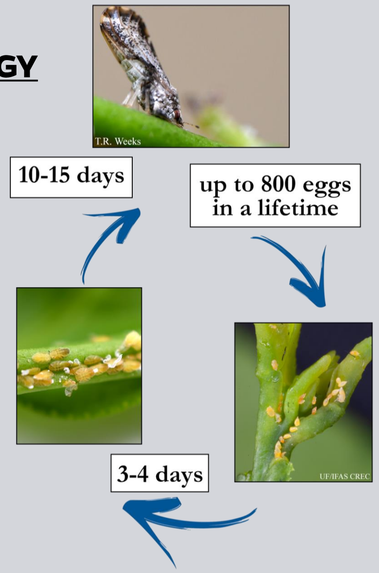
UF IFAS Extension UNIVERSITY of FLORIDA

ASIAN CITRUS PSYLLID MANAGEMENT

1 ASIAN CITRUS PSYLLID (ACP) BIOLOGY

- Pest of citrus and vector for citrus greening (Huanglongbing, HLB) disease
- Most active in spring through fall
- Adults feed on flush, mature leaves, and non-citrus plants
- Require flush to reproduce



2 MANAGEMENT

Chemical

- Recommended contact and systemic insecticides can be found in the Florida Citrus Production Guide
- Insecticide resistance has been documented in local populations, susceptibility can be restored by rotating insecticide Mode of Action (MOA)

Biological Controls

- Natural enemies measurably reduce ACP populations in unsprayed areas; however, 3-4 insecticide sprays/year can reduce the impact of natural enemies

Cultural Controls

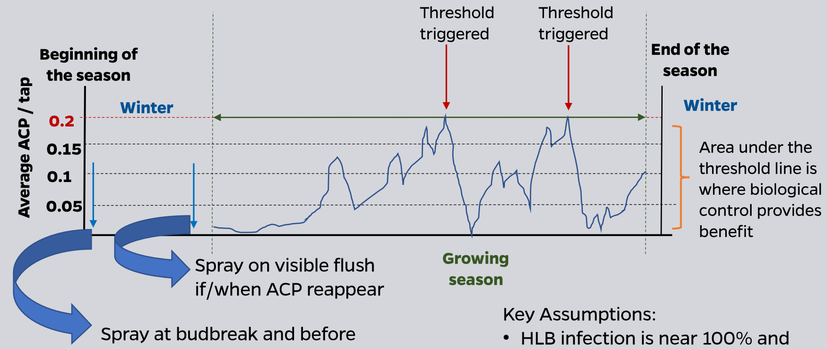
- ACP can be prevented from accessing newly planted trees through use of IPCs
- Metallized reflective mulch and red kaolin can reduce ACP infestation and subsequent infection with HLB

Funding: CRDF Citrus Research and Development Foundation, Inc. USDA HLB Multi Agency Coordination Group

3 TIMING MANAGEMENT TO PEAK ACTIVITY

- Psyllid populations can be managed by targeting flush
- Dormant season sprays made in the winter provide reduction in the early spring ACP breeding populations and therefore are critical for effectiveness of season-long ACP management
- Timing sprays to peak flush periods will reduce survival of eggs and nymphs

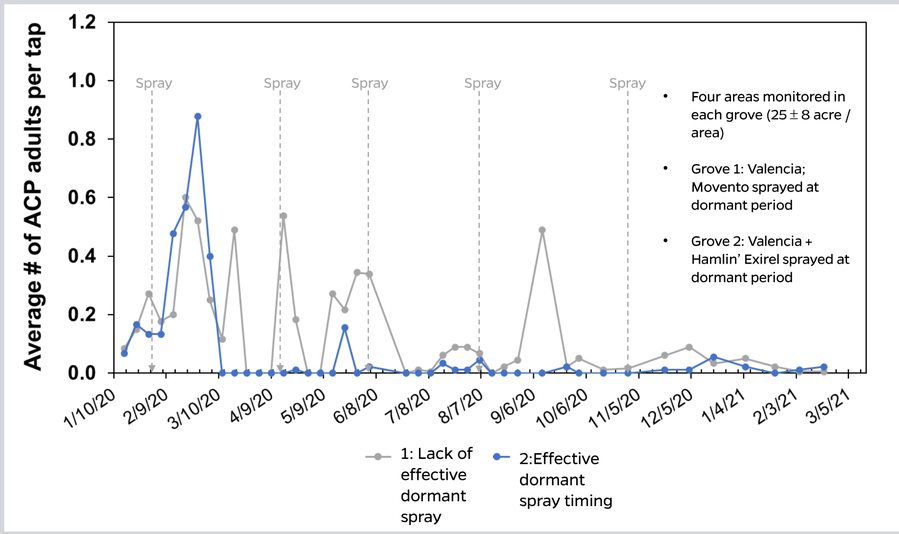
Hypothetical example of implementing an Economic Injury Level at 0.2 ACP/ tap



