







Addressing Change: The Pesticides Alternative Laboratory











Board & Researchers,
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Students 2007

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Pesticide Alternatives Lab

Ecology

- **History:**
- **Goals:**
 - To serve **Agri.** and **Policy Makers** through innovation of appropriate **IPM Practices**...
 - To provide **Enviro.** and **Technical Services** to **Policy Makers, Farmers & Public Lands Managers**...
 - To **Train Pest Mngt. Scientists** for Tomorrow...
- **Our purpose** is to develop advanced IPM, Chemical Ecology & Organic Strategies, Tactics and Tools for Pest Management in Agriculture and on Public Lands.

Developing Close Working Relationships with Legislatures, Regulators & Funding Agency Staff

The Michigan Specialty Crop Industries

- **Understand the Process & Communicate!!!**
- **Hard Working...no one will do this for us!**
- **Invest Wisely: Personnel, \$, Time...**
- **Relationships, Relationships, Relationships**

Involves: Commodity Organizations, Processors, Growers, Shippers, Sellers, Suppliers, MSU, MDA, DEQ, Farm Bureau, USDA, USEPA, Legislatures, Local Leaders, etc., etc., & etc...

Decision Maker's Tours



Key USEPA, USDA, Commodity & Representative Staff

USEPA Administrator Steve Johnson in Lake MI



"In the end, after FQPA- we all have to roll-up our sleeves and get our feet wet if specialty Crop agriculture is to survive in the US..."

Global Green Movement

- **Linked to the Consumer Movement**
- **Global in scope**
- **Transsects demographics of society**
- **Strongly affects regulatory policy**
- **Projected to expand well into the 21st Century**



Change Driver!

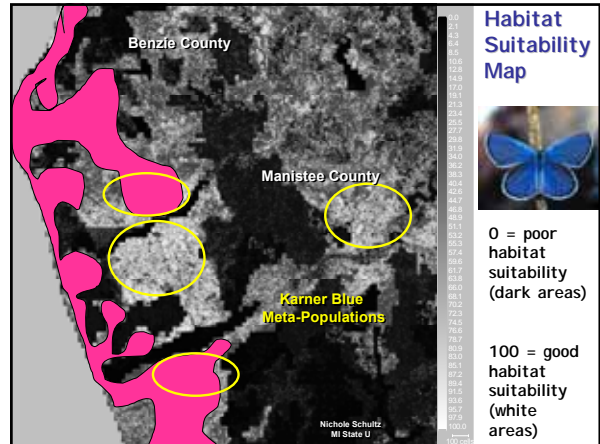
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Landscape Changes Associated with Population Pressures, Dis-Agriculture & Graying America

- **The Search for Amenities**
- **Land valuation Δ**
- **Sprawl**
- **Land Transition**

1. **Chemical trespass**
2. **Abandoned/Neglected Orchards**
3. **Noise, Smell Abatement**
4. **Imposed Aesthetic Standards**
5. **Pest Status**

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US Pesticide Legislation

- FQPA, FIFRA, Pesticide Reregistration Improvement Act
- Endangered Species Act as amended
- Clean Water Act as amended
- Clean Air Act as amended
- Numerous others

More & More NGO's are Using Local & Federal Courts

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Bottom Line

- **Environmental Issues Will Increase**
 - IPM IS a Terrestrial Ecological Measurement & Analysis System
- **Instruments for these changes**
 - Air & Water Quality Acts
 - FIFRA/FQPA/PRIA
 - Endangered Species Act
 - Upper Midwest = Great Lakes Annex
- **Land Use Issues Will Increase**

Ecosystem Services: Future Farms????

