UF | IFAS Extension
UNIVERSITY of FLORIDA

# Sample Submission

FLORIDA FIRST DETECTOR

# Sample Submission: Sample Types

- Plant disease symptoms and/or signs
- Invasive insect damage and/or specimens
- Invasive plant and weed identification
- Abiotic damage (weather, management practices, etc)

Insect feeding damage on leaf

A leaf from a ***Stevia rebaudiana*** plant infected with Tomato Spotted Wilt Virus

**FFD's** focus - **Early Detection** of insect or plant diseases

Photos - Top: Forest & Kim Starr, CC BY 3.0 US <https://creativecommons.org/licenses/by/3.0/us/deed.en>, via Wikimedia Commons; Bottom: Garlan Miles, CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons

# How do you Survey to Collect Samples?

- Use a Systematic approach
  - Search every plant the same way
- Document your methods
  - Search every other plant, every fifth plant, 10 plants in a row in 10 rows per crop, etc.
- Quantify the effort
  - Number of plants searched, total number of plants on the innermost row, etc.

# Hard-Bodied Vs Soft-Bodied Samples

## Hard-Bodied Samples

- Outer body is firm and not very flexible
- Adult insects are typically hard-bodied, with some notable exceptions
- Without proper packaging methods, samples could be crushed or disfigured
  - ✓ Pinned; stored in empty, dry container; stored in alcohol vials
- Examples of hard-bodied insects include:
  - ✓ Adult beetles, stink bugs (adults and nymphs), cockroaches, etc.

## Soft-Bodied Samples

- Insect feels squishy and soft; easily crushed
- Often includes immature stages of insects
- Without proper packaging methods, samples could become discolored or disfigured
  - ✓ Stored in alcohol vials
- Examples of soft-bodied insects include:
  - ✓ Caterpillars, beetle grubs, termites, small insects, etc.

**If you're unsure how to package your insect, contact your local county extension agent or ask online**

# General Packaging Tips

1. Don't store loose samples in boxes or packages that can easily be damaged during transit

2. Try to find whole, undamaged samples. Insect parts are not always identifiable, so the more the merrier

3. If 70% isopropyl alcohol is not available, short-term alternatives can work
   - Nail polish remover, secure dry container

4. Make sure any vials filled with liquids have caps that will not come off during transit (do not use cork-tops; twist-caps are preferred)

5. Try to mail samples earlier in the week as packages will be left sitting over the weekend.

# How to Package Your Samples:

# Adult Insects & Hemimetabolous Nymphs (Hard-Bodied Insects)

- Capture multiple specimens if possible and put them in a vial with preservative (70% alcohol)
  - Secure, dry vials will work, too
- Put the vial in a sealable bag
- Put this bag plus the sample submission form in yet another bag
- Box your sample and take it to your county extension agent.
- http://www.youtube.com/watch?v=DPSOddSQxDE

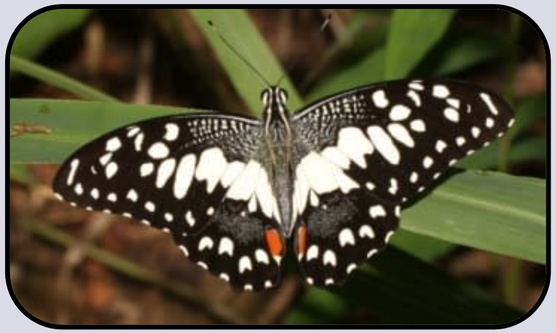
Beetles (Coleoptera)

Stink bugs, grasshoppers (Hemiptera)

