

The Invasion of Florida: a Sentinel High-Risk State



Pesticide Review Council

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Florida Department of Agriculture and Consumer Services

2012 Alachua, FL

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The People Statistics

- Over 80 million visitors in 2010
 - 11 million from Canada or overseas
- 1 in 8 Floridians are immigrants
 - 30% of annual growth
- Florida in 2009
 - 1.4 % Africa
 - 10.0% Asia
 - 10.5% Europe
 - 74.8 % Latin America
 - 3.1 % North America



Traveling Agricultural Products

People like to bring something from their original homelands or where they visited while on foreign travel

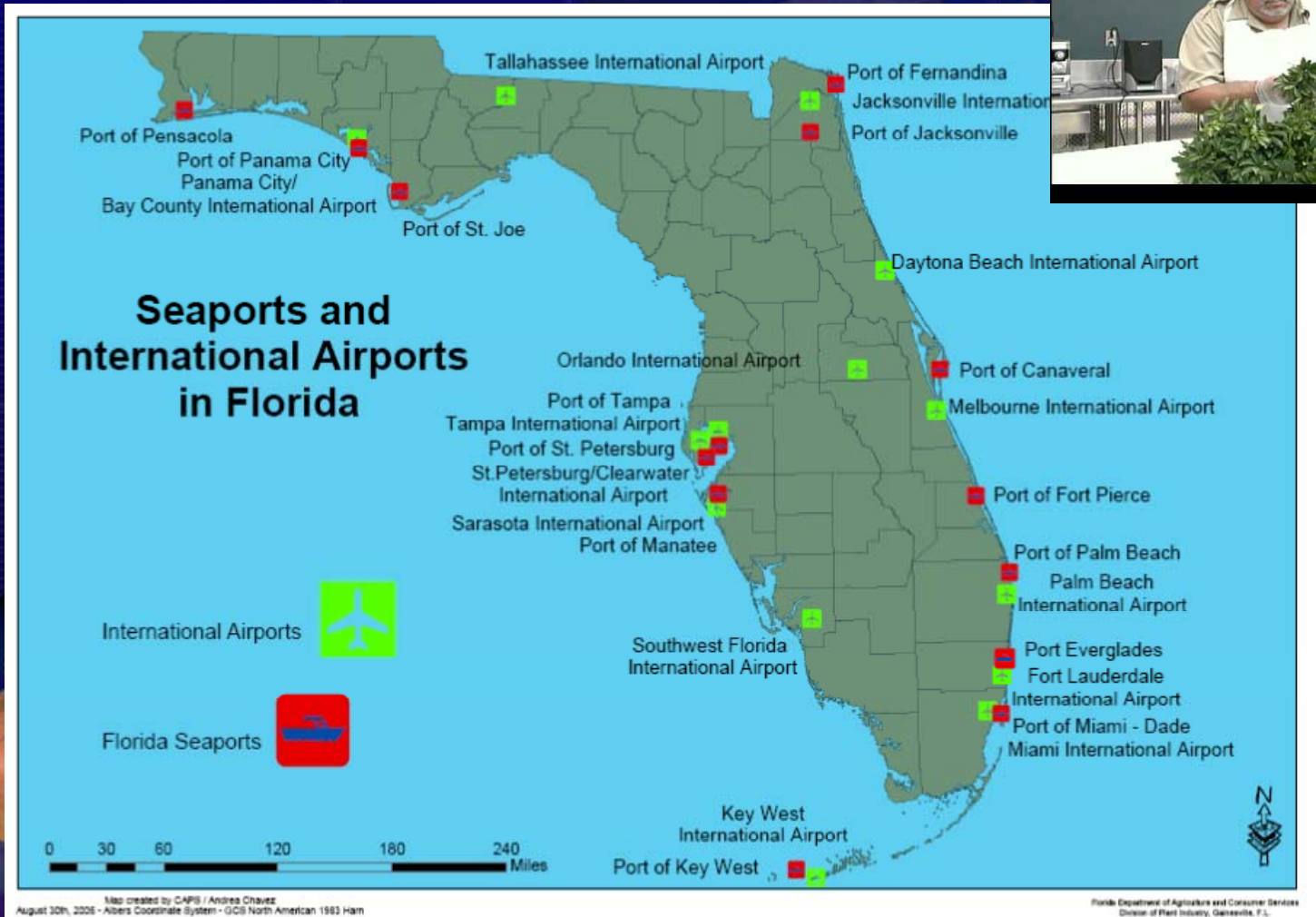


Traveling Agricultural Products

U.S. Customs and Border Protection:
contraband from
baggage at
Miami
International
Airport



Florida's Ports of Entry



Florida as the Buffet Table

Climate Diversity: Tropical, Subtropical and Temperate

Ecosystems: Uplands, flatlands, wetlands, coastal.....

