

# Biopesticides for Insect Control in Fruit Crops

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AgBioResearch

# Biopesticides for Insect Control in Fruit Crops

## Conventional Insecticides

- Chlorinated Hydrocarbons
- Organophosphates
- Carbamates
- Synthetic Pyrethroids
- Insect Growth Regulators
- Spinosyns
- Avermectins
- Neonicotinoids
- Oxadiazines
- Diamides
- Pyrizes

## Biopesticides

- Naturalytes (fermentation byproducts)
  - *Bts*
  - Spinosyns
  - Grandevo & Venerate
- Botanical / Plant extracts
  - Azadirachtin
  - Pyrethrum
  - Sabadilla
- Virus
- Particle Film
- Oils / Soaps
- Pheromones

# Biopesticides for Lepidoptera Pests

## Naturalytes

*Bts*

Entrust, Success/Spintor

Grandevo & Venerate

## Virus

Granulovirus

## Botanical

Pyrethrum / Pyrethrin

Azadirachtins

## Pheromones

xxx

# Biopesticides for Homoptera Pests

## Naturalytes

Grandevo

## Oils & Soaps

xxx

## Botanical

Azadirachtins

Pyrethrum / Pyrethrin

## Particle films

Surround WP

# Biopesticides for Diptera Pests

## Naturalytes

Entrust, Success/Spintor

Grandevo

## Oils & Soaps

XXX

## Botanical

Azadirachtins

Pyrethrum / Pyrethrin

Sabadilla

## Particle Film

Surround WP\*

(\* rhagoletis fruit fly)

# Biopesticides for Thrips

## Naturalytes

Entrust, Success/Spintor

Grandevo & Venerate

## Oils & Soaps

?

## Botanical

Azadirachtins

Pyrethrum / Pyrethrin

Sabadilla

## Particle Film

Surround WP

# Biopesticides for Coleoptera Pests

## Naturalytes

Venerate

## Botanical

Azadirachtins

Pyrethrum / Pyrethrin

Sabadilla

## Particle films

Surround WP

# Biopesticides for Hemiptera Pests

## Naturalytes

Grandevo & Venerate

## Botanical

Pyrethrum / Pyrethrin

Azadirachtins

Sabadilla

## Oils & Soaps

?

## Particle films

Surround WP\*

(\*pear psylla)



## 20<sup>th</sup> Century Delivery Systems Evolved To Optimize the Performance Attributes of Broad Spectrum Contact Poisons:

- Foliar sprays enhanced contact exposure to target pests.
- Compounds were relatively persistent to environment.
- Inexpensive materials reduced penalty for waste.