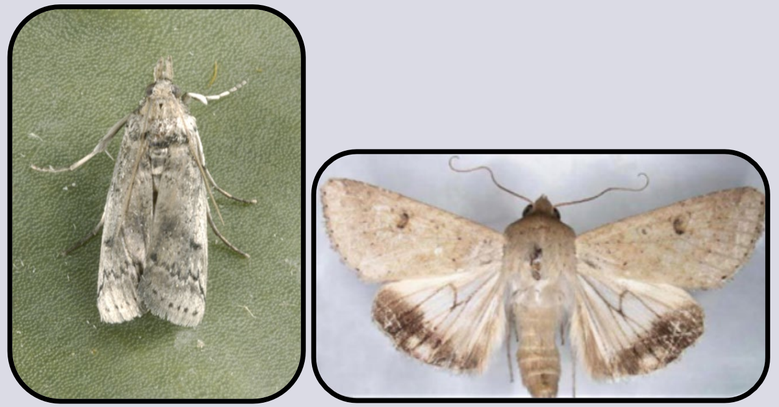
Photo credit: Colorado potato beetles, Leptinotarsa decemlineata (Say), feeding on foliage. David Cappaert, Michigan State University, www.insectimages.org; Southern green stink bug, *Nezara viridula,* Suwannee Valley Research Center*; Eastern lubber grasshopper,* Susan Follick, Master Gardener Volunteer.

# How to Package Your Samples: Butterflies & Moths

- Freeze overnight to submit a dry sample
- Store adults in empty container that is big enough to not crush the sample, but will also not cause the sample to be damaged during transit
  - Tissue paper can help to prevent too much movement
- Combine your sample bag and sample submission form in one package
- Take your completed package to your County agent



Butterfly (Lepidoptera)



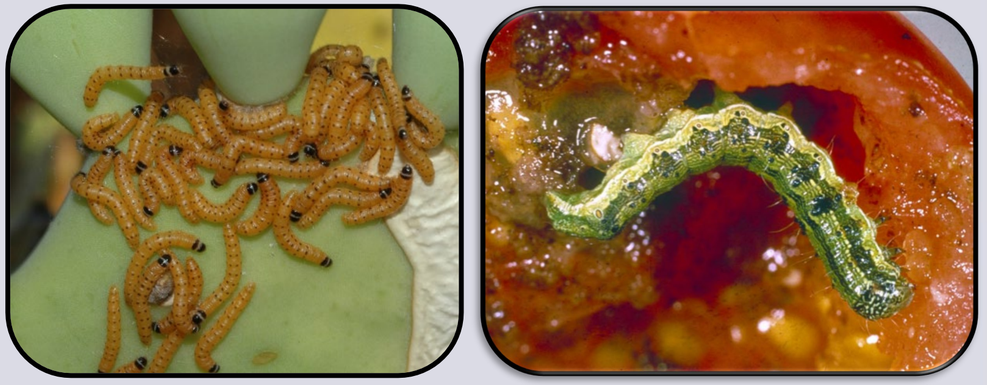
Moths (Lepidoptera)

Photo credit: https://www.fdacs.gov/Agriculture-Industry/Pests-and-Diseases/Plant-Pests-and-Diseases/Lime-Swallowtail-Citrus-Pest#; Cactus moth, *Cactoblastis cactorum*, Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org , #5199023; Old World Bollworm, *Helicoverpa armigera*, Julieta Brambila, USDA-APHIS-PPQ bugwood.org #539264

# How to Package your Samples: Holometabolous Larvae (Soft-Bodied Insects)

- Capture multiple specimens if possible
- "Fix" the sample with boiling water. Add the specimens to the boiling water for approximately 1 minute
- Remove the specimens from the water and put them in a preservative-filled vial (70% alcohol)
- Put the vial into a sealable bag
- Put this bag plus the sample submission form in yet another bag
- Box your sample and take it to your county agent
- http://www.youtube.com/watch?v=2HA06HW4Kc4

Lime Swallowtail (Lepidoptera)

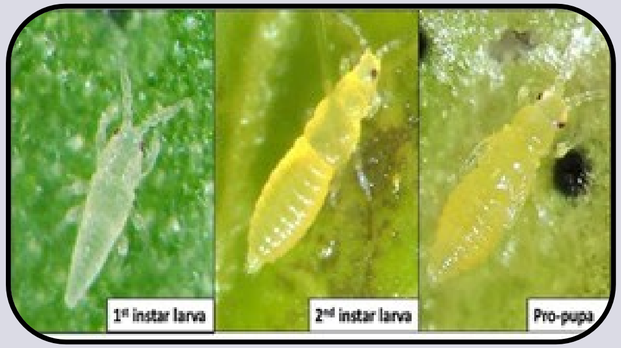


Moth larvae (Lepidoptera)

