

New and Emerging Pests In Landscapes and Nurseries

Crop Production Services Seminar
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There are 40 total slides.

Click on “Outline” to close left pane.

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New and Emerging Pests

Already Here in Hawaii

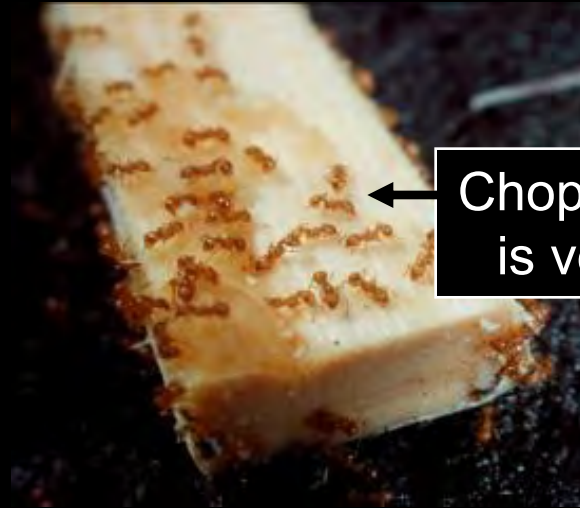
Little fire ant
Rover ant
Myoporum thrips
Chilli thrips
Western flower thrips GH
Bougainvillea looper
Coconut flower & nut mite
Protea mealybug
Protea armored scale
A scarab beetle
Pasadena masked chafer
Fiorinia armored scale
Iceplant scale

Soon to be Here in Hawaii

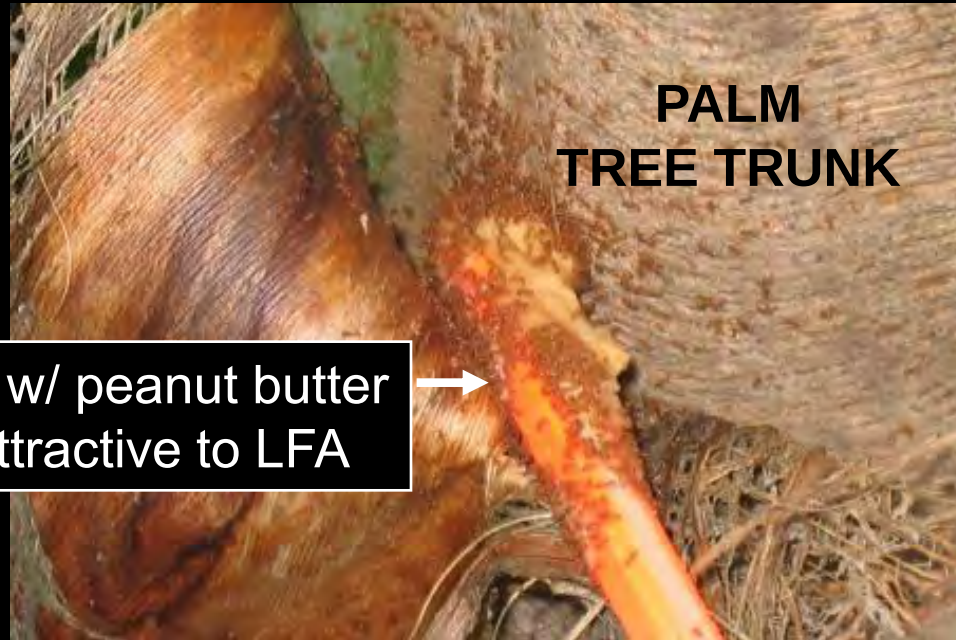
Potato psyllid
Strawberry aphid
Ginger grub
Eastern flower thrips GH
Guatemala thrips
Guatemala leafhopper
Guatemala ant
Arion slug
Palm weevils
Coconut rhinoceros beetle
Red palm mite
Ficus or Fig whitefly
Rugose whitefly
Croton scale
Sri Lanka weevil



Little fire ant (LFA) or Electric Ant



Chopstick w/ peanut butter
is very attractive to LFA



- First discovered on the Big Island in 1999 and spreading.
- Stings and tends to honeydew-producing insects.
- Nest in trees (coconut, fruit trees) with no connection to ground.
- An inter-island, inter-state and international quarantine pest.
- **Eventually will spread throughout the Hawaiian Islands.**

Little fire ant (LFA) infestation at an anthurium nursery

Infested peanut butter stick one hour after placement in an anthurium shadehouse.



