

Insect and Frog Pest Control

11th Hawaii MIDPAC Conference
October 19, 2006
Hawaii Export Nursery Association

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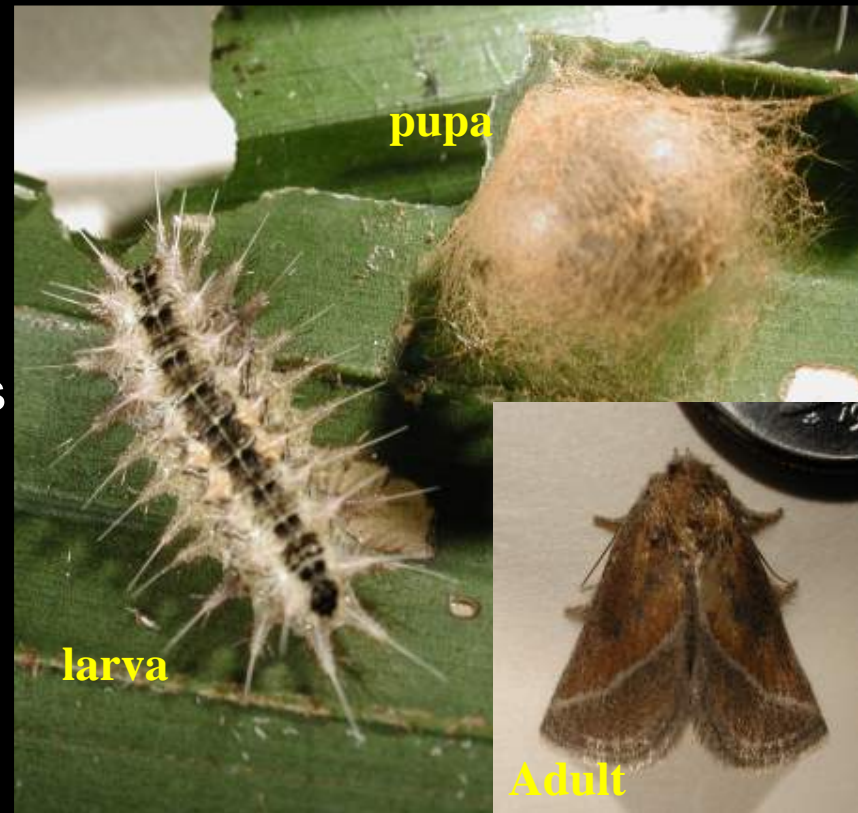
Recent Quarantine Pest Issues:

- *Nettle Caterpillar – Interisland and California
- *Hibiscus Snow Scale – California
- *Little Fire Ant – Interisland, also California
- *Coqui frog – Interisland, Guam
- *For 2007?

Nettle caterpillar, *Darna pallivitta*

Lepidoptera: Limacodidae

- *First noticed on rhaps palm in Hilo, HI in Sept 2001 by nursery workers who were stung by the caterpillar's stinging spines.
- *Current infestations detected only on the Big Island.
- *Also found in Taiwan, China, Thailand, Malaysia, Indonesia & Java.
- *Hosts in Hawaii include: palms (fishtail, phoenix, areca) coconut, Dracaena, ti-leaf.
- *Attempt was made to eradicate the original infestation by chemical insecticides applied by the nursery.
- *An effective natural enemy has been discovered in Taiwan and presently in the quarantine insectary in Hawaii.
- *Approval for release of this parasitic wasp should be soon.



*Pupal Stage has been found in potted plants by quarantine inspectors in California.

*Pupation sites are in media or older leaf axils:

Media



Leaf axils



*The pupal stage is the most resistance stage to insecticides and heat treatments.

*120 F for 12 min is required to kill pupae.

Insecticides Against the Nettle Caterpillar (Tested at labeled rates)

<u>Brand Name</u>	<u>Common Name</u>	<u>Class</u>	<u>Days to >95% mortality*</u>
Decathlon	cyfluthrin	pyrethroid	3
Dursban	chlorpyrifos	organophosphate	3
Conserve**	spinosad	spinosyn	14
Dipel**	<i>Bacillus thuringiensis</i>	microbial	14
Sevin**	carbaryl	carbamate	14

* Moribund caterpillars stops feeding but brushing against spines will cause sting.