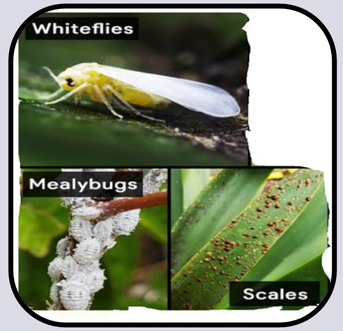
Photo credit: https://www.fdacs.gov/Agriculture-Industry/Pests-and-Diseases/Plant-Pests-and-Diseases/Lime-Swallowtail-Citrus-Pest#; Cactus moth larvae, *Cactoblastis cactorum*, Right-Baez, USDA Agricultural Research Service, Bugwood.org, #5015069; Old World Bollworm, *Helicoverpa armigera*, Central Science Library, Harpenden, British crown, Bugwood image 0454075

# How to Package your Samples: Small Insects Attached to Plant Material

- Collect multiple life stages on 15.24-20.32 cm (6-8 in) of a plant; wrap in a paper towel or newspaper and double bag them
- Host plant ID can help with pest identification
- Collect multiple life stages on a smaller piece of plant, put them in a vial along with a preservative (70% alcohol); put the vial in a sealable bag
- Put both sample bags plus the sample submission form in yet another bag.
- Box your sample and take it to your county agent.
- http://www.youtube.com/watch?v=Ma42IE02pDo



Thrips (Thysanoptera)



Order Hemiptera


Thrips actual size

Photo credit: Whiteflies, mealybugs and scales (Raymond Kartzman, Just Home Gardening), and thrips (Babu Panthi, UF/IFAS), feeding on foliage; thrips actual size (houseplantjournal.com/thrips)

# How to Package your Samples:
# Plant Disease Sample

- Collect 15.24 - 20.32 cm (6 - 8 in) of symptomatic (NOT DEAD) plant material, wrap it in paper towels or newspaper, and bag it
- Collect 15.24 - 20.32 cm (6 - 8 in) of material without symptoms, wrap it in paper towels/newspaper, and bag it separately
- If possible, collect the entire plant specimen in one bag
- Package together any samples plus the sample submission form
- Box your sample and take it to your county agent
- http://www.youtube.com/watch?v=JOrNi8HrIpI

Viral pathogen


Nematode


Fungal pathogen


Bacterial pathogen

Photo credit: Fungal, Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org; Bacterial, Margery Daughtrey, Cornell University, Bugwood.org; Viral, William M. Brown Jr., Bugwood.org ; Nematode, Shannon McAmis, University of Florida

