Quarantine Issues for HI & CA and the Systems Approach

17th Hawaii MIDPAC Horticultural Conference
July 26, 2012

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There are 32 total slides.
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Use navigational buttons at the bottom of the slide
OR
Click on “Slide Show” at bottom right, then click on each slide
to advance or right-click mouse to back up to previous slide or
close slide show.
Issues To Be Covered:

* All Hawaii Shipments to CA are considered High Risk
* Major Causes of Pest Interceptions
* Stricter CDFA Policy April 01, 2011
* Biology & Control of Armored Scales, Ants and Slugs
* Coqui frog as a quarantine pest in CA
* Control of Coqui Frog
* Systems Approach
California Department of Food and Agriculture  
Sacramento, CA  
Division of Plant Health and Pest Prevention Services  
Interior Pest Exclusion Program

High Risk Pest Exclusion Reports
- Foreign Plant Shipments
- Hawaii
  - Florida
  - Incoming Nursery Stock 008s
  - Weekly 008 Reports NEW
  - Monthly High Risk Interception Reports
  - Monthly Nematodes Sample Results
  - Parcel Facility Locations
  - Suspended Out of State Shippers
  - Weekly A and Q Report

Hawaii Reports
- A, B, Q Weekly Reports (Hawaii Origin Nursery Stock)
- Approved Nursery Stock Shippers (QC 650)
- Weekly A & Q Interceptions on Cut Flowers, Fruits & Vegetables

CDFA is watching us like a hawk
Summary of Pest Intercepted on Hawaii-Origin Nursery Stock by California Department of Food and Agriculture

January to June 2012

Number of Interceptions

Plants: Alocasia, bromeliads, *Dracaena* spp., palms (areca, kentia, rhapis and *Veitchia*), plumeria
New CDFA Policy in Effect on April 1, 2011

* Nurseries shipping under the terms of Master Permit from Hawaii to California will be suspended from shipping under the master permit for a period of not less than 6 months for:

1. 4 or more A, B or Q rated pest rejections (List of over 2,700 species).
2. a single regulated plant parasitic nematode (reniform and burrowing)
3. a single improperly certified shipment

* Suspended Nurseries will be required to export plants under a Hawaii Dept. of Agriculture (HDOA) original phytosanitary certificate.

* CDFA will require a written report from HDOA detailing the following:

1. Actions taken to manage the pest.
2. Actions taken by HDOA as the result of the suspension.
3. Records, including HDOA inspection schedule and results and nematode sampling results if applicable.
4. Treatments performed.
Top 3 pests Causing Rejections

* Armored Scales
  - Armored vs. Soft scales
  - Hibiscus Snow scale
  - Control of Armored Scales

* Ants
  - White-footed ant
  - Little Fire Ant Control

* Slugs
  - Coqui Frog Control

* Hot water

Systems Approach to Pest Management
Scale Insects

**Armored**

- Does not produce honeydew
- Cockerell or Magnolia White Scale

**Soft**

- Produces honeydew with a symbiotic relationship with ants
- Green scale
Development of Armored Scales

Armored covering formed by cast skins and waxy secretions

Crawler to adult is about one month

Hibiscus Snow Scale
## Control of Armored Scale Insects

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Armored/Hard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oils, horticultural</td>
<td>Effective</td>
</tr>
<tr>
<td>OP and Carbamates: Dursban and Sevin</td>
<td>Crawlers only</td>
</tr>
<tr>
<td>Pyrethroids: Talstar/Decathlon</td>
<td>Crawlers only</td>
</tr>
<tr>
<td>Neonicotinoids:</td>
<td>Not effective</td>
</tr>
<tr>
<td>Marathon (imidacloprid)</td>
<td>Effective +</td>
</tr>
<tr>
<td>TriStar (acetamiprid)</td>
<td>Not effective</td>
</tr>
<tr>
<td>Safari (dinotefuran)</td>
<td>Effective</td>
</tr>
<tr>
<td>Insect Growth Regulators (IGRs):</td>
<td></td>
</tr>
<tr>
<td>Distance (JH mimic)</td>
<td>Effective +</td>
</tr>
<tr>
<td>Talus (Chitin inhibitor)</td>
<td>Effective</td>
</tr>
</tbody>
</table>

* Hot water dip of Dracaena cuttings at 120 F for 6 min will eliminate armored scales (Only limiting factor: promotes *Erwinia* infection in cutbacks)

* Start clean and you will remain clean to market.
Control of Hibiscus Snow Scale on Dracaena Cuttings with Systemic Insecticide Dips

Kontos = spirotetramat    Safari = dinotefuran

Efficacy of Kontos and Safari 20 SG Dips to Control Snow Scale on JC Compacta

- Number of Pots with live Snow Scales

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pretrt</th>
<th>6 wat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Kontos</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Safari</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>
White-footed ant (WFT), *Technomyrmex difficilis* (=*albipes*)

* Does not bite or sting.
* Feeds on plant nectars and honeydew, but will also feed on insects and other protein.
* Foragers do not share food directly with nest mates but through the production of non-viable trophic eggs by workers.
* Although bait toxicants are not orally transferred between workers, they can still kill enough workers to cause death of brood by starvation.
* Liquid bait insecticides containing borates and sugar has been effective.
* Pyrethroids, such as bifenthrin (Talstar), formulated as granules is partially effective as a barrier treatment.
* Liquid residual insecticides have not shown effectiveness (Univ. of Florida)
Active Ingredients:
1.00% Hydramethylnon, similar AI to Amdro & Probait

Mode of Action: Disrupts energy metabolism.