Land Area: 65,755 sq. mi.

Host Area: 24 million acres – forests, cropland

47,000 commercial farms on 9 million acres

Timberlands cover 15.6 million acres

\$70 - 97 billion/yr agricultural impact

Greenhouse and nursery products cash receipts \$1.9 billion
for over 10,000 nurseries and stock dealers



Safeguarding System

- **Offshore Risk Management**
 - Int'l Services, Pre-clearance & Clean Stock Programs,
 - Risk analysis, Gathering info on pests and pathways
- **Port of Entry Measures**
 - DHS/CBP & USDA/APHIS/PPQ through MOA
- **Quarantine**
 - Permits, quarantine facilities
- **Pest Detection**
 - CAPS, Plant inspectors, NPDN, SITC, First Detectors, Master Gardener's, the General Public, others
- **Emergency Response**
 - Eradicate or mitigate?
 - Regulatory, Extension & Research and other stakeholders

Records Established Last Two Years:

Division of Plant Industry, Florida Department of Agriculture and Consumer Services

- For 2010 – 2011, Division of Plant Industry scientists identified or diagnosed
 - 5 Western Hemisphere Records
 - 21 Continental US Records
 - 26 State of Florida Records
 - 19 Significant Pest Detections/Interceptions



Month	Type of Record	Scientific name	Common name	Economic importance
2010				
January	US Continental	<i>Colpoptera</i> species	a plant hopper	Not expected to be a pest
	US Continental	<i>Septoria mikania-micranthae</i>	a fungal leaf spot	Possible biological control for <i>Mikania micrantha</i>
	US Continental	Passion fruit woodiness virus	Passion fruit woodiness virus	Pest of ornamental and fruiting passion fruit
	Florida State	<i>Hylocurus rudis</i>	a bark beetle	Not expected to be a pest
	Florida State	<i>Hylocurus binodatus</i>	a bark beetle	Not expected to be a pest
February	Florida State	<i>Corniculariella species</i>	a fungus	Potential pest of peaches
March	US Continental	<i>Guignardia citricarpa</i>	citrus black spot	Pests of citrus species including later maturing oranges, lemons, mandarins and grapefruit.
	US Continental	<i>Oxycarenus hyalinipennis</i>	cotton seed bug	Serious pest of cotton and other malvaceous plants.
	Florida State	<i>Peronospora phlogina</i>	fungal downy mildew of phlox	potential pest of phlox
	Florida State	<i>Sobarocephala dreisbachi</i>	a clusiid fly	Not a pest species
April	Significant Pest Interception	<i>Halyomorpha halys</i>	brown marmorated stink bug	Potential to be a significant pest to most agricultural crops grown in Florida.
	Hemisphere	<i>Mesalox pitangae</i>	cherry mite	Not expected to be a pest
	Hemisphere	<i>Cryptolestes atratulus</i>	a bark beetle	Not a pest species

Month	Type of Record	Scientific name	Common name	Economic importance
May	Hemisphere	<i>Strongylium cultellatum</i>	a darkling beetle	Not a pest species
	US Continental	<i>Euceropsylla martorelli</i>	a psyllid	Not expected to be a pest
	US Continental	Passion fruit mottle potyvirus	Passion fruit mottle potyvirus	Pest of ornamental and fruiting passion fruit
	Florida State	<i>Chrysobothris scitula</i>	a buprestid beetle	Not expected to be a pest
June	US Continental	<i>Paracoccus herreni</i>	lantana mealybug	Not expected to be a pest
	Florida State	<i>Odonaspis secreta</i>	a armored scale	Not expected to be a pest
	Florida State	<i>Siphoninus phillyreae</i>	ash whitefly	Pest of citrus
	Significant Pest Detection	<i>Ceratitis capitata</i>	Mediterranean fruit fly	Serious pest to citrus and many other plants
July	Florida State	<i>Dysmicoccus mcdanieli</i>	a mealybug	Not expected to be a pest
	Florida State	<i>Agrilus difficilis</i>	a buprestid beetle	Not expected to be a pest
August	Florida State	<i>Odonaspis bernardi</i>	a armored scale	Not expected to be a pest
	Florida State	<i>Heterococcus raii</i>	Rau mealybug	Not expected to be a pest
	Significant Pest Interception	<i>Bactrocera dorsalis</i>	Oriental fruit fly	Pest species; polyphagous