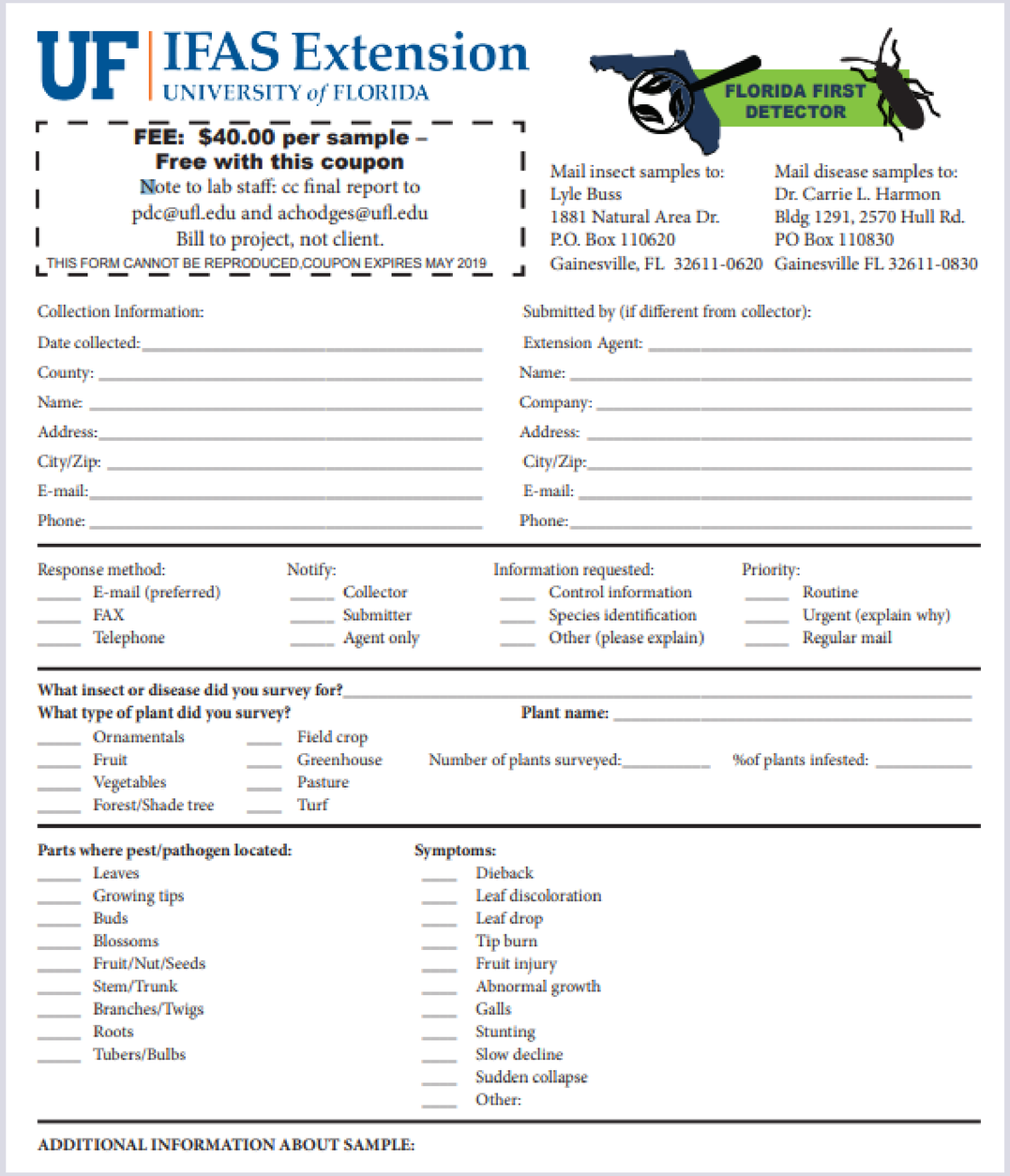
# Submission Form: Information Needed

1)General information

2)Pest surveyed for

3)Plant type surveyed

4)Additional information



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FLORIDA FIRST DETECTOR

**FEE: $40.00 per sample – Free with this coupon**
Note to lab staff: cc final report to pdc@ufl.edu and achodges@ufl.edu
Bill to project, not client.
THIS FORM CANNOT BE REPRODUCED,COUPON EXPIRES MAY 2019

Mail insect samples to:
Lyle Buss
1881 Natural Area Dr.
P.O. Box 110620
Gainesville, FL 32611-0620

Mail disease samples to:
Dr. Carrie L. Harmon
Bldg 1291, 2570 Hull Rd.
PO Box 110830
Gainesville FL 32611-0830

Collection Information:
Date collected:
County:
Name:
Address:
City/Zip:
E-mail:
Phone:

Submitted by (if different from collector):
Extension Agent:
Name:
Company:
Address:
City/Zip:
E-mail:
Phone:

Response method:
___ E-mail (preferred)
___ FAX
___ Telephone

Notify:
___ Collector
___ Submitter
___ Agent only

Information requested:
___ Control information
___ Species identification
___ Other (please explain)