# Optimized Delivery Systems for Biopesticides

## Insecticide-Bait formulations



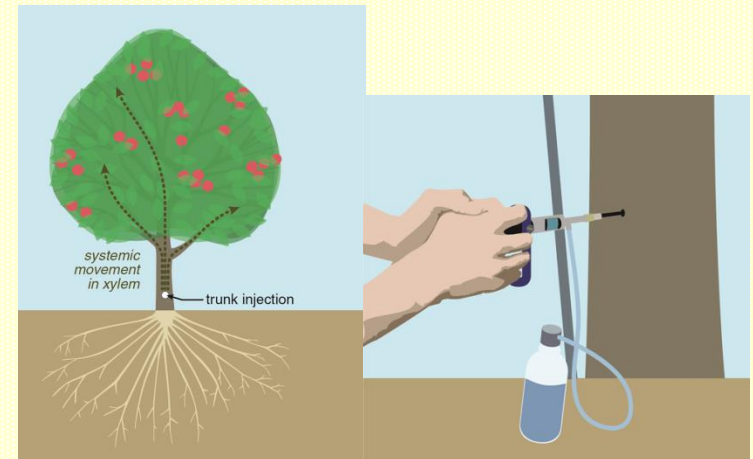
## Pesticide Treated Sphere



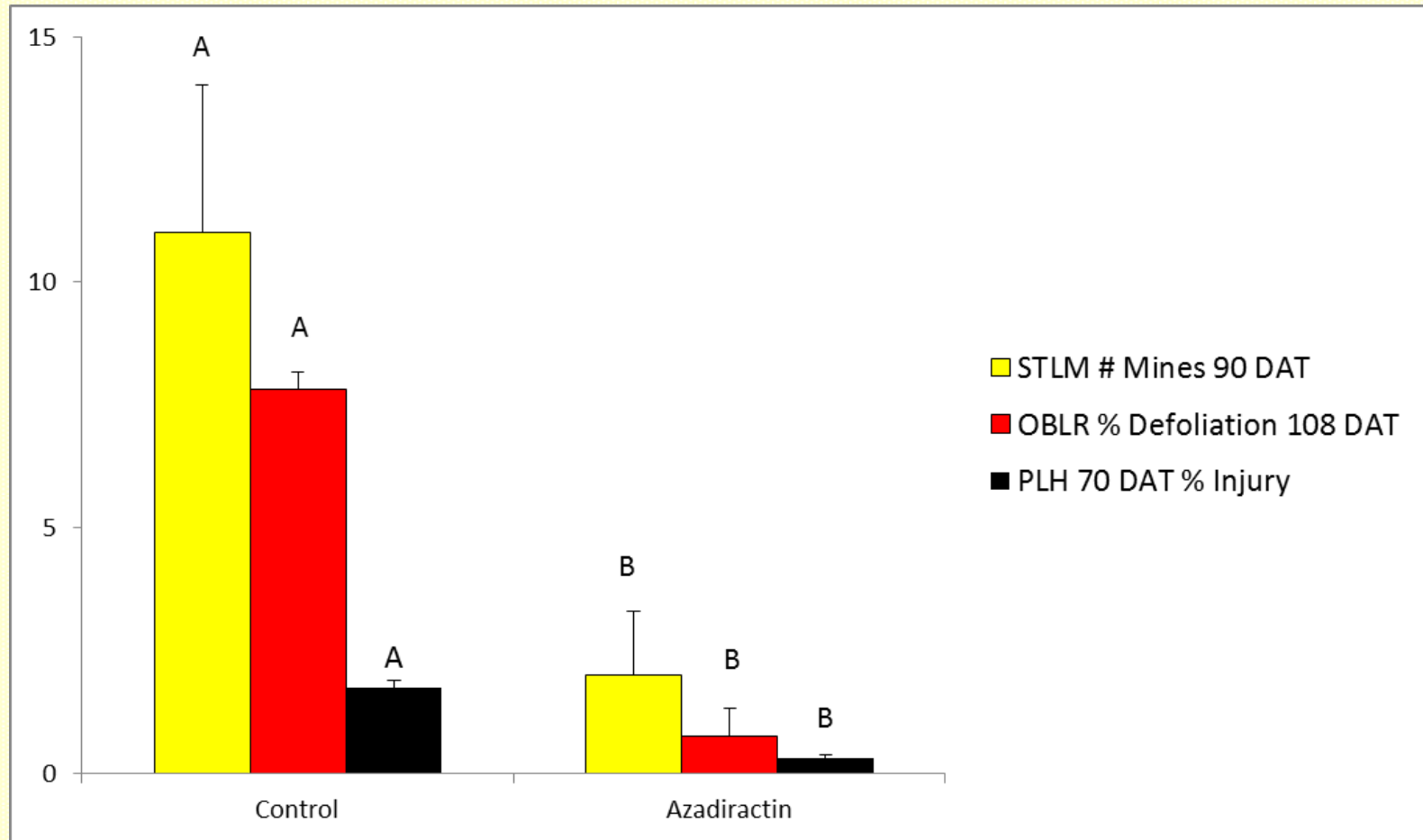
## Solid Set Canopy Deliver



## Trunk Injection



# Trunk Injection of Biopesticides



# Optimized Delivery Systems for Biopesticides

## Michigan FARMER

February 2013 [www.FarmProgress.com](http://www.FarmProgress.com)

From weaver to spinner to shepherd Pages 6-7

Hardwood farms take root in Detroit Page 40

Mac tractors to cross a week earlier Page 52



**PEST PROTECTION:** MSU graduate research assistant Tony VanWoerkom uses a trunk-injection method to protect an apple tree from pests.