**Reduced-risk insecticides and Sevin took longer to kill caterpillars.

Scale Insects

Armored

Soft

Covering formed by cast skins of earlier instars and secretions



No covering over scale insect



Hibiscus Snow Scale, *Pinnaspis strachani*

- * Aka lesser snow scale was a major cause of shipment rejection in California on foliage plants.
- * An armored scale with elongated male preadult.
- * About one month to complete life cycle.



Preadult or pupa encased in armor produced by their previous body shell and secretions.



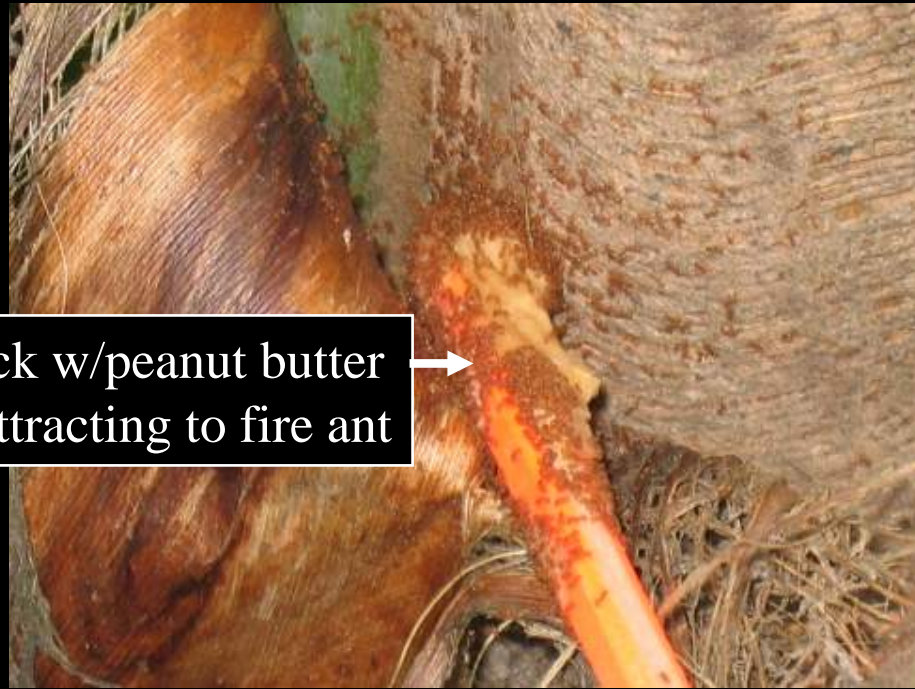
Control of Scale Insects

Insecticide	Armored/Hard	Soft
Oils, horticultural	Effective	Effective
Pyrethroids: Talstar/Decathlon	Not effective	Effective
Neonicotinoids: Merit/Marathon TriStar Safari	Not effective Not effective Effective	Effective Effective Effective
Insect Growth Regulators (IGRs): Distance	Effective	Not effective
Talus	Effective	Effective

Little fire ant (LFA) or Electric ant



Chopstick w/peanut butter
is very attracting to fire ant



- *An inter-island and inter-state quarantine pest.
- *Only effective treatment is Amdro bait insecticide.
- *Quarantine treatments are presently being evaluated:
 - Talstar granular
 - Hot water drench
 - Talstar drench
 - Precise (Orthene) G

Incorporating
Talstar G into
media for fire
ant control



Potting plants with
Talstar incorporated
in media.

Test in Progress



Hot water dip tank

Hot Water Dip Against LFA



Screened dish with with
over 300 ants for testing

- * Workers of LFA was effectively killed at 113 F (45 C) for 10 min.
- * Test is needed using hot water drench on ant nest in potted pots.