Priority:
___ Routine
___ Urgent (explain why)
___ Regular mail

**What insect or disease did you survey for?**
**What type of plant did you survey?**
**Plant name:**

___ Ornamentals
___ Fruit
___ Vegetables
___ Forest/Shade tree
___ Field crop
___ Greenhouse
___ Pasture
___ Turf

Number of plants surveyed:
%of plants infested:

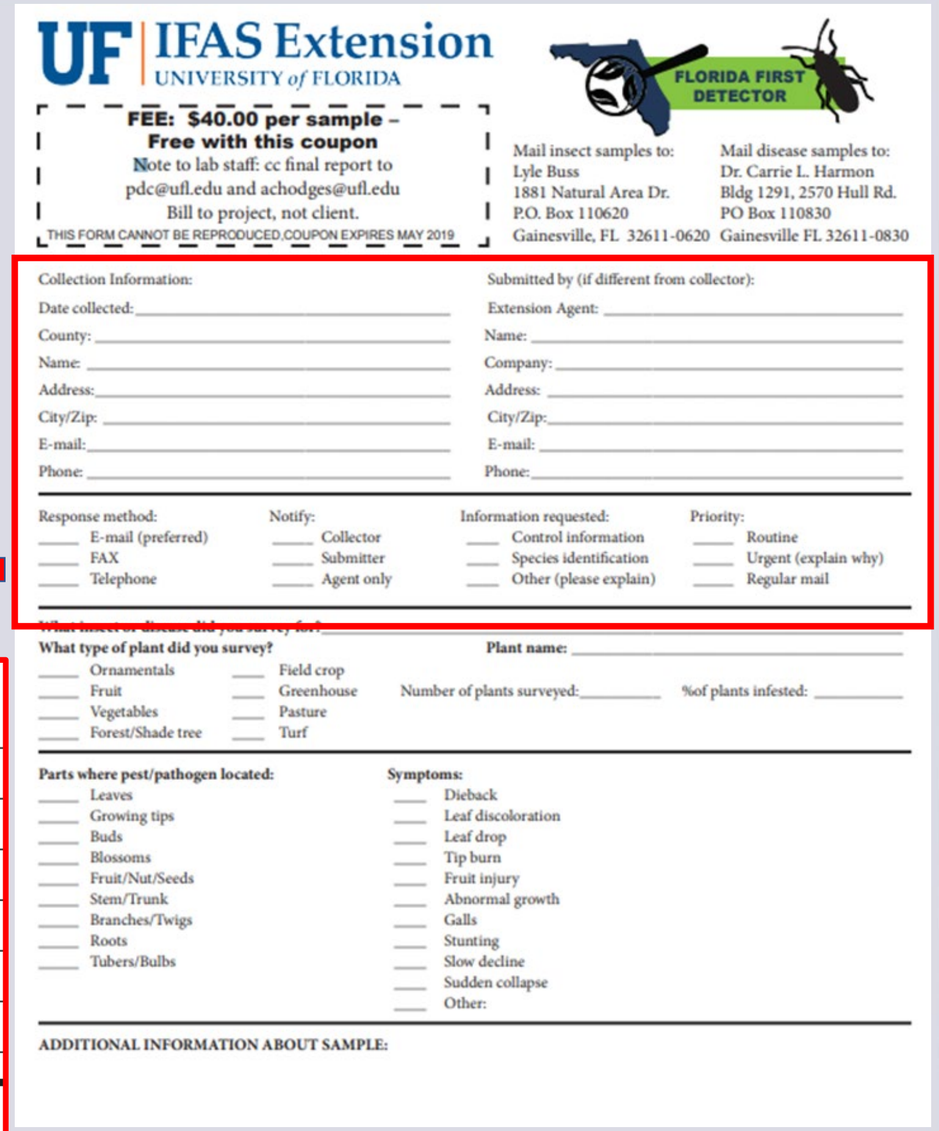
**Parts where pest/pathogen located:**
___ Leaves
___ Growing tips
___ Buds
___ Blossoms
___ Fruit/Nut/Seeds
___ Stem/Trunk
___ Branches/Twigs
___ Roots
___ Tubers/Bulbs

