Good morning!
We’re nearing the finish line!

You should have an email with today’s notes and an insecticide list
One more Lync session after today – let me know if you have topics that you would like covered
Final exam will be like 2nd Hour Exam – I will send it early so you have time to work on it

Biorational and Organic Insecticides and Control Problems

Terms
- **Biorational insecticide** - active ingredient or formulation derived from biological or natural origins
- **Organic insecticide** – (several)
  Insecticide that contains carbon (virtually all)
  From a plant or animal source
  Listed by OMRI (Organic Materials Review Institute)
Terms

- **Conventional insecticide** - all insecticides other than biological insecticides OR synthetic insecticides
- **Conventional reduced risk insecticide** – low impact on human health, lower toxicity to non-targets, low potential for groundwater contamination, low pest resistance potential, compatible with IPM practices (Groups 4 and 5)

Terms

- Some biorational products may not be on OMRI list
- Some OMRI products are not biorational
- Lots of overlap

OMRI insecticide Active Ingredients

- **Bt**
- **Diatomaceous Earth**
- **Neem**
- **Oils**
- **Pyrethrins**

*B* See emailed list for example brand names
Biorational vs Conventional

- Better control of pests? No, but often equal
- Controls broader pest spectrum? Usually narrower
- Cheaper? Usually more expensive

Biorational vs Conventional

- Similar residual effect? No, shorter-breakdown in sunlight, air
- Less toxic to humans? Usually yes
- Safer for environment? Usually yes

Biorational vs Conventional

- Safer for beneficial insects? Usually yes
- Required for certified organic production? Almost always yes
Types of organic insecticides

- Botanicals
- Soaps and oils
- Microbial insecticides (Bt, Spinosads)
- Growth regulators (IGRs) (synthetic)
- Pheromones (synthetic) – EF 203
- Non-organic natural products (sulfur, clays)

“Old botanicals”

- Nicotine – contact, degrades quickly
- Pyrethrins – still widely available
- Rotenone - from legumes, stomach, contact
- Sabadilla – dust from seeds of a lily – contact, degrades rapidly
- Rynia – S Amer shrub, stomach poison

Pyrethrins

- Contact, quick knockdown – recovery
- Inverse temperature effect
- Short residual – hours not days
- Synergist (piperonyl butoxide) not OMRI approved
**Keys to Bt Success**
- Early detection – small larvae, to to cleanup active infestations
- Larvae actively feeding
- Good spray coverage – spreader-sticker or surfactant
- Not extremely hot or cold

**Non-organic products**
- Cryolite or Kryocide
- Vegetables and fruit
- Sodium aluminofluoride
- Mined mineral
- Colorado potato beetle
- Not OMRI approved

**Non-organic products**
- Kaolin – Surround 95 WP – forms a protectant barrier film – insects, sunburn, heat stress
- Fruits, berries, vegetables
- Clay based
- Feeding barrier
- Leaves white residue on produce
- OMRI approved
Biorationals require

- Greater management skills
- More scouting to detect infestations earlier
- Use preventive and alternative control measures when appropriate

Colorado potato beetle—super pest

CPB biology

- Spend winter as adults
- Females – 350 yellow eggs
- Few natural enemies
- 75% defoliation in last instar (4I)
- Pupate in soil
Colorado potato beetle

- Use different classes on 1st and 2nd generations
- Target small larvae – not overwintering adults
- Treat at 15% egg hatch
- Potatoes can tolerate 30% defoliation before flowering – 10% during tuber fill

Colorado potato beetle (home)

- Colorado Potato Beetle Beater (Bonide)
  Bt san diego – stomach poison, small larvae (11)
- Neem products (26)
- Permethrin (3)

Colorado potato beetle control commercial growers

- Systemic – imidacloprid Admire (4)
- Pyrethroids (3)
- Biologicals Bt M-Trak, Novodor, AgriMek
- Neem (26)
**Horn fly**
The billion dollar fly
- Blood sucking pest of cattle
- Treatment guideline > 100 per side
- Return from calves ($15- $20/head)

**Horn fly – pasture pest**
- Winter as pupa beneath cow manure
- Blood feeders
- 99% of time on animals
- Breed ONLY in fresh cow manure
- Several generations each year
Insecticide ear tag
Insecticide resistance
- Sustained release, decreases over time
- Widespread adoption
- Late season flies exposed to reduced dose – strong selection pressure
- Permethrin
- Cross resistance w/diazinon

Insecticide ear tags
Resistance management
- Pyrethroid
- Spinosad
- Organophosphate
- Abamectin
- Combination tags

Spotted wing *Drosophila*
- SVD Male – note the characteristic dark spot near the tip of each wing.
- SVD Female – note the saw-like egg-laying structure (insert); lacks wing spots.
**DETECTION, coverage, resistance, harvest residue**

- Baited trap before harvest
- Detect adults
- Start treatment

**Detection, COVERAGE, resistance, harvest residue**

- Adults hide in foliage
- High pressure
- High spray volume

**Detection, coverage, RESISTANCE, harvest residue**

- Rotate classes
  1- OP / carbamates
  3- Pyrethroids
  5- Spinosyns
Detection, coverage, resistance, HARVEST RESIDUE

- Check label – post harvest interval

Others
- Corn earworm – sweet corn
- Squash bug
- Cucumber beetles
- Small grain aphids – wheat
- Cabbageworm complex
- Face fly – cattle
- European corn borer - peppers