

First International Conference on the Coqui Frog

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Presentation Outline

- Definitions
- General background on invasive species
- Focus on Florida
- Invasive Cuban Treefrog (CTF)
 - Ecology
 - Impacts
 - Management

Some Definitions

- **Nonindigenous/introduced** (many other terms used as well) species are those moved by human mechanisms to areas outside of their native range
- **Invasive species** are organisms, including their seeds, eggs, spores, or other biological material capable of propagating that species, that are not native to the ecosystem in which they are found; and whose introduction does or is likely to cause **economic** or **environmental harm** or harm to **human quality of life**.

Invasive species are a serious problem!

- Interactions with introduced species ranked among top causes of species endangerment in the US (Czech and Krausman 1997)
- Introduced predators have accounted for about half of island bird extinctions (Diamond 1989)
- Approx. 25% of species in Hawaii are invasive (Miller and Eldridge 1996)
- An estimated 3,000 species are transported globally in ballast water each day (McNeely 2001)
- Economic damages in the US associated with invasive species is estimated to be in excess of \$120 billion/year (Pimentel et al. 2004)

Examples of Invasive Species Globally



Red Imported Fire Ant



Rainbow Trout



Zebra Mussel



Asian Tiger Mosquito



Black Rat



Cane Toad

Direct effects of invasive species on natives

- Pathogens and disease
- Predation
- Competition
- Major Habitat Modification
- Hybridization



Indirect effects and synergy of invasive species

- Indirect Effects
- Synergy



So how do they invade?

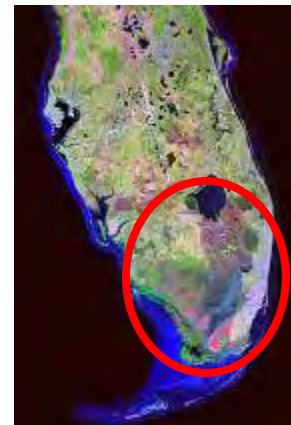
- Human mediated movement
- Intentional vs. Accidental Introductions
 - Intentional introductions (some examples)
 - These include species imported for: agriculture uses, ornamental plant trade, pet trade, hunting/fishing industry, industrial uses
 - Accidental introductions (some examples)
 - Species that are transported unintentionally with cargo, crops, ornamental plants, in ballast water, on cars/airplanes

Getting established



- Some attributes of invasive species
 - Good dispersal abilities
 - Long growth periods and life spans
 - Lack natural predators/parasites/pathogens
 - Broad range of physiological tolerance
 - Affinity for disturbed areas
 - Habitat generalists
 - Prior history of invasion elsewhere

Florida's unique situation



- Florida is among the top 3 states in the US with regard to numbers of introduced and invasive species
- A lot of disturbed and human modified habitats
- The southern half of the peninsula is surrounded by water on three sides and a frost line to the north
- A moderate climate
- Booming ornamental horticulture and pet trades
- Miami/Tampa are major ports of entry and Florida is hub for tourism
- Florida has an abundance of lakes and wetlands

Nonindigenous vertebrates in Florida

- Birds: ~200 species documented in the state
 - About 15 established and breeding species
- Mammals: ~30 species documented
 - About 15 established and breeding species
- Fish: ~100 species documented
 - About 35 established and breeding species
- Reptiles: ~50 species documented
 - About 40 established and breeding species
- Amphibians: ~ 5 species documented
 - Three established and breeding species
- *Data from FWC website, FLMNH, pers. observations, colleagues*



Examples of Invasive Animals in Florida



Introduced and Invasive Amphibians



Greenhouse Frog



Coqui



Cane Toad



Cuban Treefrog

The Invasive Cuban Treefrog in Florida: Ecology, Impacts and Management





Cuban Treefrog Background

Native to Cuba, Isle of Pines, Bahamas, Cayman Islands

First confirmed in Key West in late 1920's (Barbour, 1931)

Believed to have invaded Florida via cargo ships from Cuba

Until 1945 they appeared to be absent from mainland FL

By mid-1970s they had dispersed throughout south FL

Today they occur throughout the peninsula



Cuban Treefrog Background

Breeding populations as far north as Cedar Key,
Gainesville, Jacksonville

Recent records from the panhandle (Gadsden & Franklin Cos.)

Recent records from coastal GA, SC, AL, TX

Isolated records in other parts of US and Canada





Cuban Treefrog Identification

Family Hylidae—Expanded toe pads, excellent climbers

Have a bug-eyed appearance

Rough, often warty skin

Skin fused to skull in individuals >1.5 in.

Juveniles with blue-green bones, reddish eyes, light lateral stripe

Colors and patterns highly variable in adults



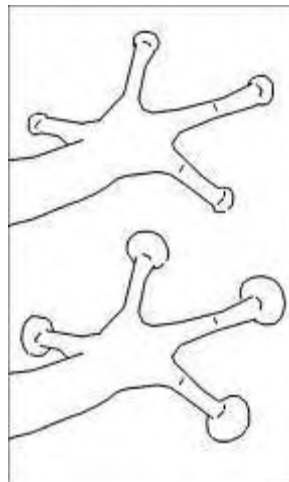


Cuban Treefrog Identification

Variable colors: brown, beige, white, green

May or may not be patterned

Yellow wash in groin and armpits





Cuban Treefrog Identification

Large adults—most often to 3-4 in.

Treefrog species	SVL in inches
Cuban Treefrog	F 6.5 / M 3.3
Barking Treefrog	2.75
Green Treefrog	2.5
Grey Treefrog	2.4
Pinewoods Treefrog	1.75
Squirrel Treefrog	1.6





Cuban Treefrog Ecology

Found in urban and suburban settings

Also invade a diversity of native habitats

Dispersed inadvertently by people: cars, ornamental plants, boats, trailers, etc.