**Symptoms:**
___ Dieback
___ Leaf discoloration
___ Leaf drop
___ Tip burn
___ Fruit injury
___ Abnormal growth
___ Galls
___ Stunting
___ Slow decline
___ Sudden collapse
___ Other:

**ADDITIONAL INFORMATION ABOUT SAMPLE:**

# Submission Form: General Information

- Date and place of collection
- Name of collector and person submitting sample
- Address, email, and phone number of the collector and person submitting the sample



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Collection Information:
Date collected: _____
County: _____
Name: _____
Address: _____
City/Zip: _____
E-mail: _____
Phone: _____

Submitted by (if different from collector):
Extension Agent: _____
Name: _____
Company: _____
Address: _____
City/Zip: _____
E-mail: _____
Phone: _____

Response method:
____ E-mail (preferred)
____ FAX
____ Telephone

Notify:
____ Collector
____ Submitter
____ Agent only

Information requested:
____ Control information
____ Species identification
____ Other (please explain)

Priority:
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____ Regular mail

What type of plant did you survey?
____ Ornamentals
____ Fruit
____ Vegetables
____ Forest/Shade tree
____ Field crop
____ Greenhouse
____ Pasture
____ Turf

Plant name: _____
Number of plants surveyed: _____
%of plants infested: _____

Parts where pest/pathogen located:
____ Leaves
____ Growing tips
____ Buds
____ Blossoms
____ Fruit/Nut/Seeds
____ Stem/Trunk
____ Branches/Twigs
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____ Dieback
____ Leaf discoloration
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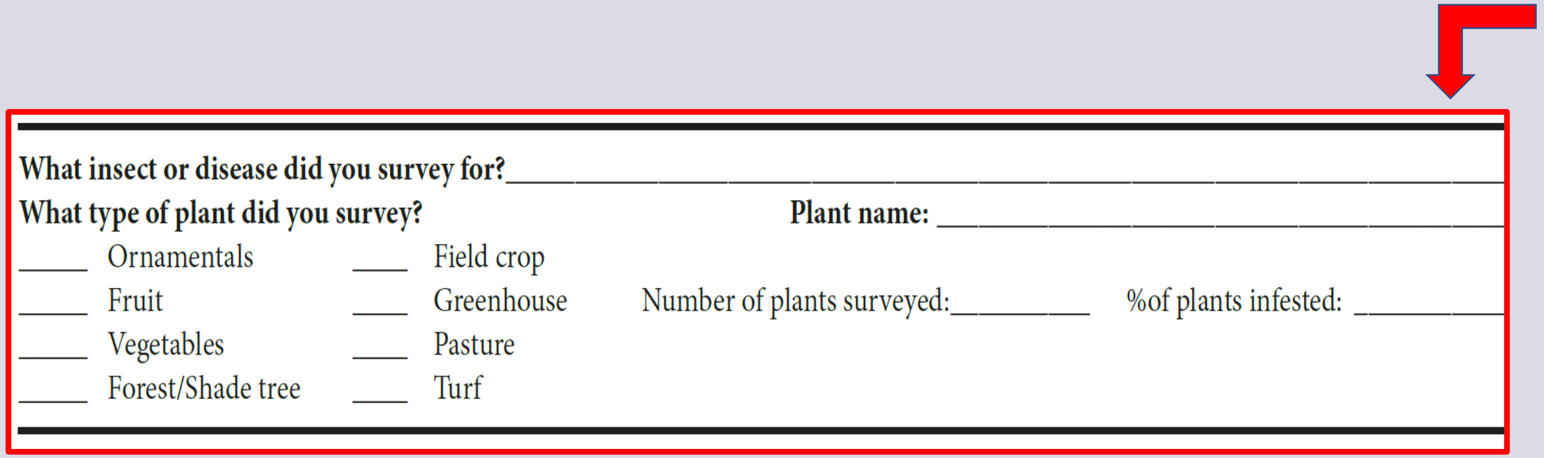
# Submission Form:
# Pest and Plant Information

Pest surveyed (insect or disease)

Plant surveyed (type and name)