Coqui Frog Controls

1. Chemical

Citric acid

Hydrated Lime

Pyrethrins

2. Non-Chemical

Heat

Physical Barrier

Electric Fence

Research in collaboration with:

Mr. Kyle Onuma, HDOA

Mr. Brian Bushe, UH-CTAHR

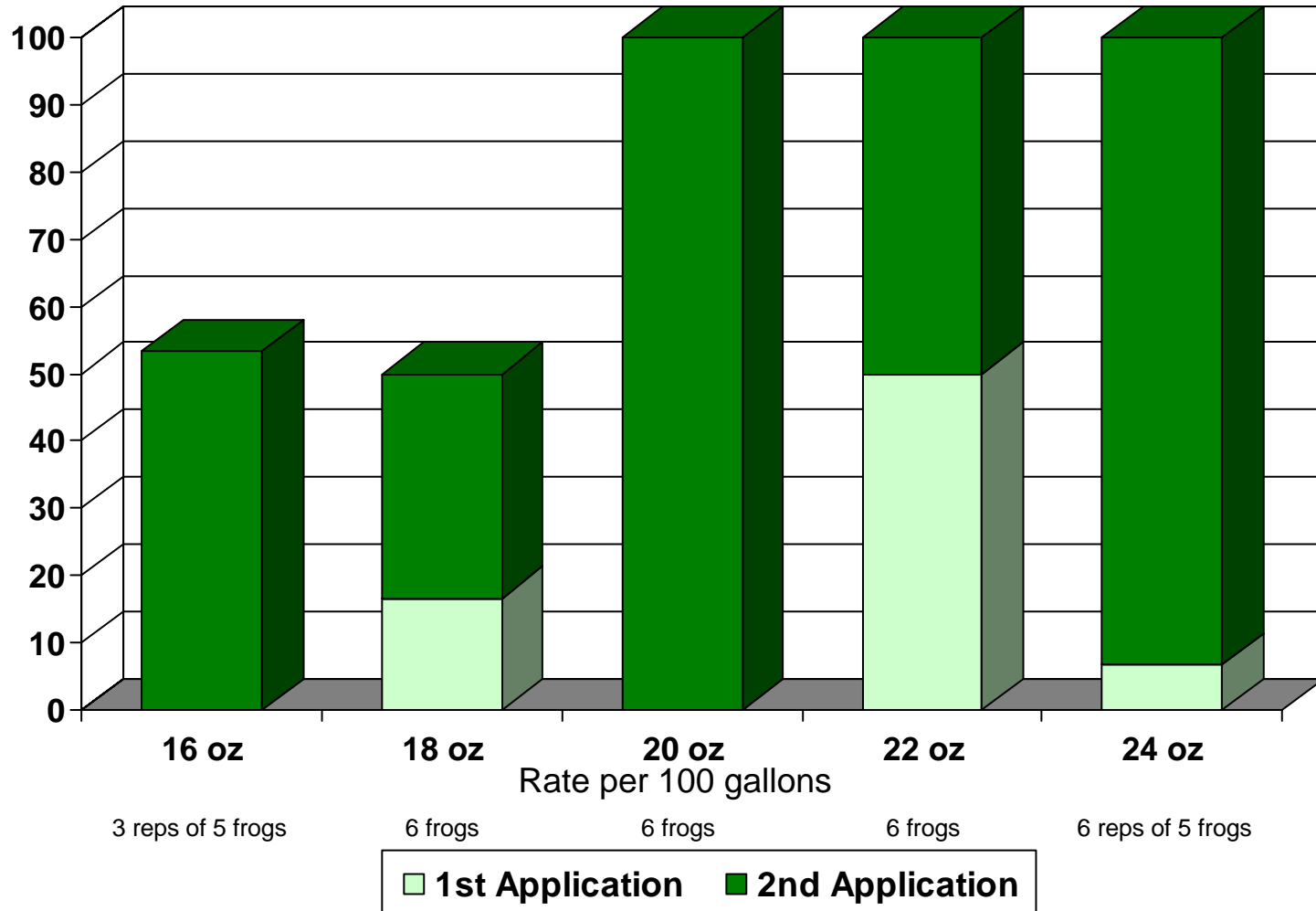
Citric acid, Hydrated Lime, Pyrethrins, Cold & Hot Water Against Coqui Frogs