LFA foraging on spadix & flowers were intercepted by PQ inspectors on Maui.



Applying bait insecticides with blower.



LFA infestations discovered in ferns growing above on shade cloth.



- The rover ant's, *Brachymyrmex obscurior*, mating flights have been a seasonal nuisance throughout Hawaii for the past several years.
- Mating flights usually occur from May to August.
- Colonies are formed under turf in soil, bases of trees, in leaf litter, wood piles, mulch etc.
- Attracted to honeydew and extra floral nectaries.
- Requires relatively high moisture.
- Alates or wing adults are attracted to light.



worker

Brachymyrmex nest with pupae

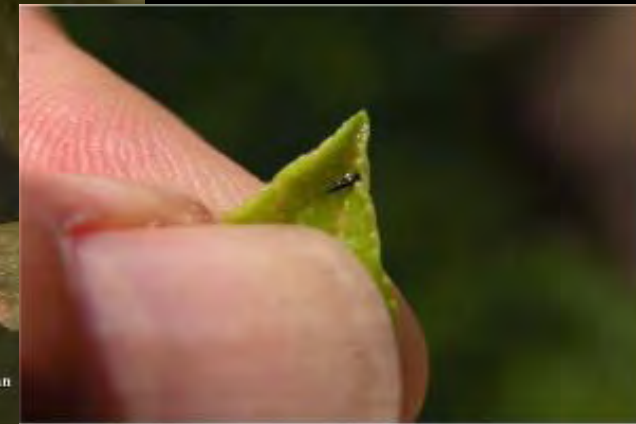


Alate or winged male

Myoporum thrips

Klambothrips myopori

- First reported in March 2009 at Waikoloa Village by G. Nakashima
- First observed in 2008 by landscapers
- First described in CA in 2007
- Specific to *Myoporum* spp. or naio, false sandalwood



Dead *Myoporum laetum* plants killed by Myoporum Thrips in San Diego



Scirtothrips sp. another thrips attacking Naio Papa

- High population of *Scirtothrips* sp. observed on naio papa at Maunalani Point causing bronzing, stunting, thickening, and deformed, curled leaves, but with minimal galling (04/16/09).
- Previously, plants were infested with galling myoporum thrips.





Chilli thrips, *Scirtothrips dorsalis*, is a polyphagous species with more than 100 recorded hosts from about 40 different families, including peppers, and roses. In Oahu since 1987, it has been reported on African daisy, cucumber, joyweed, false heather.

Distribution: Widespread across Asia, South Africa, Pakistan, India, Bangladesh, Sri Lanka, Thailand, Malaya, Indonesia, New Guinea, Solomon Islands, Australia, Taiwan, Japan, Hawaii, Venezuela, Caribbean Islands
Florida, Texas (Probably spreading in the world through the horticultural trade).