Key Assumptions:

- HLB infection is near 100% and stopping spread is not a goal
- Keeping ACP below the chosen threshold boosts yield via improved tree health

4 PUTTING THEORY INTO PRACTICE



- Starting out with low ACP population with effective dormant spray is essential for implementing an EIL

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LEBBECK MEALYBUG

1

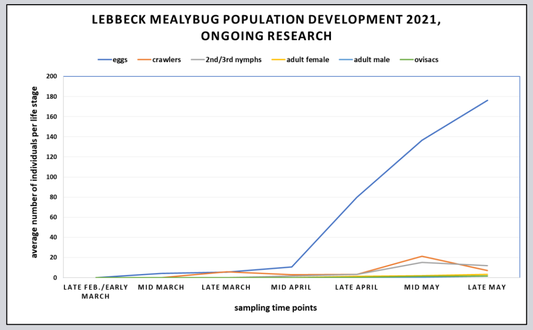
GENERAL INFORMATION

- Scientific name: *Nipaecoccus viridis* (Newstead)
- Many common names including hibiscus mealybug and spherical mealybug
- Wide host range
- Thrives in high humidity and high temperatures, capable of overwintering in cooler climates
- Hard to detect at low populations, crawlers are very small and blend in with bark
- Gregarious, all ages prefer to congregate together tightly and feed in large numbers where juveniles are often protected by the wax of the female ovisacs
- Feed in both open and cryptic locations: under calyx junction, in tree wounds, leaves, etc.
- Feeding can cause damage to fruit, stems, and leaves and can kill young trees at high populations
- Feeding damage can cause fruit to drop before physiological fruit drop
- Impacts of feeding depend on when in fruit development infestation occurred and how heavy the mealybug population is

2

LIFE CYCLE & POPULATION DEVELOPMENT

- Varies by host and temperature
- Development time varies from 14-21 days
- Unmated females produce approximately 400 eggs in a lifetime
- Mated females produce approximately 1000 eggs in a lifetime



Population monitoring is underway in 8 commercial groves in central Florida. In all sites, populations increase concurrent with the start of fruit set. Fruit damaged at this point of development are likely to be lost or severely damaged from mealybug feeding

3

Damage to fruit

Damage to leaves & stems

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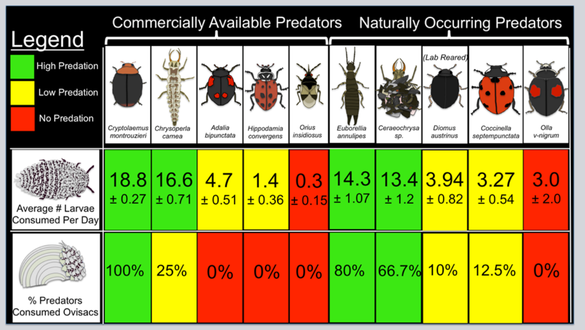
ONGOING RESEARCH MANAGEMENT

- Early season management is key for protecting developing fruit
- Predatory insects and spiders are important to control lebbeck mealybug



Potential predators collected from groves and purchased commercially were screened for potential use against lebbeck mealybug. Several predators from this suite show promise for use as biological controls in an integrated management program

Funding:

For more information, please contact Lauren Diepenbrock, ldiepenbrock@ufl.edu

PHYSICAL BARRIERS TO INSECT PESTS CONFER ADDITIONAL STRESS TOLERANCE

1

BENEFITS

- Healthy trees tolerate pests and pathogens better than do trees previously damaged by disease, herbivory or resource deficiency/toxicity.
- Barriers protect newly planted trees, which are less tolerant of pests and diseases than mature trees.

2

LANDSCAPE FABRIC TO PREVENT WEEVIL ENTRY INTO SOIL

This flatwoods site was severely damaged by *Diaprepes* root weevil and replanted on landscape fabric in 2020.

