Conservation Biological Control of Insect Pests

Jesusa C. Legaspi
USDA, ARS, CMAVE
FAMU - Center for Biological Control
Tallahassee, Florida
Silverleaf Whitefly (SLWF) – *Bemisia argentifolii*
Silverleaf Whitefly and Infestation
IPM in Florida

Spatial & landscape ecology, biological control of invasive pests

Basic biology, gross physiology, field ecology - insect pests of vegetables, horticultural crops
Determined parasite complex of SLWF after biological control program in Florida in the 1990’s.

Whitefly populations increased during the fall

Species of *Encarsia* and *Eretmocerus* parasites more abundant in nightshade and yellow primrose weeds
Research Highlights – ornamental pests

- Effects of alternative landscape design and management on pest and beneficial insect species diversity in residential areas in North Florida

- Increased plant species diversity correlated with increasing predator abundance while pest numbers decreased
Research Highlights – thrips

• Evaluate effect of intercropping - augment predators to suppress thrips pests

• Double quick orange sunflower variety - most attractive to *Orius* predator and thrips pests.

• Sunflower intercropped with bell peppers acted as sink for *Orius* and thrips.

• Sunflower may be used as trap crop to reduce thrips in multiple cropping systems.
“Push –pull” – SLWF pest olfactometer lab test / ethovision software – 2 mustard plant var., arugula, plant oils – arrested behavior in giant red mustard, arugula; repellency in Caliente mustard var. and mustard oil

Field tests – refuge plants - sweet alyssum intercropped with broccoli and kale; malaise traps - preda-lure to attract hoverfly predators of whiteflies and aphids
Sustainable / Organic Management of Pests

- **Push-pull strategies** – “pull” – population studies of predators – hoverflies, ladybeetles - refuge plants – annuals - sweet alyssum, Queen Anne’s lace, buckwheat, yarrow; perennials – blue mist flower, lesser snakeroot, dotted horsemint

- **Cover crops** – buckwheat, rye grass, sunnhemp – attract beneficial insects, enhance soil nutrients, reduce weeds

- **Olfactometer** - test repellency of mustard oils – potential repellent compounds - oleic acid, linoleic acid – study whitefly behavior using ethovision software
Sustainable / Organic Management of Pests

- Attractive Flowering Plants
  - Hoverflies
  - Tachinid Flies
  - Parasitoid Wasps

- Trap Crops
Sustainable / Organic Management of Pests

Predator Work:

Spined Soldier Bug
*Podisus maculiventris*

*Delphastus catalinae*
Annual / perennial plants, USDA-ARS demonstration vegetable field plots, Summer 2017, Tallahassee, Florida
Demonstrating border perennial weeds / flowering plants to increase and maintain beneficial pollinators / natural biocontrol insects – USDA, ARS-CMAVE, Tallahassee, Florida, summer 2017
Demonstrating annual / perennial plants to increase beneficial insects, vegetable field plots, USDA-ARS-CMAVE, Summer 2017, Tallahassee, Florida
Demonstrating boxed perennial weeds and flowering plants to increase / maintain beneficial pollinators and natural biocontrol insects – outside USDA, ARS-CMAVE labs., Tallahassee, Florida
Demonstrating boxed annual / perennial weeds / flowering plants to increase / maintain beneficial pollinators / natural biocontrol insects outside USDA, ARS-CMAVE labs., Tallahassee, Florida, Summer 2017
The Philippines

Isabela

Benguet
Border flowering plants (marigold, zinnias, etc.) to increase beneficial insects near cacao and coconut trees, Isabela State University (ISU), Echague, Isabela, Philippines, June 2017
Border flowering plants near cacao and coconut trees – ISU campus, Echague, Isabela, Philippines, June 2017
Fall 2017 – intercrop sweet alyssum, collards, cilantro, giant red mustard
Small Farm Field Day, FAMU, Quincy, FL – June 9, 2018

High tunnels, tropical screenhouse / joint – UF, Univ. of GA, FAMU, OREI project

Intercrop flowering plants, mustard greens, buckwheat cover crop
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