Maxforce Complete granules contain a bait matrix combining sugars, proteins (including silk worm pupae), fats and oils, which accommodate insects' changing nutritional needs.

Ants (Acrobat, Argentine, Big Headed, Carpenter, Cornfield, Field, imported and native Fire, Ghost, Harvester, Odorous House, Pavement, Pharaoh, Thief)

Maxforce® Complete Brand Granular Insect Bait is a ready-to-use product for use indoors and outdoors and around buildings, on lawns, and other non-crop areas (including school yards, playgrounds, golf courses, and ornamental nurseries).
Little Fire Ant

1 Hour after placement

Control (Peanut Butter)  Maxforce Complete  Probait

2 Hours after placement

Control (Peanut Butter)  Maxforce Complete  Probait
Little Fire Ant attracted to peanut butter, Maxforce and Probait (hydramethylnon)
LITTLE FIRE ANT CONTROL

* Maxforce Compete, Probait/Amdro (hydramethylnon) & Extinguish Plus (hydramethylnon + methoprene, insect growth regulator) are most effective.
* Esteem (pyriproxyfen, IGR) is labeled for tropical fruit crops.
* Aerial colonies in trees are difficult to control (bait must be in trees)
* Tango (methoprene) mixed with vegetable oil and xanthan gum (emulsifier and thickener) can be applied in trees (Vanderwoude).
* Talstar granular and liquid effective as a residual contact/barrier treatment.
* Termidor (fipronil, PCO only) for building perimeter is effective.

Untreated

Extinguish Plus
(0.365% hydramethylnon & 0.25% S-methoprene)

Nest Activity 7 WAT
Attractiveness of peanut butter, Probait, Extinguish Plus & Extinguish Professional to LFA

Peanut butter

Probait 0.73% hydramethylnon

Extinguish Plus
0.36% hydramethylnon + 0.25% methoprene

Extinguish Professional
0.50% methoprene
Efficacy of Ant Baits on Little Fire Ant colonies

Worker Ant Mortality (%)

Weeks After Treatment

- Indoxacarb PB (0.18\% indoxacarb)
- Indoxacarb CG (Advion) (0.22\% indoxacarb)
- Extinguish Professional (0.5\% S-methoprene)
- Extinguish Plus (0.365\% hydramethylnon + 0.25\% S-methoprene)
- Probait (0.73\% hydramethylnon)
Incorporating Talstar G (bifenthrin) into media for little fire ant and root mealybug control.

Potting plants with Talstar incorporated in media. Treatment was very effective.
Bifenthrin was applied as root zone drenches using Ortho Max (1.5oz/gal) and Talstar Flowable (2.5ml/gal @ media bulk density of 381) to 20 fishtail palms per treatment growing in 4 inch pots and infested with little fire ants.
Hot Water Against Little Fire Ant (LFA)

- Workers of LFA were effectively killed at 113 F for 10 min.
- Drenching potted palms at 114 F for 11 min was effective against LFA.
- A tank-less gas water heater and pump provided the hot water drench.

Hot water dip tank

Screened dish with over 300 ants dipped in hot water
Live Little Fire Ants Recovered After Hot Water Drench of Potted Palm Plants at 114 °F for 11 min

* Little fire ants reduced by 99.3 and 89.3% in rhapis and fishtail, respectively.
Biology & Control of Slugs

* Adults are hermaphroditic (possess both male and female sex organs).
* After mating both may lay eggs.
* Egg mass average about 50 eggs, and hatch in 14-30 days.
* Copper and copper hydroxide is known to be repellent and toxic to snails and slugs.
* Snails and slugs are effectively controlled with bait and metaldehyde as the toxicant (Deadline, Metarex), Slugfest?
* Other sprays, Imidan (OP) and Mesurol 75WP (RUP) should be effective.
Coqui Frogs Intercepted on Plant Shipments from Hawaii

The purpose of this advisory is to inform county inspectors of CDFA’s procedural policy for coqui frogs (*Eleutherodactylus coqui*).

Inspectors should carefully inspect all Hawaiian plant material for coqui frog life stages:

**County inspectors will reject infested shipment** under the California Fish and Game Commission’s *[Wild Animal Policy](#)* which makes it illegal to import, transport, or possess coqui frog in California without a permit.

