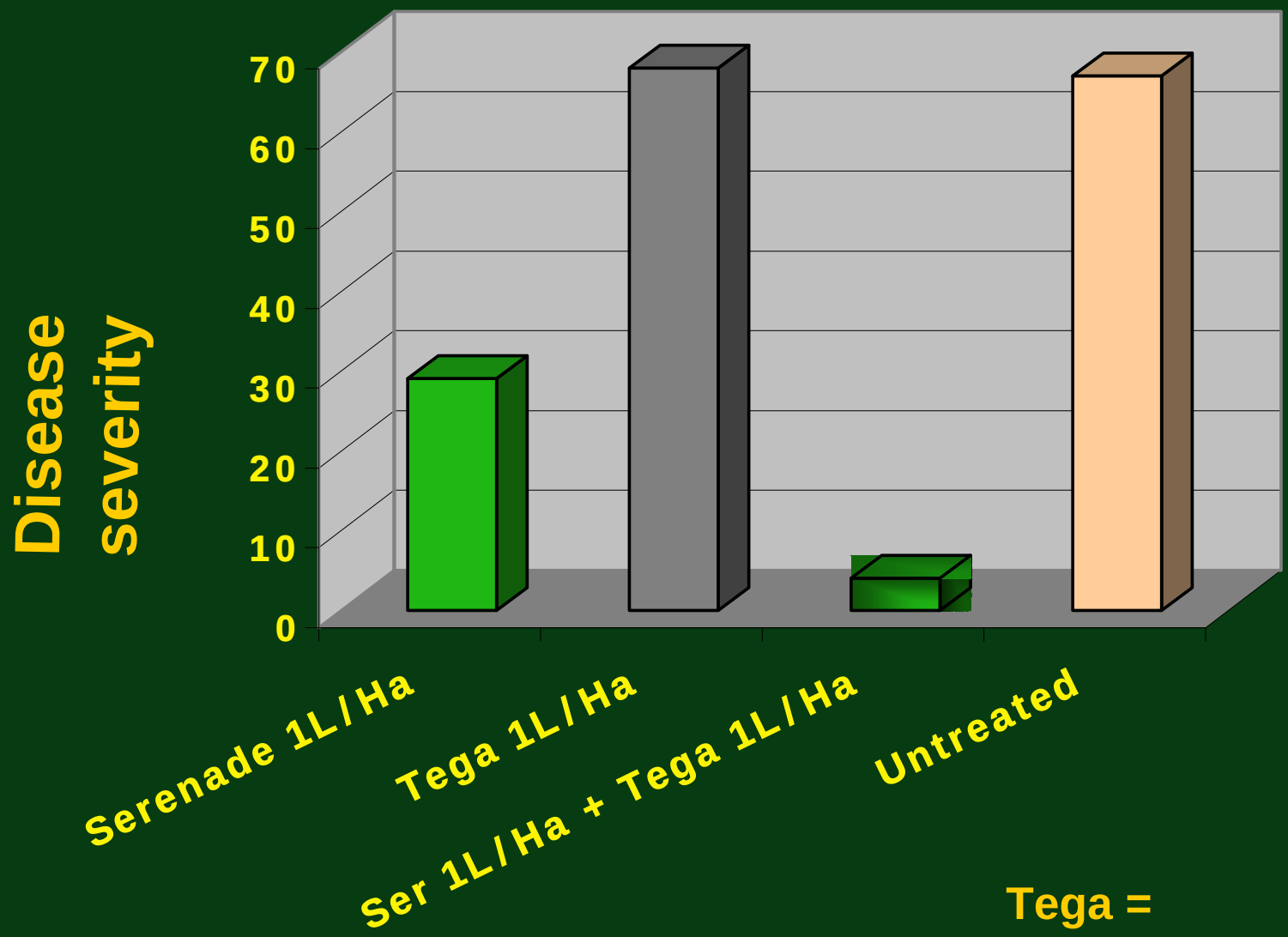
- Florida tomatoes: 2lbs + 2 lbs copper
- Bananas: Serenade + 1/2 rate EBDC
- Beans: 2lbs Serenade + 1-2 lbs Topsin
- Apples: replace/reduce Captan in scab program
- Lower rate of sulfur on all crops
- Turf: Low rate of Chlorothalonil + Serenade

Synergistic Inhibition of *Mycosphaerella fijiensis* ascospores collected from farms resistant to Propiconazole



AGRA QUEST

Synergistic Inhibition of *Mycosphaerella fijiensis* with Serenade and Trifloxystrobin in a single leaf test



Tega = trifloxystrobin

AGRA QUEST

Serenade as a resistance management tool

In Costa Rica, commercial farms that applied Serenade 12 times a year in a program for sigatoka control had higher susceptibility of *Mycosphaerella* to systemics than farms that did not use Serenade in their program

Examples of Successful Adoption of Biological Fungicides

- Contans® (Prophyta), *Coniothyrium minitans*
- Lettuce - for *Sclerotinia sclerotiorum* leaf drop, applied at planting
- 100 tons per year (2-8 kilos/hectare) sold in rape, sunflower, lettuce, beans, and other crops in 18 countries
- Better than Endura alone; looked great in rotation with Serenade or Endura (at thinning) - (Mike Matheron, Univ. of AZ)

AGRA QUEST

Contans®WG

- There are many successful examples of biofungicides that have good market penetration and continue to grow rapidly
- While they all can stand alone, growers use multiple products, thus biofungicides shine in disease control programs in rotations and tank mixes
- Synergistic efficacy and modes of action allowing lower chemical usage and resistance management is an area for focus

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