Results

- No need for tree resets to date
- Additional weevil control unnecessary
- Herbicides unnecessary, even if middles are allowed to grow (supporting beneficial arthropods)
- Fabric increases water use efficiency and stimulates tree growth, even in the absence of pests

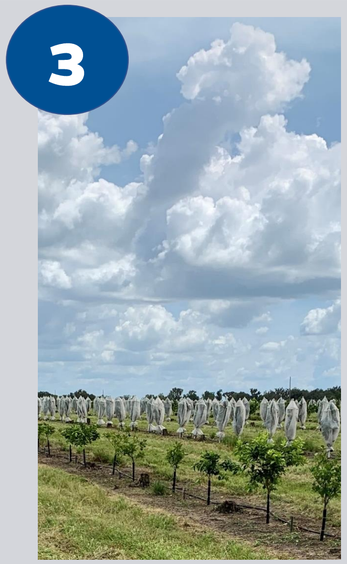
3

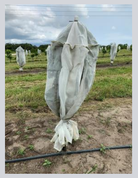
IPCs PREVENT WEEVILS FROM FEEDING AND LAYING EGGS IN CANOPY

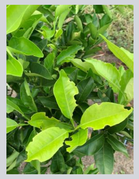
This flatwoods site was also severely damaged by weevils prior to replanting in 2019.

Results:

- IPCs prevent HLB and they prevent adult weevils from feeding and laying eggs in the tree canopy
- The individual tree photos were each taken at a distance of 6 feet, note that the tree height of covered trees is nearly twice that of bare trees.
- Note the irregular growth in uncovered tree rows compared to rows with IPCs
- Will covered trees tolerate weevil damage better than uncovered trees following IPC removal?







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IPCs PREVENT PSYLLIDS FROM CAUSING HLB IN YOUNG TREES

The site above is infested with sting nematode (*Belonolaimus longicaudatus*) and all uncovered trees have HLB. The grove was planted in fall 2017; some heavily damaged roots were removed and replanted in summer 2019.

An upcoming research project will determine if:

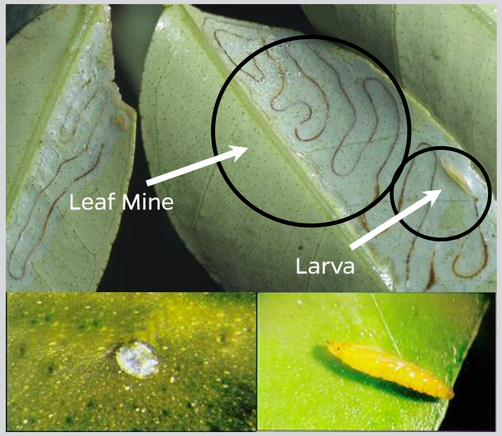
- Sting nematodes reduce tree growth as much on covered as on uncovered trees
- Nematode management increases growth of covered trees more than that of uncovered trees
- Covered trees tolerate nematodes better when the covers are removed (due to better health and larger size)
- Covered trees respond to nematode management better following removal of the covers

Funding:

For more information, please contact Larry Duncan, lwduncan@ufl.edu

MANAGEMENT OF CITRUS LEAFMINER

1 CITRUS LEAFMINER FIELD IDENTIFICATION

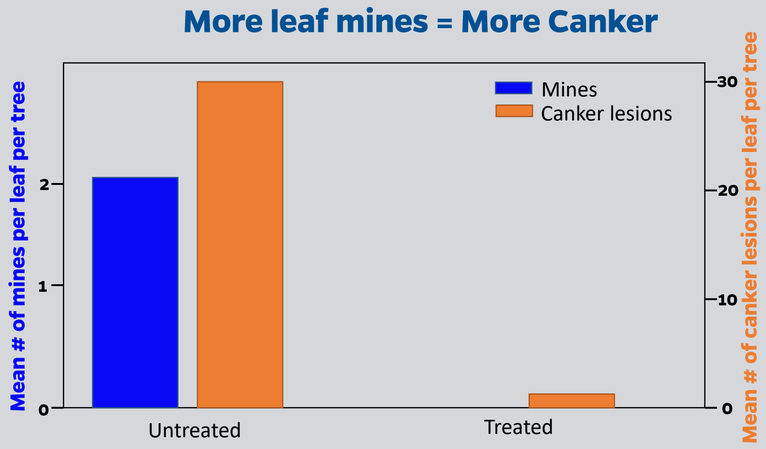


Transparent and ovoid-shaped egg

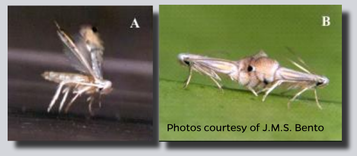
Pupa

2 DAMAGE AND RELATIONSHIP WITH CANKER

- Damage heaviest during flush
- Direct damage greatest to young trees
- Reduced photosynthesis, tree growth
- Mines provide entry for pathogens