Month	Type of Record	Scientific name	Common name	Economic importance
September	Significant Pest Detection	<i>Halyomorpha halys</i>	brown marmorated stink bug	Potential to be a significant pest to most agricultural crops
October	US Continental	<i>Tenuipalpus uvae</i>	a false spider mite	Not expected to be a pest
	Florida State	<i>Stenotomus adenticulata</i>	a mealybug	Not expected to be a pest
	Florida State	<i>Duponchelia fovealis</i>	European pepper moth	Potential pest of container -grown nursery stock.
	Florida State	<i>Illignina illinoensis</i>	a leafhopper	Minor pest of grape
	Florida State	Japanese holly fern pterovirus	Japanese holly fern pterovirus	Potential serious pest of Japanese holly fern
	Significant Pest Detection	<i>Halyomorpha halys</i>	brown marmorated stink bug	Potential to be a significant pest to most agricultural crops
November	Florida State	<i>Elsinoe australis</i> near	sweet orange scab-like pathogen	Economic impact unknown for citrus industry
	Significant Pest Detection	<i>Bactrocera zonata</i>	Peach fruit fly	Pest species; polyphagous; host range that includes guava, mango, papaya, peach and sweet orange
December	US Continental	<i>Planococcus minor</i>	Passion vine mealybug	Potential serious pest of tropical fruit industry and ornamentals industry

Month	Type of Record	Scientific name	Common name	Economic importance
2011				
January	Significant Pest Detection	<i>Ceratitis capitata</i>	Mediterranean fruit fly	Serious pest to citrus and many other plants
February	Hemisphere	<i>Coleosoma blandum</i>	a spider	Not a plant pest; not expected to be a nuisance pest
	US Continental	<i>Clerada apicicornis</i>	a blood feeding lygaied	Possible nuisance pest
	Significant Pest Interception	<i>Halymorpha halys</i>	brown marmorated stinkbug	Potential to be a significant pest to most agricultural
March	US Continental	<i>Cithaeron praedonius</i>	a spider	Not a plant pest; not expected to be a nuisance pest
	Florida State	<i>Nausibius species</i>	a beetle	Not a plant pest
	Significant Pest Interception	<i>Halymorpha halys</i>	brown marmorated stinkbug	Potential to be a significant pest to most agricultural
	Significant Pest Interception	<i>Halymorpha halys</i>	brown marmorated stinkbug	Potential to be a significant pest to most agricultural
April	Florida State	<i>Athous equestris</i>	a click beetle	Not expected to be a plant pest.
	Significant Pest Interception	<i>Halymorpha halys</i>	brown marmorated stinkbug	Potential to be a significant pest to most agricultural

Month	Type of Record	Scientific name	Common name	Economic importance
May	US Continental	<i>Euwallacea interjectus</i>	a bark beetle	Pest status unknown
	US Continental	<i>Holoplagia guamensis</i>	minute black scavenger fly	Not a plant pest
	US Continental	<i>Aleuroplatus cocculus</i>	a whitefly	Pest status unknown
	US Continental	<i>Ambrosiodmus minor</i>	a bark beetle	Pest status unknown
	Florida State	<i>Neorhegmoclemina bisaccta</i>	a minute black scavenger fly	Not a plant pest
	Florida State	<i>Amitus granulatus</i>	a mite	Not expected to be a plant pest.
	Florida State	<i>Tessaropa tenuipes</i>	a longhorn beetle	
June	US Continental	<i>Phenacoccus multicerarri</i>	a mealybug	Pest status unknown.; polyphagous species
	US Continental	<i>Holobus species</i>	a rove beetle	Not a plant pest
	Significant Pest Interception	<i>Halymorpha halys</i>	brown marmorated stinkbug	Potential to be a significant pest to most agricultural
August	Florida State	<i>Epitremus pyri</i>	a mite	Not expected to be a plant pest.
	Florida State	<i>Ophiomyia kwanensis</i>	daylily leafminer	Potential significant pest for daylilies.
	Significant Pest Interception	<i>Halymorpha halys</i>	brown marmorated stinkbug	Potential to be a significant pest to most agricultural crops
	Significant Pest Interception	<i>Halymorpha halys</i>	brown marmorated stinkbug	Potential to be a significant pest to most agricultural
	Significant Pest Interception	<i>Eriophyes chibansis</i>	an eriophyiid mite	Potential pest for pears