Bronzing *Scirtothrips* sp. versus Galling *Myoporum* Thrips



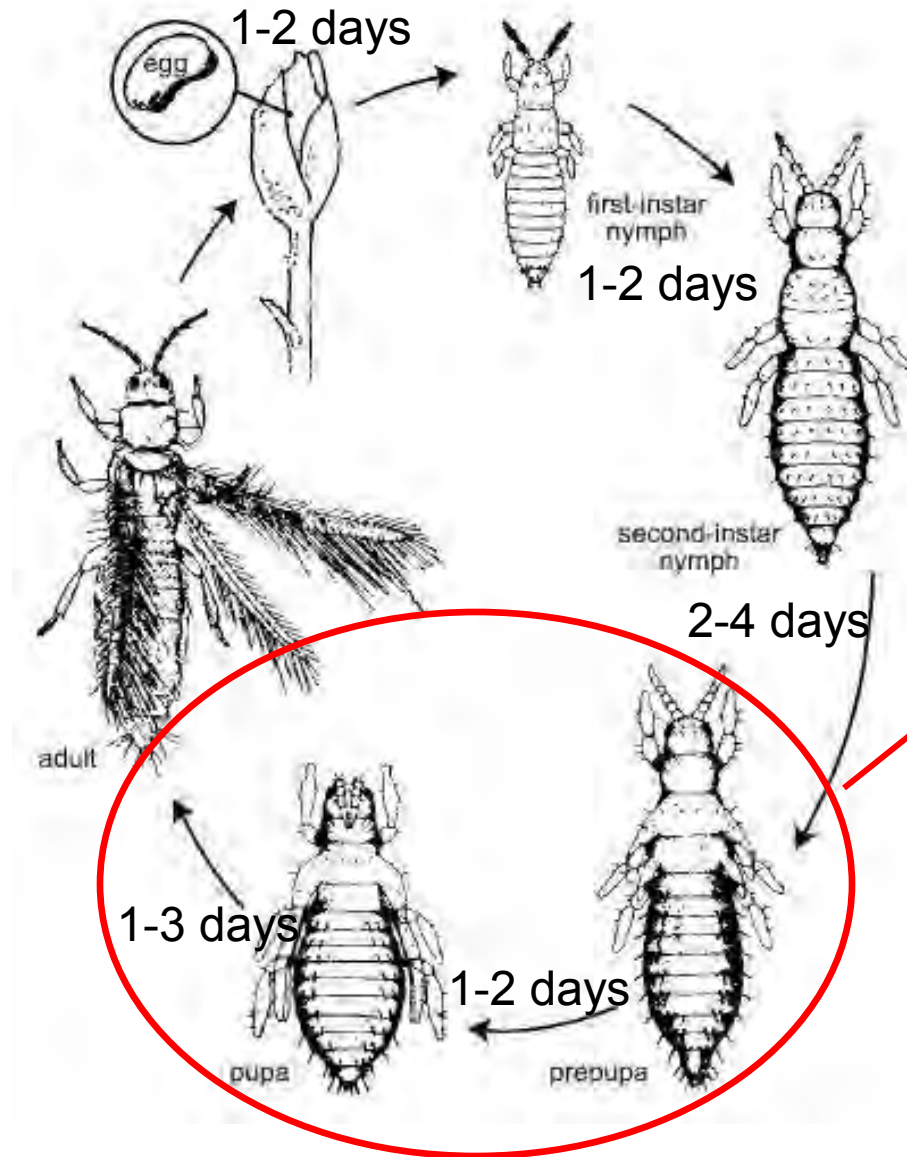
- Western Flower Thrips, Glasshouse Strain (GH) damage to dendrobium blossoms.
- Resistant to insecticides including Avid and Conserve.



Life Cycle of Thrips (7 to 14 days)

Eggs inserted
in plant tissue
(150-300 eggs
per female)

Adults are
characterized by
wings fringed with
hair-like setae.
Life span =
30 to 45 days



Adult and nymphs
occur on flowers or
foliage.

Prepupa and pupa
occur in the media
below the plant.

COUNTY OF LOS ANGELES
DEPARTMENT OF AGRICULTURAL COMMISSIONER/WEIGHTS AND MEASURES

Bougainvillea Looper (*Disclisioprocta stellata*)

Other common name: Sombre Carpet Moth

Distribution: Neotropical species introduced into many parts of the world. In the Western hemisphere: from Canada to Brazil. Found also in Africa and islands of the Indian Ocean. In the U.S.: southeastern states, HI and CA.

Hosts: Recorded on *Bougainvillea*, *Amaranthus*, *Boerhaavia*, *Mirabilis*, and *Pisonia*.

Damage: Larvae feed on foliage, producing deep notching cuts or consuming the entire leaf except the larger veins. During heavy infestations larvae may defoliate and kill younger plants.

Field ID: Adults with 25-33 mm wingspan. Wings mainly dark brown with black and tan wavy bands. Nocturnal moths.

Larvae (full grown) about 25-30 mm long. Locomotion with a characteristic looping gait. Young larvae are greenish with some rusty brown; later instars are more rusty brown.

Pupae around 11-13 mm long, mostly dark brown. Terminal segment armed with a pair of hooks.



Larva

Photo by G. Arakelian

November, 2007



Adult

Photo by G. Arakelian



Pupa



Photo by G. Arakelian



Photo by G. Arakelian

Feeding damage on Bougainvillea

Coconut flower and nut mite

Aceria guerreronis

- First discovered in Hawaii in 1991 on Maui.
- First described in Mexico and occurs throughout the tropics.
- Feeding causes scarring and distortion of the fruits and may cause premature fruit drop.
- It is one of the worst arthropod pests of coconut palm.