Treatment	Kill Eggs	Kill Adults	Safe on Orchids
Citric Acid – 16%	yes	yes	no yes w/rinse
Hydrated Lime – 3%	yes	yes	yes heavy residue
Pyrethrin-24oz/100gal	no	1 appl- paralysis 2 appl- death	yes
Pyrethrin-24oz/100gal + citric acid-8%	yes	yes	yes? yes w/rinse
Hot Water 113° F, 5 m	yes	yes	yes/no
Cold 36-38° F for 6 h	no	no	no

EFFICACY OF PYRETHRINS ON COQUI FROGS

PYRETH-IT (6% pyrethrins: 60% piperonyl butoxide (1:10))
(Pyrenone, Pyronyl)

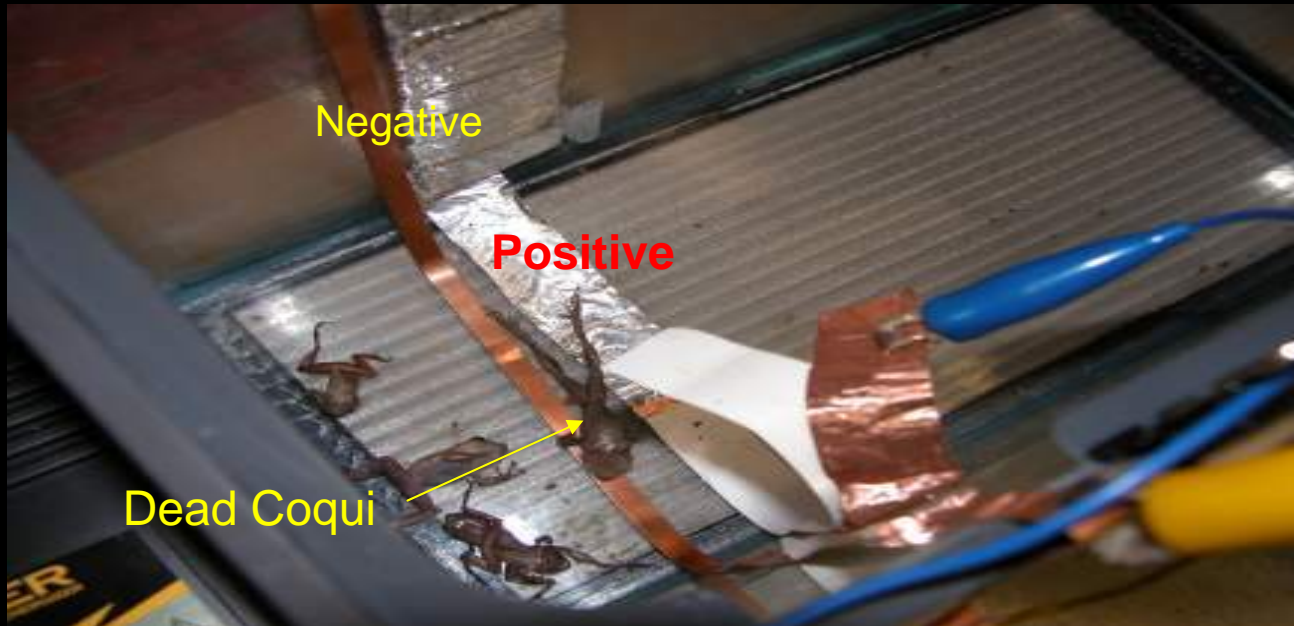
Mortality of coqui frogs 12 hr after 2nd application