3 CLM PHEROMONE



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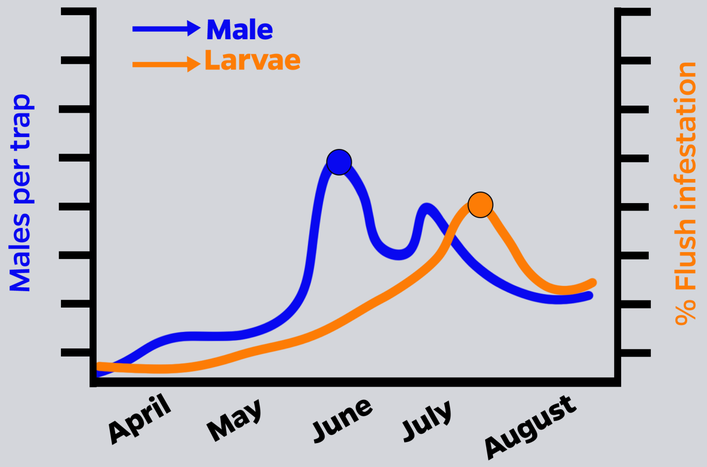
Rubber septum releases pheromone just like live female

Insert rubber septum into sticky trap. Males fly to and are caught in trap

4 RELATIONSHIP BETWEEN ADULT FLIGHT AND LEAF INFESTATION

Peak larval infestation of leaf flush occurs 3-4 weeks after peak male capture in traps

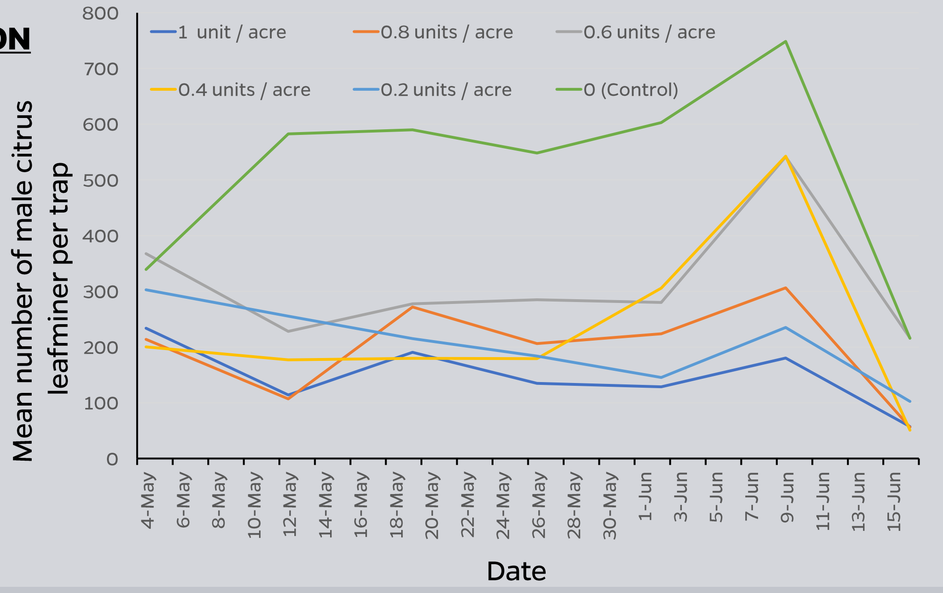


5 PUFFERS FOR MATING DISRUPTION

New technology evaluated in 2021 for management with mating disruption:

- Deployed at low unit density/acre
- Fully automated “Puffers” spray pheromone and remain active season long (April – October)
- Set it and forget it approach

Representative image of an Isomate “Puffer” unit deployed in Walnut



Funding: UF IFAS University of Florida; Citrus Initiative, Funded by the Florida Legislature; CRDF Citrus Research and Development Foundation, Inc.

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