**A mealybug, *Delottococcus confusus* infesting
King protea, *Protea cynaroides*, Kula, Maui, HI.**

- *First discovered in CA in Nov. 2006 on *Leucadendron argenteum* tree and soon after in Hawaii (2009).
- *Infestations also on mink protea in Kula, HI.
- *Infested flowers are unmarketable due to sooty mold and feeding damage to bracts.
- *Mealybug destroyer, *Cryptolaemus*, observed under bracts with mealybug infestations.
- *Control strategies: Control ants & systemic insecticides:

Safari, Kontos, Tri-Star, Discus as a drench, bark, or foliar (Kontos) application for mealybugs

sooty mold and ants

Egg sac

feeding damage

09/01/11

New Armored Scale Pest on Protea

Pseudaulacaspis brimblecombei

- First recorded at the Kula Research Station, Maui, (2000) on *Telopea speciosissima*.
- Described as a new species in Williams (1973) on macadamia from Queensland and New South Wales.
- Numerous interceptions of *P. brimblecombei* on protea shipments to California



Heavily infested
Telopea speciosissima



Arnold Hara, Dick Tsuda, David Oka, and
Pam Shingaki UH-CTAHR October 2011

A scarab beetle, *Termnorhynchus retusus* (Scarabaeidae: Dynastinae: Pentodontini)

- First reported from Mauna Lani 08/08/07.
- Adults and grubs taken from seashore paspalum.
- Native to East Africa, and also occurs in Australia.
- Adults feed on grasses and are weakly attracted to light.
- Hypothesized that the species was transported from South Africa to Australia in soil used as ship's ballast prior to the 1940's.
- Grubs or larvae are large C-shaped that are associated with sandy soil, where they feed on roots of grasses and other garden plants (Jameson et al. 2009, PHES 41:25-30).
- Development along the Kona and Kohala coastlines has seen increasing in materials from Southeast Asia and Africa could have provided pathway for introduction (Jameson et al. 2009).



Pasadena masked chafer,

Cyclocephala pasadenae

Sacrabaeidae: Dynastinae: Cyclocephalini

- First reported April 12, 2007 by tourist whose apartment. in Waikoloa near a golf course was being swarmed by beetles.
- Golf course staff reported adult beetles were caught as far back as the mid-1990's.
- Staff also reported birds digging into turf for white grubs causing more damage than the grubs.
- Grubs were also used for fish bait.
- Native to continental U.S., abundant in southwestern U.S.
- Among the most destructive masked chafers in the Midwest, Ohio Valley and west coast of U.S.
- In high numbers, grubs cause damage to turf grasses, pastures, and crops due to feeding on roots.
- Adults are nocturnal and attracted to light traps.
- This species could have been transported to Hawaii in turfgrass as grubs or adults, or as adults hitchhiking on ships and attracted to lights at night on docks or piers (Jameson et al. 2009)

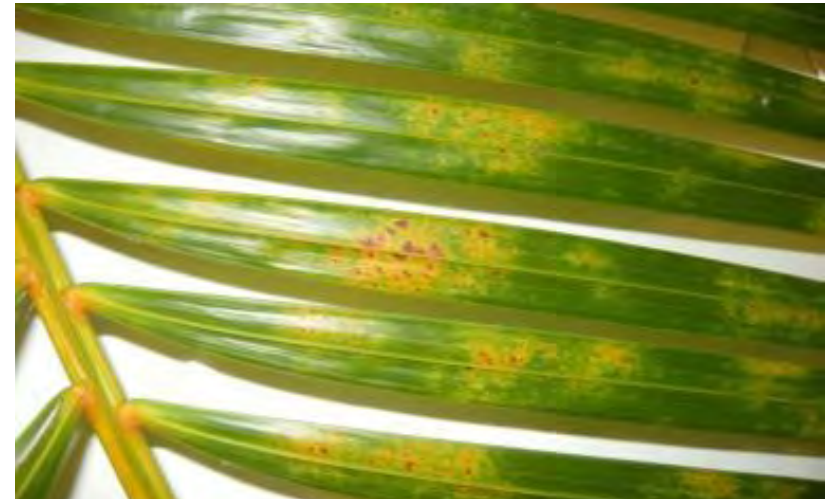


0.5 inch in length

New Armored Scale on Palms and Ornamental Plants in Hawaii

Fiorinia phantasma (Hemiptera: Diaspididae)