Here now

- Evidence of Warming
- Climate Change not just temperature

Carbon sequestration Credits

- Trees & soil

Nitrogen movement & availability

- Humans
- Animals

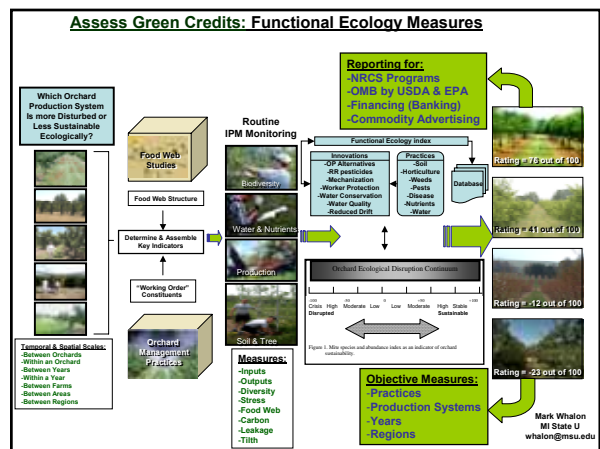
Water credits = filtering Credits

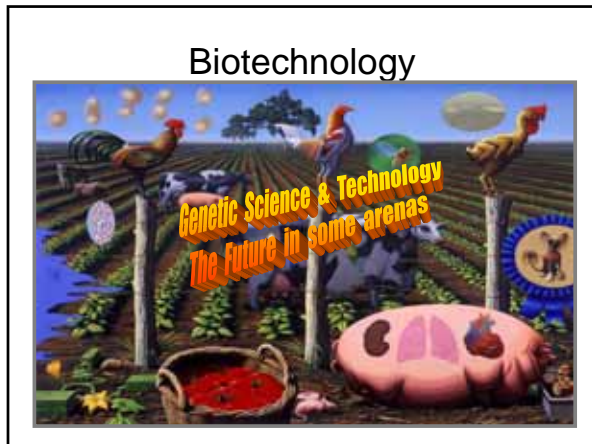
- Great Lakes = surface water

Animal & Plant Diversity Credits

- Pestiferousness
- Pest resistant
- Natural Enemy Reward
- Season-long pollen & nectar

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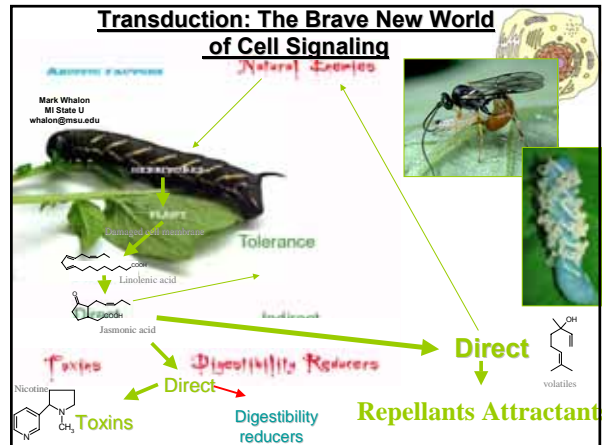




Semiochemical Ecology

- Do healthy plants resist pests better?
- What about plant elicitors?
- Are "induced" plants safe to eat?
- How will nanotechnology affect production?
- How will regulations change agriculture?

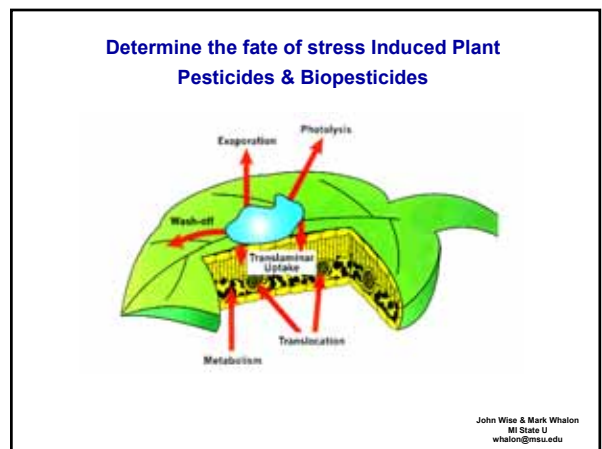
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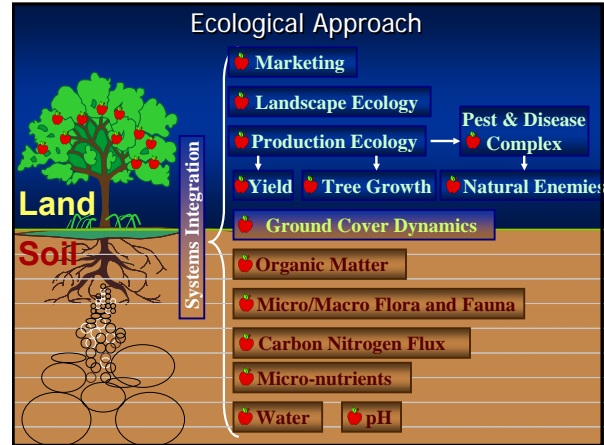
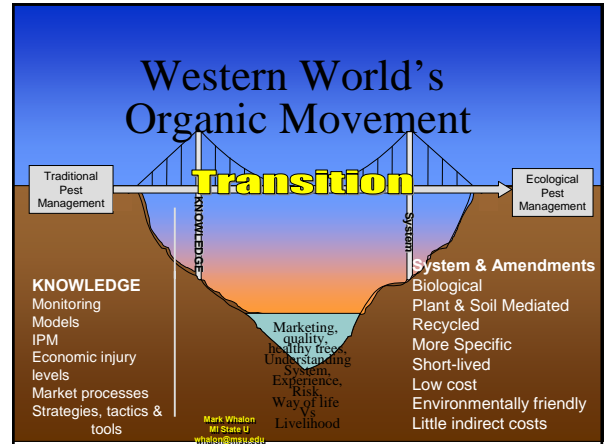
What plant and animal derived amendments can do?