**What insect or disease did you survey for?**_____

**What type of plant did you survey?** **Plant name:** _____

| | | | |
|---|---|---|---|
| ____ Ornamentals | ____ Field crop | | |
| ____ Fruit | ____ Greenhouse | Number of plants surveyed:_____ | %of plants infested: _____ |
| ____ Vegetables | ____ Pasture | | |
| ____ Forest/Shade tree | ____ Turf | | |

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**What insect or disease did you survey for?**_____
**What type of plant did you survey?** **Plant name:** _____
____ Ornamentals ____ Field crop
____ Fruit ____ Greenhouse Number of plants surveyed:_____ %of plants infested: _____
____ Vegetables ____ Pasture
____ Forest/Shade tree ____ Turf

**Parts where pest/pathogen located:**
____ Leaves
____ Growing tips
____ Buds
____ Blossoms
____ Fruit/Nut/Seeds
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____ Roots
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**Symptoms:**
____ Dieback
____ Leaf discoloration
____ Leaf drop
____ Tip burn
____ Fruit injury
____ Abnormal growth
____ Galls
____ Stunting
____ Slow decline
____ Sudden collapse
____ Other:

**ADDITIONAL INFORMATION ABOUT SAMPLE:**

# Submission Form:
# Pest Location and Damage

Location of pest (insect or disease)