- First discovered in Hawaii in Dec 2004 on Japanese privet on Oahu; previously, only reported from Philippines.
- Also found on various palms, including coconut palms and traveler's palm, kamani, *Ficus benjamina*, *Cassia* sp., naio (myoporum), pandanus, heliconia, mock orange, Madagascar olive.
- Reported as a serious pest on areca palms in the landscape in Wailea/Kihei, Maui (Sept 2011).
- Natural enemies not identified yet. Scale insect is totally encased in their cast skin "shell" providing protection.
- Horticultural oils should be effective against crawler stages. Systemic insecticides (e.g. Safari) and insect growth regulators (e.g., Distance, Talus) may be effective.



Damage on upper leaf surface of areca

Female – yellow
w/red stripes



females

males



Infestation on lower leaf surface

Janis Garcia, HDOA
Arnold Hara, UH-CTAHR
October 2011

Iceplant scale

Pulvinariella mesembryanthemi

- First discovered at Kohala Ranch in 2012 on mini iceplant, *Lamprantus roseus*.
- Related to akulikuli. *L. glomeratus*.
- Major pests of iceplant in the landscape in California.
- In California, scale was successfully controlled by parasitoids.



Highly Probable Invaders to Hawaii

Based on :

- Frequent interceptions (foreign & states) in Hawaii.
- Occurrence in high numbers in other subtropical and tropical areas of the world.
- Pests found on imported crops to Hawaii cannot be controlled in exporting state or country because of resistance to pesticides.

Hawaii Department of Agriculture Plant Quarantine Branch

- Kahului Airport Risk Assessment project inspects 100% of all produce, plants & flowers.
- **Organic produce has the highest rate of pest interception.**
- Pests resistant to insecticides in producing state or country are constantly intercepted.



Potato psyllid on bell peppers collected for data processing; shipment confiscated.



Caterpillars and aphids found on cabbage.

Potato psyllid

Bactericera cockerelli (Homoptera: Psyllidae)

- The most highly rejected commodity was peppers caused by the potato psyllid
- Countless number of infested peppers was frozen before disposal.
- In Mexico and California and resistant to commonly used pesticides.



Potato psyllid, *Bactericera cockerelli*



The potato psyllid is a polyphagous, phloem-feeding insect pest that is economically detrimental to cultivated solanaceous crops (eggplant, potato, tomato and pepper) in western and southern U.S.

State of Hawaii
Department of Agriculture
PLANT QUARANTINE BRANCH
1649 Aiea Street, Honolulu HI 96819
OAHU - Airport (808) 837-8413 Mailroom (808) 832-0586
MAUI - Airport (808) 472-3848 Mailroom (808) 873-3556
HIL - Airport (808) 874-4141 KONA - Airport (808) 326-1077
KAUAI - (808) 274-3089

Date: 9/9/10

AWQ Tracking No.
C10-3624

NOTICE OF NON-COMPLIANCE

The commodity described below was introduced in Hawaii by UPL in contravention of Chapter 150A, Hawaii Revised Statutes and Chapter _____, Hawaii Administrative Rules of the Division of Plant Industry, Department of Agriculture.

The prohibited commodity has been removed.
The prohibited material has been released.
Carton(s)/Piece(s) have to be have been returned to the place of origin.
(No.) _____

REJECTION/VIOLATION NOTICE TO FOLLOW.