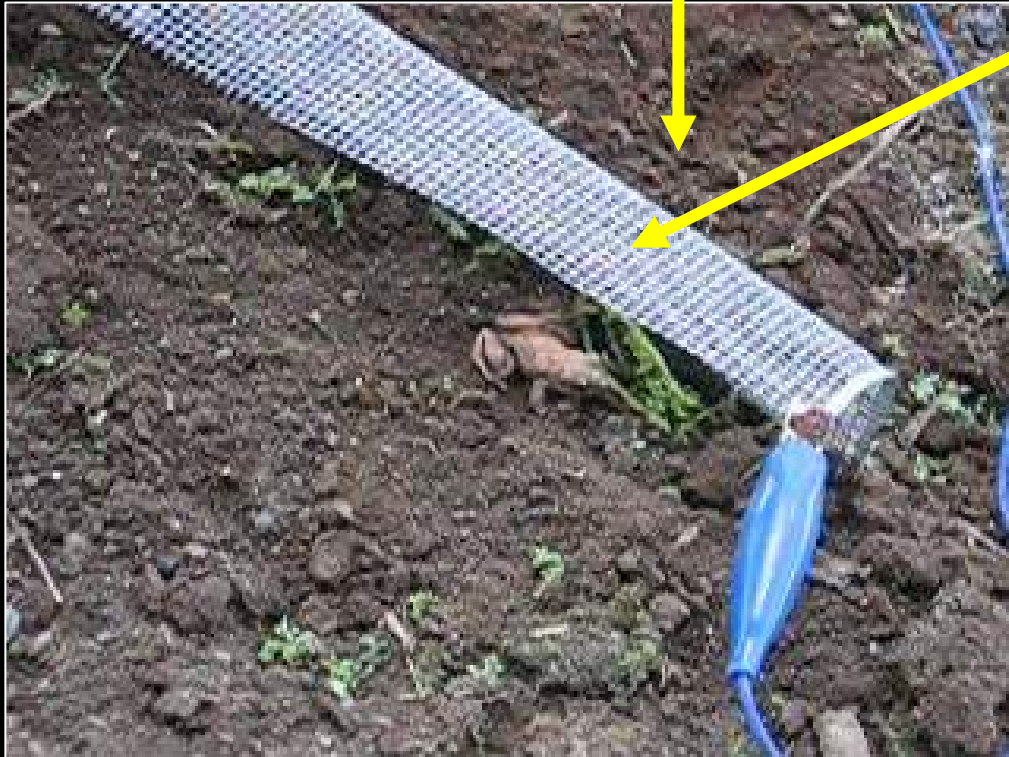
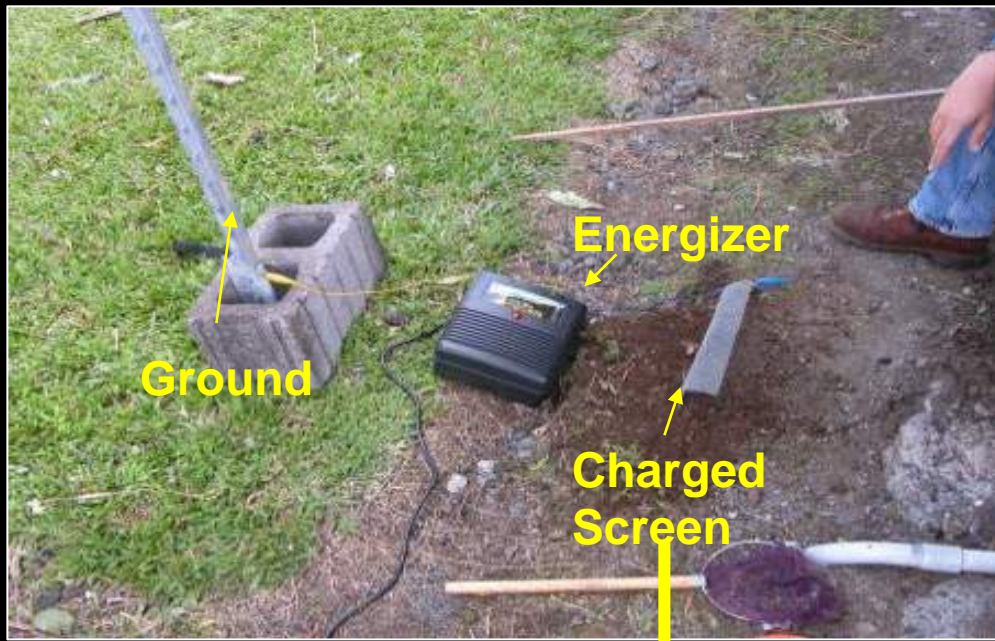


(12 h between applications)

Exclusion of Coqui Frogs by Electric Fence?