Month	Type of Record	Scientific name	Common name	Economic importance
September	US Continental	<i>Pharoscyrnus flexibilis</i>	a ladybird beetle	Not a plant pest
	US Continental	<i>Tenuipalpus crassulus</i>	a false spider mite	Possible pest of succulent plants in the ornamentals industry
	Florida State	<i>Cylindrocopturus tetralobus</i>	a weevil	
	Significant Pest Interception	<i>Bagrada hiliaris</i>	bagrada bug	Serious pest of cole crops
	Significant Pest Interception	<i>Bactericera cockerelli</i>	potato psyllid	Serious pest of Solanaceous crops; vector of <i>Liberibacter</i> species.
	Significant Pest Detection	<i>Achatina fulica</i>	giant African land snail	Serious agricultural pest and potential vector of a form of meningitis
October	Florida State	<i>Atherigona reversura</i>	Bermuda grass stem maggot	Potential serious pest to Bermuda grass producers
December	Hemisphere	<i>Aphis eugeniae</i>	an aphid	Possible pest of pear
	US Continental	<i>Paraleyrodes bondari</i>	a whitefly	Possible serious pest for tropical fruits, citrus and avocado
	Significant Pest Interception	<i>Bactericera cockerelli</i>	potato psyllid	Serious pest of Solanaceous crops; vector of <i>Liberibacter</i> species



Brown marmorated stink bug

Decisions, Decisions, Decisions...

- Several of these newly detected plant pests may not become noteworthy in damages
- Some may displace indigenous species through competition—niche displacement
 - Difficult to measure or observe
- Some will be inconspicuous for a period of time and then “bloom”
- Some will have an immediate impact
 - Decisions need to be made





Spiraling rugose whitefly



Laurel wilt - Redbay ambrosia beetle



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Decisions, Decisions, Decisions...

- 47% of the detections were of pest species with known or likely impact on one or more agricultural crops
- It is fairly common for a plant feeding species not a pest in its homeland to become a sometimes significant plant pest in the new country
 - Lack of natural enemies
 - Whiteflies and mealybugs
 - Lack of host plants with defense mechanisms (co-evolution)
 - Laurel wilt and redbay ambrosia beetle

Regulatory Strategies

- Containment through Quarantine
- Suppression through chemical control, biological control, physical control
- Mitigation through Research
- Synergy through Outreach
 - Industry, Public, Government Agency Cooperators

Outcome: Eradication





Mediterranean Fruit Fly



Citrus Greening



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Eradication Not Achieved

- Agriculture industry effects:
 - Expense of new or additional control treatments
 - Abandonment of preferred crop
 - Closing of foreign and domestic markets or
 - Expensive mitigation actions to allow continued movement of crop
 - Loss of land to re-purposing

Outcomes: Increased Production Costs or Loss of Crop



Gladiolus rust



Daylily rust

Eradication Not Achieved

- Homeowner impact:
 - Expense of new or additional control treatments
 - Abandonment of preferred plant
 - Provides continued threat of re-infestation to commercial crop plantings



Outcomes: Change in Landscape
and Threat to Commercial
Plantings

National Incident Management System (NIMS), as released by the U.S. Department of Homeland Security in 2004

Incident Command System



The Incident Command System (ICS) is a standardized, on-scene, all-hazards incident management approach

Allows for the integration of facilities, equipment, personnel, procedures and communications operating within a common organizational structure

- Enables a coordinated response among various jurisdictions and functional agencies, both public and private



Incident Command System



- Establishes common processes for planning and managing resources
- ICS is flexible and can be used for incidents of any type, scope and complexity. ICS allows its users to adopt an integrated organizational structure to match the complexities and demands of single or multiple incidents



Incident Command System

Incident Commanders and Staff

- Science Panel
- Planning Section
 - Chief
 - Resource Unit Leaders
 - Documentation/Data Unit
 - Technical Specialists
- Logistics Section
 - Chief
 - Security Unit
 - Facility Unit
 - Staging Area
 - Vehicle Maintenance
- Finance Section, Chief

Operations Section Chief

Branch 1 Survey

Branch Director
Strike Teams

Branch 2 Regulatory

Branch Director
Teams

Branch 3 Investigation

CAPS
SITC

Branch 4 Control

Branch Director
Teams



Giant African Land Snail:

- **Initiation**



- Detected September 2010
- Feeds on over 500 plant species
- Eats stucco, plaster and cement
- May carry parasitic nematode that causes eosinophilic meningitis
 - No nematode found to date



Giant African Land Snail

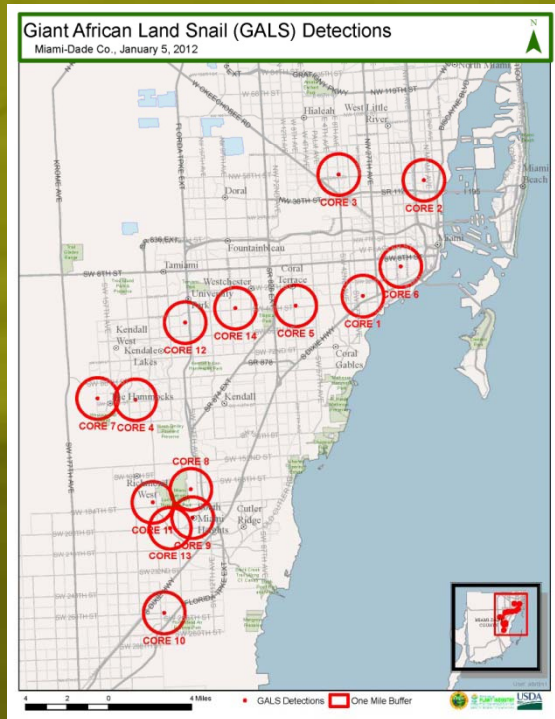


- **Biology**

- Grows up to 8 inches in length, 4 inches in diameter
- Live up to nine years
- Hermaphroditic
- Each snail can lay up to 1,200 eggs/yr



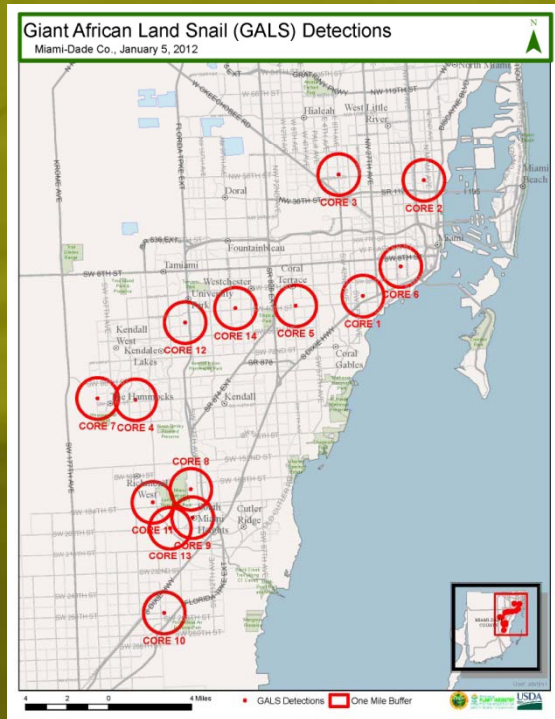
Giant African Land Snail



- **Distribution**
 - 14 Cores in Miami-Dade Co. 12/23
- **Inspections**
 - **Commercial Inspections**
 - 132 nurseries; 128 stock dealers
 - No snail detected
 - **Residential Inspections**
 - 45,967 inspections
 - 1,556 properties within Z-grid
 - 23,383 properties within ½ mile
 - 48,237 snails collected
 - 2,553 signed waivers; 6% refusal



Giant African Land Snail



Regulatory Inspections

- Nursery (80+) 215
- Stock Dealers (80+) 198
- Solid-waste / Transfer Stations 124
- Compliance Agreements
 - Nursery and Stock Dealers 124
 - Lawn Maintenance 7
 - Solid Waste/ TS 15



Giant African Land Snail



- **Chemical Control**
 - Snail bait-treated properties: 12,453
 - 288 positive properties
 - Sluggo: iron phosphate
 - Every two weeks @ Z-grids and out to 200 yds
- **Staffing**
 - 38 employees → 47
 - Two-week rotations → OPS
 - 10-14 hr days → Tuesday - Saturday