COMMODITY 2 cases green belts selected up for testing / 6 cases strawberries selected up for test

SHIPPER UPL ADDRESS _____ IMPORTER UPL ADDRESS _____

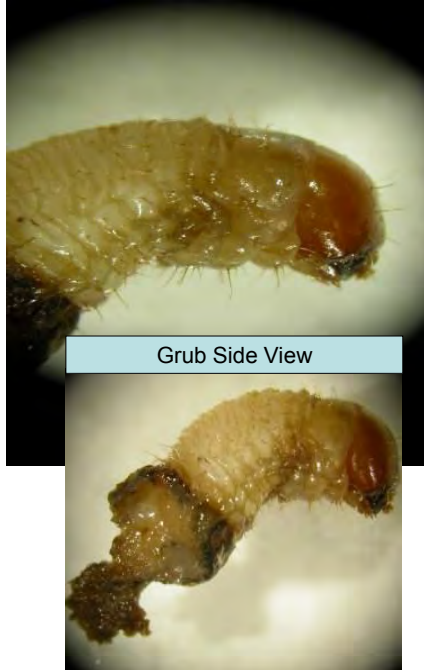
REMARKS Final Inspection

Plant Quarantine Inspector _____ 9/9/10 2010/09/09
(Date)

Chaetosiphon sp. on strawberries



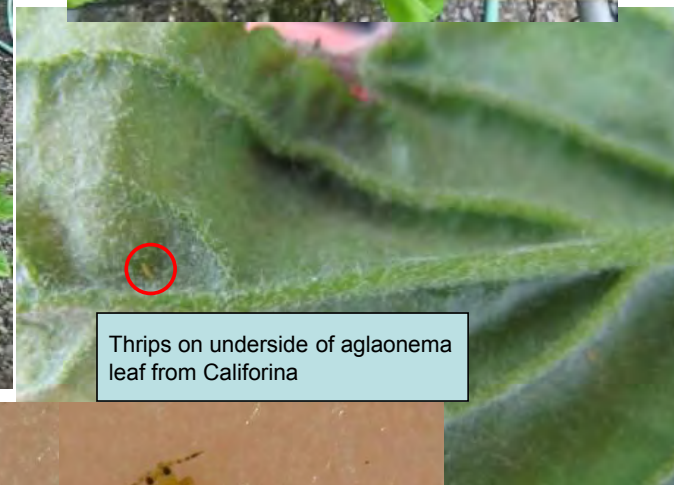
- Edible ginger at Safeway in Hilo purchased by my wife infested with an unidentified grub imported from Brazil.
- In addition, the grub probably died from an entomopathogenic nematode infection.
- Foreign imports that are arriving via domestic air cargo to Hawaii are high risk.
- Foreign imports regulated by Customs and Border Patrol, Dept. of Homeland Security since 9/11.



Thrips from California discovered at a nursery in Hilo, Hawaii

Gerbera Daisies Infested with Thrips

288 cell packs (72 plants per pack) from Ball Tagawa Growers in Arroyo Grande, CA to a Panaewa Nursery in Hilo, Hawaii. 6/16/10



Thrips on underside of aglaonema leaf from California

Thrips on flowering gerbera daisy 6/16/10

UC Farm Advisor states "they have a problem right now due to the harvesting of strawberries next door. The species may be related to the strawberries." Tentative ID by D. Tsuda, UH-CTAHR, *Frankliniella tritici*, the eastern flower thrips, a pest of strawberries.

Feeding Damage on flower petals



Thrips collected from flowering gerbera daisy 6/16/10



Aglaonema Cuttings From Guatemala via Florida
Received at a Panaewa Nursery in Hilo, HI 6/16/10



Dorsal view



Thrips on Aglaonema Cuttings



Ventral view



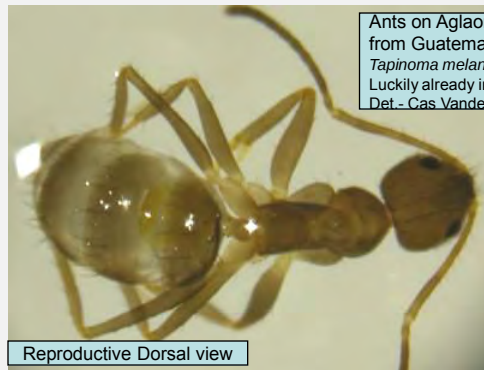
Pupae on Aglaonema Cuttings
Origin: Guatemala



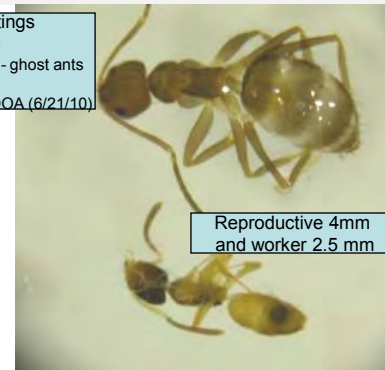
Parasitic wasps emerged from leafhopper eggs found on aglaonema cuttings

Leafhopper eggs were
intercepted on aglaomea
cuttings on 06/16/10 and wasps
emerged from eggs on
06/28/10.