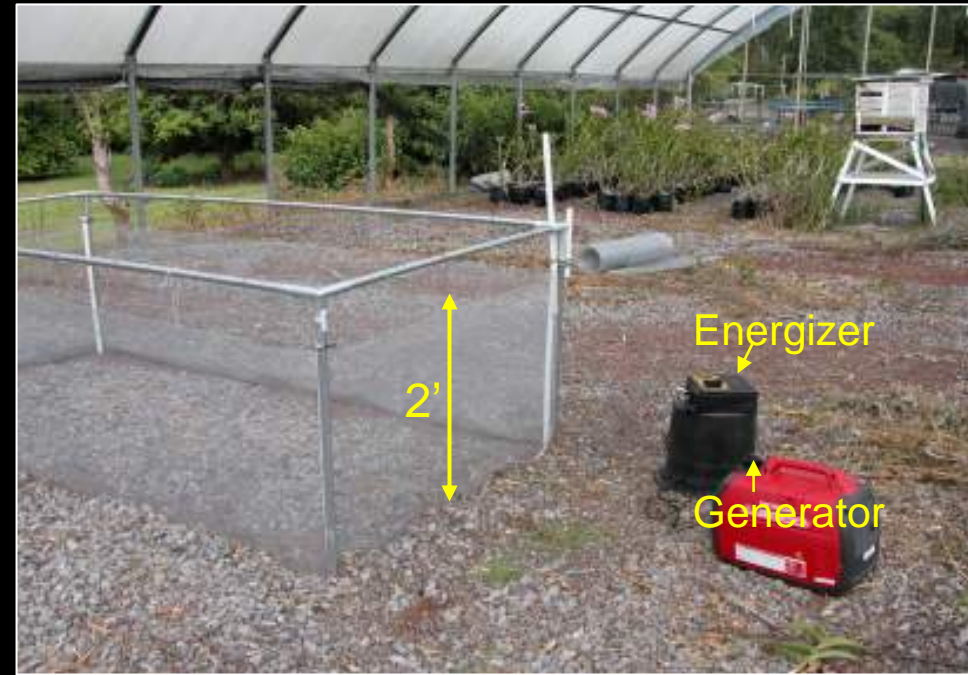
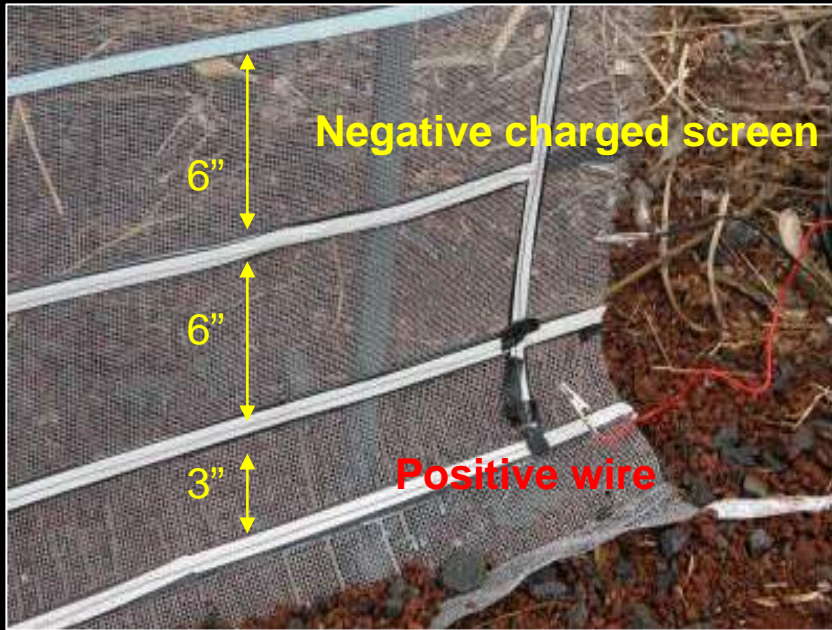
- *Dr. Max Goldberg, Physicist, HCEOOC, demonstrated the potential of delivering lethal electrical shock to coqui frogs.
- *Design an electric fence that could exclude coqui frogs.
- *Low impedance transformer for electric fences against large animals was used.
- *Major issue was coqui frogs is not grounded when climbing fence.