- Pheromones --
- Arrestants --
- Deterrents --
- Repellents --
- Analgesics --
- Sterilants --
- IGR's --

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Byron Poster



Clarksville Organic Apple Project

- Soil, ground cover & tree
- Pathogen Control
- Organic IPM
 - Attract & Kill PC
 - Surround
 - Virus for CM
 - Predators for OBLR
 - Predators for Soft insects
- Diversity Strips = mesoarea
- Research
 - Beneficial Insect Monitoring Transects
 - Root stocks
 - Ground covers/mulches
 - Pest management
 - Soil management
- Open Access to Visitors
- Regional Educational Impact

Ground Cover, Nutrients & Weed Control

- Swiss Sandwich System
- Flaming for Weed Control
- Composting
- Legume Grass Drive Row = nutrients

Organic Functional Diversity Strategies

- **Cultural Control**
 - Living barrier
 - Ground cover
 - Sanitation
 - Mulching
 - Timed Mowing
 - Habitat Manipulations
- **Organic Ecology**
 - Soft pesticides
 - Attract and Kill
 - Trap out
 - Virus
- **Natural and Biological Control**
 - Generalist predators OK
 - Augmentative releases not necessary
 - Nectar reward helped parasitoids
- **Pheromone disruption**
- **Host Plant Resistance**
- **IPM Principles**
 - Monitoring
 - Timing
 - Thresholds

Bio-Diversity Strips for IPM

Project Goal- Use border plantings to provide food (pollen & nectar) and refuge for beneficial insects.

Establish Strips

Native Plants that provide food throughout the season
Irrigated & plastic mulch

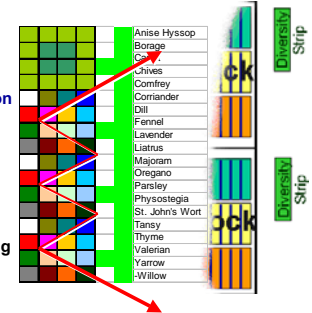
Neutral Strips (Control)

Neutral (?) = orchard grass

Weed suppression & compaction

Alternative Crops: multi-cropping

Herbs, flowers, potted plants



Biological Control: Rosie Apple Aphids, Tarnished Plant Bugs, Leafrollers, Budworms, Fruitworms, CM/OFM, Mites, ...

- Monitoring?
- Ratios for Thresholds?
 - Predators : Pest
- Establish Predators & Parasites w/in Orchard
 - Especially: Mites, Rosie Aphid, Mites & Leafrollers
- Works for many pest species—**Except for PC**
- Sulfur can induce Mite outbreaks



Granulosis Virus: Codling Moth

- **Key Issues**
 - Cost
 - Timing
 - Spray Frequency & Rate
 - Integration with other Tactics and Tools
 - Understanding establishment & reinfestation
 - In Combination with Pheromones



Fruit Fly Bait and Kill with Spinosad

- Better Bait Formulation.
- Get low-volume application technology distributed.
- Adjust dosage to Adult fly densities to reduce costs.