Ants on Aglaonema Cuttings
from Guatemala 6/16/10
Tapinoma melanocephalum - ghost ants
Likely already in Hawaii
Det. - Cas Vandenwoude, HDOA (6/21/10)



Reproductive Dorsal view



Reproductive 4mm
and worker 2.5 mm



Reproductive Ventral view



Worker Lateral View

Emergence: 6/28/10



Ventral view



Dorsal view



Dorsal view



Eyes & Mandibles

Arion sp. slug intercepted on Christmas trees
from Oregon in 2010 and 2011





Douglas Fir trees 14 days after hot shower treatment at 118 F for 8 min. No significant heat damage observed.

Approx. 5,000 trees treated with hot shower at 118 F to kill slugs

Monitoring Site of Coconut Trees at Kahului Airport for Most Unwanted Beetle & mite pests in Hawaii



red palm mite,
Raoiella indica



coconut rhinoceros beetle
Oryctes rhinoceros



red palm weevil
Rhynchophorus ferrugineus



giant **palm** weevil
Rhynchophorus palmarum

Rugose Spiraling Whitefly, *Aleurodicus rugioperculatus*

Gumbo Limbo Spiraling Whitefly

- First reported in Florida in 2009 on gumbo limbo, palms, especially coconut, avocado, black olive, mango and kamani.
- Similar in appearance to the spiraling whitefly, *A. dispersus* in Hawaii.
- Originated from Central America.
- First described in 2004 in Belize.



Rugose Spiraling Whitefly



Fig or Ficus Whitefly, *Singhiella simplex*

- First reported in Florida in 2007 on *Ficus benjamina*
- Attacks species of *Ficus*
- Reported as a pest of *Ficus* sp. in India
- Also occurs in Burma and China





Ficus Whitefly damage



Photo: Eastern Exterminating

Lobate lac scale

Paratachardina pseudolobata

- First reported in Florida on a hibiscus in August 1999.
- Occurs also in Bahamas and Christmas Island
- Produces honeydew, on which sooty mold establishes
- Host range of over 307 species of woody plants, including Fabaceae (Acacia), Malvaceae (Hibiscus) Moraceae (Ficus), Myrtaceae (Eugenia, guava), rose, gardenia, Phoenix palm.
- Belongs to the lac scale family from which shellac is produced.
- Potential Expansion in Distribution:

“The potential for further spread of this scale is especially high for warm areas into which there is a significant movement of living plants e.g., from Florida to Puerto Rico, and other localities of the Caribbean Region, California and HAWAII (Howard et al. 2002).”



2008

Croton Scale

Phalacrocooccus howertoni

- New to science
- Numerous hosts;
many native plants
in Florida
- Similar to
Philephedra
species
- Does not produce
an ovisac



<http://www.freshfromflorida.com/pi/pest-alerts/coccoidea-coccidae.html>

Croton Scale Damage

- Plant decline; leaf drop
- Excessive amount of honeydew and sooty mold



Photo: C. Mannion, UF/IFAS



Photo: D. Caldwell, UF/IFAS ; Collier Co. Ext.

Photos: G. Hodges, DPI/FDOACS

Sri Lanka Weevil

Myloccerus undatus

- First reported in Florida in 2000
- Native to Sri Lanka
- Adults are about ¼ inch long, whitish-gray, and are foliage feeders.
- In Florida host records included at least 66 tropical fruit trees (lychee, mango), palms, various ornamental plants, and citrus.
- Larvae are root feeders and are very difficult to detect.
- Larvae pupate in the soil.



The Reality

- Many more new invasive species will arrive in Hawaii.
- Once a new species is discovered in Hawaii, eradication is almost impossible.
- Exclusion and very early detection is the only effective strategies to prevent the invasion of pest species.
- Use of pesticides will increase in Hawaii because of these newly established invasive species.

A BIG THANK YOU!

For assistance:

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