Breed in small bodies of water





Impacts of CTFs—Ecological

Voracious predators of native species, especially treefrogs

Most commonly encountered treefrog in central and southern FL in residential settings

CTF tadpole superior competitors to two native frog tadpoles in lab experiments (Smith 2005)

Potential for competition of adult CTFs with native species





Cuban Treefrog Ecology

Wekiva Springs State Park Study

- CTFs at a diversity of food items (22 orders)
- 3 anurans; > 500 arthropods
 - anurans included 1 CTF, 2 unidentified
 - mostly beetles, roaches, spiders (67% of all items)
- Larger frogs ate a greater diversity of items (including frogs)
- Some seasonal differences in diet

Predation observed

Competition possible

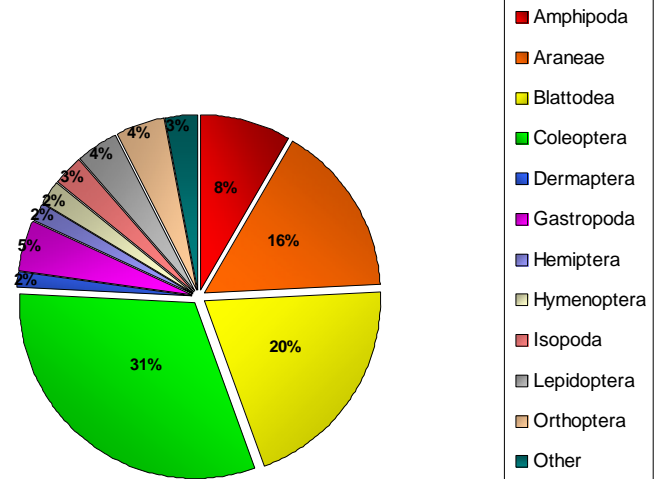
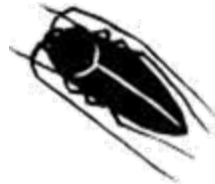
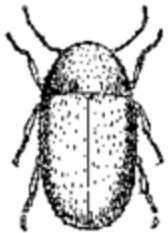


Figure 2. Diet composition of Cuban Treefrogs from Wekiva Springs State Park



Impacts of CTFs—Quality of Life

Breeding choruses can be annoying

Breed in ornamental ponds and swimming pools

Get into homes (toilets & sinks) and vehicles

Noxious skin secretions

Defecate on houses

Invade bird boxes





Impacts of CTFs—Economic

Invade electrical utility equipment

Cause short circuits and power interruption

Financial loss to utility companies





CTF Management

Capture and euthanize Cuban Treefrogs

Capturing CTFs: grab with gloves or plastic bags; use PVC pipe refugia, cover standpipes with wire mesh

Get rid of tadpoles

Eliminate breeding sites





CTF Management



Native Squirrel TF



- Suggestions for pipes
- Use 1.5 inch pipe
- Thin-walled PVC(not sch. 40)
- Cut 3 ft. sections
- Insert 2-4 inches into ground



'Plunge' Cuban Treefrogs into bag



CTF Management

Euthanizing Cuban Treefrogs

Anesthetics (benzocaine, lidocaine), freezing

Wash your hands after handling these frogs





CTF Management

Experimental test of animal deterrent—“Sniff-n-Stop”

Phil Landers—IFOAM Specialty Products Corp.

Multinomial logistic regression: all treatments significantly deterred CTFs

Residential and commercial applications

Useful for deterring Coquis (I have samples) ?????





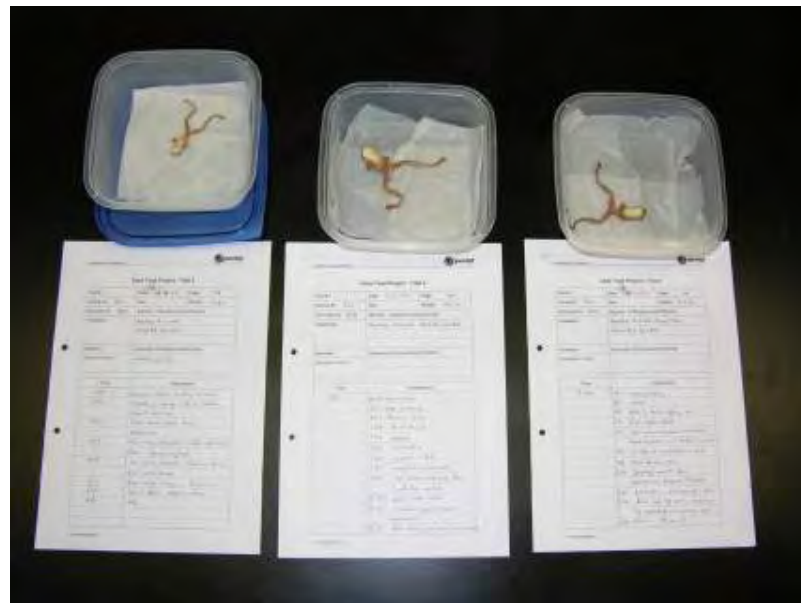
CTF Management

Lethal spray being developed by Pestat Ltd. for Cane Toads

Effective on CTFs

Residential application

David Dall will provide details on this product on Saturday





Final Comments

Keep a look out for CTFs in Hawaii!!!

Shipment of electronics from Florida to Hawaii
in 2004/05 had Cuban Treefrogs

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Visit my website: <http://ufwildlife.ifas.ufl.edu/>

CTF fact sheet: <http://edis.ifas.ufl.edu/UW259>