Latest Facts to Control Top Greenhouse Pests
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Biological Control Quality

Supplies
- www.bioquip.com For cages

Rearing Your Own Nematodes
- Rearing your own nematodes
  - Cornell Cooperative Extension, Elson Shields
  - Management of Alfalfa Snout Beetle (has rearing nematode info) [http://www.ynyagdev.org/wp-content/uploads/2012/01/Shields_ASBPamphlet_FINAL.pdf]

Pests and Their Biocontrol Control Agents

*Echinothrips americanus*
- Worked well
  - BotaniGard
  - Met 52
  - *Neoseiulus cucumeris* - no control
  - *Amblyseius swirskii* - reduced population but not controlled (3.8 thrips fed on per day)
  - *Amblydromalus limonicus* - reduced population but not controlled (2.1 thrips fed on per day)
  - Hans Hoogerbrugge, Koppert

Thrips and Fertilizer
- Effect of liquid feed concentration on western flower thrips abundance on potted mums
  - Texas A&M (Chau and Heinz, 2006)
    - Plants received 15-16-17, 75 -750 ppm nitrogen
    - 280 to 375 ppm N highest level thrips
    - 188 ppm N had half the number of thrips of the 375 ppm N
      - Plants had same height and produced a similar number of flowers.
  - Effect of liquid feed concentration on WFT abundance and the ability of a natural enemy (*Amblyseius swirskii*) to suppress thrips on roses.
- **Roses and Thrips**
  - Roses received a 15-5-15 fertilizer at a rate of either 50 or 150 ppm N.
  - 50 ppm treatment had 30% fewer thrips than those in the 150 ppm group.
  - Effect of liquid feed concentration on WFT abundance and the ability of a natural enemy (Amblyseius swirskii) to suppress thrips on roses.
  - Fertilizer rate did not affect the population of the natural enemy.
  - Combination of low fertilizer rate and swirskii reduced population to about 25% of what it was in the well-fed roses that weren’t protected by swirskii.

- **Silicon and Chrysanthemums**
  - Daniel Klittich, Michael Parrella, UC Davis
  - Si treated plants received 500 ppm Liquid potassium silicate with each irrigation
  - In treated plants 54% reduction in mining

**Western Flower Thrips, Do they need to die?**
- Non Consumption Effects. Sarah Jandricic, Steven Frank, NC State
- Amblyseius cucumeris
- 2nd instar WFT
- Time thrips spent feeding was reduced by 30%
- Leaf damage reduced by almost 40%
- Mites attack them, up to 40 times an hour

- **Western Flower Thrips, Do they need to die?**
  - Cornell University
  - Presence of A. swirskii reduces the number of eggs produced by an adult thrips, from 120 to 40 over life time
  - Reduces adult thrips lifespan, from 20 days to 12-14 days

**Spider Mites, (twospotted)**
- *P. persimilis* on TSSM
- *P. persimilis* can eat all stages of twospotted spider mites (TSSM)
- TSSM hold eggs inside when senses predators
- TSSM exposed to P. persimilis on a leaf for 24 hours
- Removed and placed on predator free leaf
- TSSM laid 22% fewer eggs, even with no predators present

**Persimilis odor**
- TSSM just smelling chemical ques from *P. persimilis* lay 15% fewer eggs per day.
- This effect is even stronger (32% fewer eggs) when spider mites smell scents of both *P. persimilis* and the dead spider mites that they’ve e.

*Thank you for coming to my talk!*
Banker Plants
- Optimizing Banker Plant Systems for Aphid Biological Control in Floriculture Greenhouses By Sara G. Prado1, Adam G. Dale2, Travis McClure2, Steven D. Frank NC Cooperative Unit, North Carolina State University, Raleigh, NC
- Banker plant species has strong effects on many aspects of parasitoid development and parasitism rate
- Parasitoids developing on barley had the shortest development time
- Rye appeared to be the worst host because parasitoids took longer to develop and only 30% were female
- Barley was the winner
- Found that parasitoids prefer to parasitize pest aphids as compared to banker plant aphids. This is good because it means that over 50% of parasitoids leave banker plants to parasitize pests
- Parasitoids dispersed over 30 feet to find pests with no reduction in parasitism.

Plant Growth Regulators
- North Carolina State University. Sara Prado & Steven Frank
- Plant Architectural Complexity
  - *Aphidius colemani* foraging efficiency
  - When parasitoids were present paclobutrazol and associated changes in plant architecture reduced parasitism and increased aphid abundance compared to untreated plants
- Green peach aphid fed in concealed locations on PGR-treated plants than those on untreated plants
- PGR’s & Parasites

Four commonly used PGR’s, *Myzus persicae* (green peach aphid), *Aphidius colemani*
- Drench PGR’s
- None of the PGR’s reduced aphid abundance alone
  - Paclobutrazol (Bonzi, Paczol, Piccolo)
    - reduced the number of mummies that developed on plants
    - reduced parasitoid size
    - reduced female : total ratio
  - Ancymidol (A-Rest, Abide)
    - no adult parasitoids eclosed (emerged) from mummies on treated plants
  - Uniconazole (Sumagic, Concise)
    - reduced female : total ratio