By JENNIFER VINCENT

### Key Points

- Consumers demand high quality fruits, which require heavy pest management.
- MSU professor is studying injecting trees with protection materials.
- The project is in its third year and moving forward.

THIS season Michigan growers scrambled to get shots to protect themselves from the flu. One injection provided protection from the virus. What if that same concept could be applied to, say, apple trees to keep the oriental fruit moth or potato leathery per at bay?

Managing pests in specialty crops, like apples, is challenging. Consumers expect a high-quality, blemish-free product. Many aspects of pest management in apples have evolved and progressed, while some practices have remained much the same as 50 years ago. "One of them is how we deliver our protection materials,"

says John Wise, associate professor in entomology at Michigan State University, who has worked on pest management for more than 20 years. "Delivering these materials with traditional ground sprayers has both strengths and weaknesses, so we need to think about alternative methods

to deliver plant medicines," he says.

Wise prefers to call them medicines instead of pesticides. "Pesticides carry negativity with them, although it is no different than taking your dog or cat to the vet and receiving treatment. It's medicine."

Whether it be to protect the tree or to treat a symptom, pesticides are a vital component of raising specialty crops, especially for the fresh market.

Wise is researching the concept of using trunk injection instead of air-blast sprayers to deliver pesticides to fruit trees. "We need to think about more precise ways to deliver plant medicines," he says.

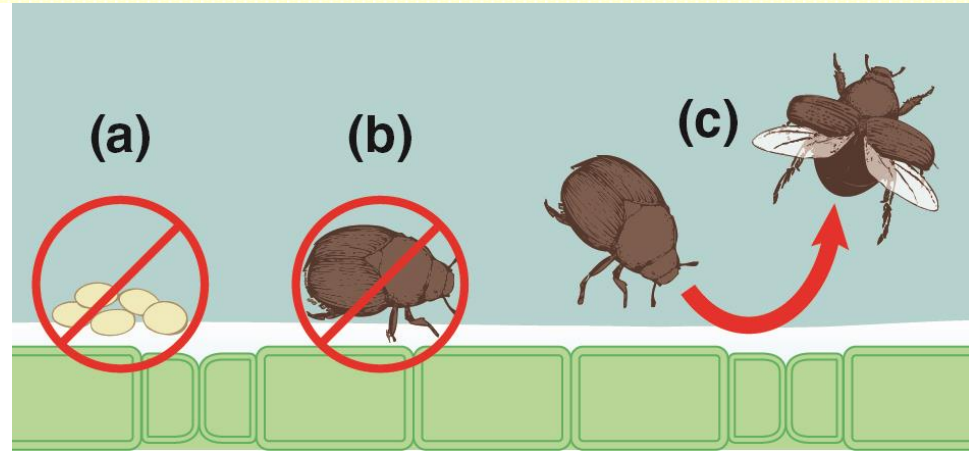
While injecting a tree offers some protection against pests, it is not a complete

vaccine and may need to be supplemented with other protection methods.

The concept of injecting pesticides into tree trunks is not new, as it has been used in forestry and in shade and ornamental trees. It continues to be used extensively to fight emerald ash borer. "Obviously, you can go to downtown East Lansing with an air-blast sprayer and have that spray drift cross into campus," Wise says.

In his third year of research, Wise says he's beyond the "proof in concept" stage. "There is potential here, but there are also several barriers that we will have to overcome."

■ Read more on Page 21.



## Delivery Systems for Biopesticides:

- Provide superior delivery of crop protection materials to tree canopy.
- Enhance performance of ingestion-active compounds.
- Prolong activity of Biopesticides.
- Reduce impact on beneficials.