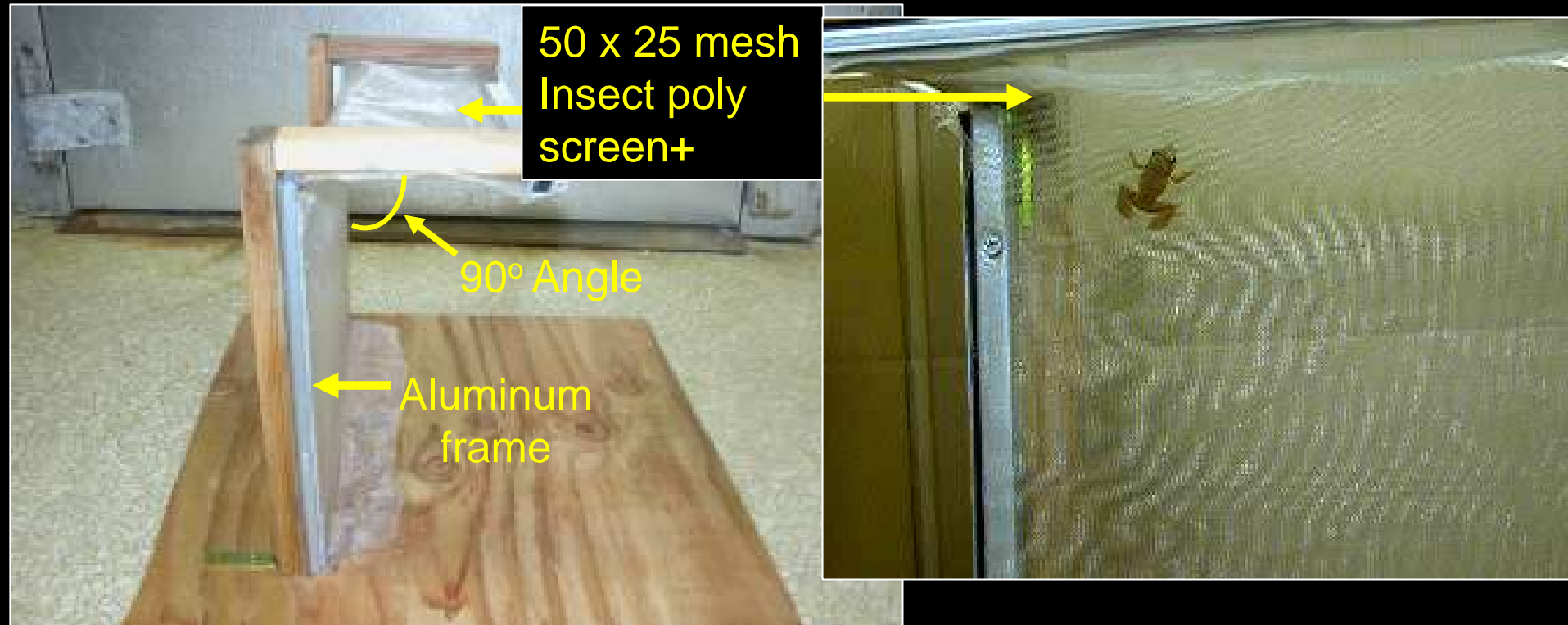
*Coqui frogs are affected by electric pulsing field.

Designing an Electric Fence for Coqui Frogs



- *Major design issue is insulation between negative screen and positive wire.
- *Water caused shorting.

Physical Barrier for Coqui Frog Exclusion



- *Credit to **Mr. Kyle Onuma**, HDOA for this invention.
- *Frogs can't hang on horizontal screen against gravity.
- *Test will be conducted by surrounding a greenhouse with this physical anti-gravity frog barrier.

Commercial Hot Shower System at Leilani Nursery Waimanalo, Hawaii



**Open House at Leilani Nursery on October 25, 2006
10 AM - 6:30 PM Kaulukuanu St. Waimanalo**

Effective Coqui Frog Controls? Star Bulletin Thinks So!



A BIG THANK YOU!

For assistance:

Darsen Aoki

Pete Ballerini

Brian Bushe

Pat Conant

Stacey Chun

Christopher Jacobsen

Ruth Niino-Duponte

Reggie Hasegawa

Clyde Hirayama

Donn Kansako

Andrew Kawabata

Ken Ogawa

Kyle Onuma

Erik Ouchi

Kelvin Sewake

Marcel Tsang