*Under the Wild Animal Policy, coqui frogs have been designated as "detrimental animals" to our native wildlife and are prohibited entry into California.*

**Disposition of Infested Shipment:**
1. Treatment: Accepts Citric acid (but can’t be used in CA?) & hot water treatments
2. Return Out of State (Rate is 3-4X back to HI)
3. Destruction
Coqui eggs intercepted in CA were **DEAD** from hot shower

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**Oct 22, 2010** via e-mail
From: *Ronnie Eaton, Deputy Agricultural Commissioner, Alameda County*

*Please note that my photos verify that the eggs in this shipment were not treated, as evidenced by the photos of treated vs. untreated eggs in your photos. *(Incorrect!)*

*They were found between two leaves of Dracaena that were stuck together, mainly by the mucus of the egg cluster.*

*This is a problem that we have seen for many pests; when leaves are naturally or un-naturally ‘stuck’ together, pests can escape treatment.*

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**LIVE EGGS =**
*Blood circulating*
*Not opaque*
Stage 4 to 6 Eggs: Embryos develop eye bulges, limb buds; by 6 DO blood can be seen circulating; embryo has tail.

Control – 6 DO Viable light pink embryos 1 DAT (7 DO)

Control – 6 DO embryos 3 DAT become gray; heart beat can be seen. (9 DO)

Control – 6 DO embryos 5 DAT have visible heart beat. (11 DO)

Treated Eggs - 1 DAT: embryos become pale; blood no longer circulating (7 DO)

Treated Eggs – 3 DAT: embryos remain pale, no heart beat; egg becomes cloudy (9 DO)

Treated Eggs – 5 DAT: no heart beat; egg is tan colored, more opaque; mold visible on egg (11 DO)
Hot shower Chamber for Commercial Use by Plant Nurseries

Refrigerated freight container (24 ft) modified to deliver 109° to 113° F water through 110 FullJet hollow cone nozzles at 70 gpm.

80 plants in one load

113 F for 5 min kills coqui frogs

110 full cone nozzles
Hot Shower Against Coqui Frogs on Out-of-State Dracaena and Palms Shipments

* In 2011, over 38,500 palms and Dracaena were treated in 1,200 chamber loads.

* Over 1,550 dead coquis were found in the chamber and filters.
The systems approach combines field pest management practices and an inspection/postharvest treatment into a unified system to produce pest-free products.

The systems approach is based on the fact that field control measures, such as chemical control, can reduce pest populations to a level at which a postharvest treatment (e.g., hot water dip or chemical dip) is 100% effective against quarantine pests.
The Systems Approach for Floricultural Crops

**Identify & Monitor**
- Pest Complex

**Integrated Field Pest Management**

**Biological Control**
- Cultural Control

**Chemical Control**
- Physical Control

**Inspection & Treatments**
- Before Market
  - Heat Treatments
    - Hot water dip, hot water shower, hot air, vapor heat
  - Insecticidal dip
    - Irradiation
    - Other safe fumigants?

**Pest-Free Products**
- for Export

Green!
July 25, 2008
To: All Hawaii Department of Agriculture Certified Nurseries,
From: Kevin Horiuchi
Nursery Specialist
HDOA PQ

Effective immediately, all Hawaii Department of Agriculture (HDOA) certified nurseries that have all or any of the four major quarantine pests (Coqui Frog, Nettle Caterpillar, Little Fire Ant, and Light Brown Apple Moth) on their nursery premise will be required to develop and implement a Pest Management Plan (PMP) to eradicate and or control these four major quarantine pests. The PMP must address how the nursery will control and or eradicate the quarantine pest(s) in their certified nursery areas.
# Systems Approach to Coqui Frog Management

<table>
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<tr>
<th>Options Available</th>
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| **Monitoring Techniques** | 1. Evening hrs for calling males using digital recorders.  
2. PCV traps (not effective if numerous coqui habitats (debris, stacked pots, etc.) |
| **Select Best Control Method** | 1. Habitat Modification - Clear surrounding and interior of greenhouse of frog retreat and nesting sites.  
2. Install screen barrier.  
3. Hot water “sprench” (120 F hot water heater temp.)  
4. Sprench with pyrethrins plus PBO or citric acid (8%) based on weekly monitoring for frogs. |
| **Treatment Before Market** | Hot water shower at 109 F to 113 F for 5 min. |
| **Final Inspection** | 1. Evening hrs for calling males using digital recorders.  
2. Visual inspection for frogs and eggs in cryptic areas. |
Summary

* Shipments from Hawaii are considered high-risk in California and are closely monitored.
* Armored scales, ants and slugs are the top 3 causes of shipment rejections from Hawaii.
* Coqui frog is considered a quarantine pest in CA.
* The systems approach combines field pest management and treatments before harvest to produce pest-free products.
* Monitoring techniques, best control methods, post-harvest treatments and final inspection techniques are being developed for major Q pests under a Farm Bill grant from HDOA.