Giant African Land Snail

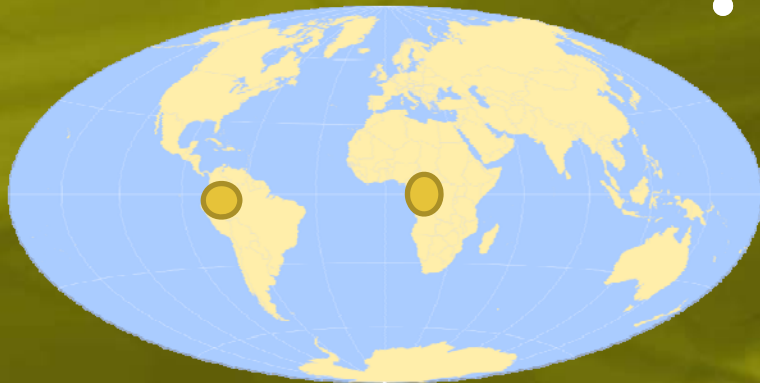
- Pathways

- Nigeria

- Snails used in ritualistic ceremonies
- 13 of 14 cores
- Right hand twist

- Ecuador

- Cosmetic treatments
- 1 of 14 cores
- Left hand twist



Giant African Land Snail

- **Snail Juice and Slime**



- Santeria ritual practiced by some individuals promoted use of snail juice to cure various medical ailments
- Ecuador immigrant promoted use of snail slime for facial treatments
- Snail use documented in Wales in 1600-1700's. Skin of dead puppies, oils made of swallows and juice of snails for various ailments



Giant African Land Snail



WANTED
GIANT AFRICAN SNAIL



LOOK FOR THEM! REPORT THEM!
888-397-1517

A major landscape and agricultural pest, even eats stucco on homes

Public health threat - known to carry rat lungworm that may cause meningitis in humans

Able to reproduce rapidly - one snail can lay 1,200 eggs in a year
Can grow to up to 8 inches in length - no natural enemies

We need your help to stop this pest!

www.freshfromflorida.com/pi

USDA
Division of PLANT INDUSTRY
Fresh Florida Protection through Detection
Adam H. Putnam, Commissioner

• Outreach

- Newspapers
- TV: the “ick” factor
- YouTube, Twitter, Word Press
- Billboards
- Radio
- Jr. Detective 5th Grade School Program
- Municipal Leaders
- Multiple Agencies:
 - FDACS, USDA APHIS PPQ
 - USFWS, ECISMA, UF/IFAS
- Airline Video



What is the Cost of a New Pest?



- Giant African Land Snail
 - September 2011 – January 2012
 - \$1,131,400
 - Estimated to be \$10 million for eventual eradication
- Citrus Canker
 - 1995-2006 \$700 million towards eradication
 - 2007-2011 \$58 million towards containment
 - \$100s+/acre additional costs to industry



What is the Cost of a New Pest?



- **Mediterranean Fruit Fly**
 - Boca Raton 2010 and Pompano Beach 2011
 - Eradications cost \$3,558,710
 - Federal \$3,320,078
 - State \$238,632
 - 1997-1998 Central Florida program \$55 million
 - Preventive Release Program since 1996 cost \$30 million



TOTAL: \$847,690,110



What is the Cost of a New Pest?



- **Mediterranean Fruit Fly Eradication Programs**



Boca Raton – June 15 – July 29 2010

GF-120 (Spinosad 0.02% a.i.) - used 2479 gallons of product to treated 32,070 properties (= \$245,421)

Diazinon AG 500 (48% a.i.) - used 31 fl. oz of product to treat 16 hosts - 2 times (\$39/gallon)

Pompano Beach – February 15 - May 3, 2011

GF-120 (Spinosad 0.02% a.i.) - used 195 gallons to treated 6,939 properties (= \$19,305)

Diazinon AG 500 (48% a.i.) – used 7.5 fl. oz of product to treat 3 host plants - 1 time

What is the Cost of a New Pest?



- Giant African Land Snail Eradication Program

Sluggo AG – Iron Phosphate (1.0% a.i.)

From Oct. 11, 2011 to May 9, 2012 -
ca. 13,549.5 lbs have been used to treat
12,728 properties (= \$ 25,065)



We need to put
boundaries back on the
pests!

It hasn't been easy and
will continue be much like
a jig saw puzzle

Parting Thoughts

- Need to achieve better phytosanitation at the location of origin, not once it gets here
 - Unsustainable burden on responding agencies, industry, residents as well as permanent loss and changes in natural resources
 - Once the horse is loose it is impossible or extremely expensive to undue the ringing of the bell
- Who should bear the cost of these invasions?
- Need to change traditional approach-- think outside the box!

Nevertheless.....



Parting Thoughts



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2012 Alachua, FL

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We will continue to stand guard in Florida

Thank you for your time and attention!