Damage/Symptoms observed

Additional information

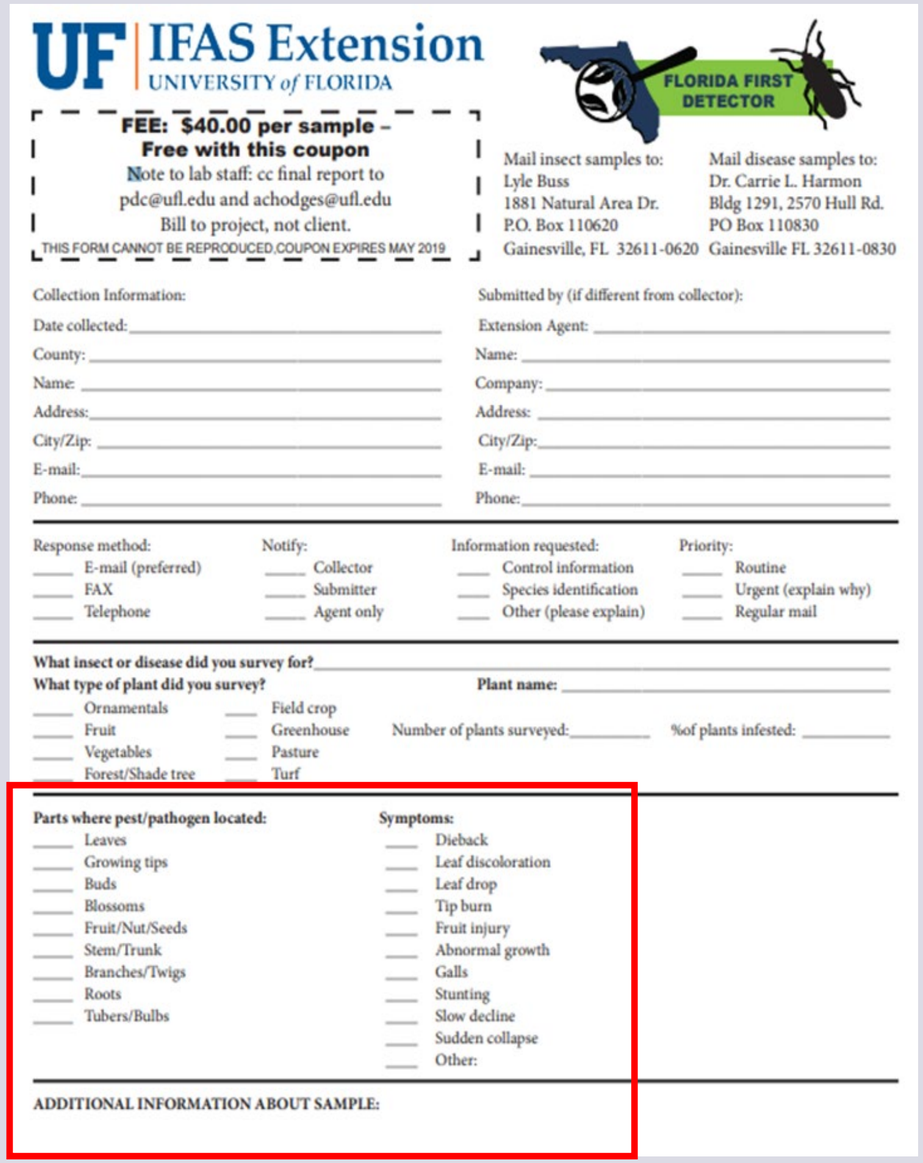
**Parts where pest/pathogen located:**

_____ Leaves
_____ Growing tips
_____ Buds
_____ Blossoms
_____ Fruit/Nut/Seeds
_____ Stem/Trunk
_____ Branches/Twigs
_____ Roots
_____ Tubers/Bulbs

**Symptoms:**

_____ Dieback
_____ Leaf discoloration
_____ Leaf drop
_____ Tip burn
_____ Fruit injury
_____ Abnormal growth
_____ Galls
_____ Stunting
_____ Slow decline
_____ Sudden collapse
_____ Other:

**ADDITIONAL INFORMATION ABOUT SAMPLE:**



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What type of plant did you survey?
Plant name:
___ Ornamentals
___ Fruit
___ Vegetables
___ Forest/Shade tree
___ Field crop
___ Greenhouse
___ Pasture
___ Turf
Number of plants surveyed:
%of plants infested:

Parts where pest/pathogen located:
___ Leaves
___ Growing tips
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Symptoms:
___ Dieback
___ Leaf discoloration
___ Leaf drop
___ Tip burn
___ Fruit injury
___ Abnormal growth
___ Galls
___ Stunting
___ Slow decline
___ Sudden collapse
___ Other:

ADDITIONAL INFORMATION ABOUT SAMPLE:

# Where to Submit the Samples?

- Bring samples (plant tissue or arthropod specimens)
  with sample submission form (www.flfirstdetector.org) to your **Local County Agent** (https://sfyl.ifas.ufl.edu/find-your-local-office/)

- UF/IFAS Entomology and Nematology Dept. Insect ID Lab - Lyle Buss
  970 Natural Area Dive, Gainesville, FL 32611
  http://entnemdept.ufl.edu/insectid/; ljbuss@ufl.edu; (352) 273-3933

- IFAS Nematode Diagnostic Lab - Dr. Billy Crow
  http://nematology.ifas.ufl.edu/assaylab/index.html NEMALAB@ifas.ufl.edu; (352) 392-1994

- UF/IFAS Plant Diagnostic Center - Dr. Carrie Harmon
  https://plantpath.ifas.ufl.edu/extension/plant-diagnostic-center/; pdc@ifas.ufl.edu
  2570 Hull Rd, Bldg 1291, Gainesville, FL 32611-0830
  (352) 392-1795, Fax (352) 392-3438

# Where to Submit the Samples?

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DDIS
Distance Diagnostic and Identification System

Home | Media Library | Diagnostic Labs | Equipment | Training | Contact Us

Become a User | Forgot Your Password

user name | password | Sign In

**Sample Type:** Insect (Plant)
**Host:** Weeping fig - Amstel
**Common Name:** Ficus Whitefly
**Scientific Name:** *Singhiella simplex*
**Family:** Aleyrodidae
**Sample Submitter:** Mark Tancig
**Sample ID:** 18-4332

**Distance Diagnostic and Identification System (DDIS)**

The DDIS is a digital diagnostic collaboration and communication platform for UF/IFAS Extension. The system allows Extension agents and their clientele in Florida to submit digital samples to UF/IFAS diagnostic laboratories, clinics, and specialists for quick diagnosis. Authorized users may submit samples of plant diseases, insects, plant/weed, mushroom/fungus, invasive species, plant management, physiology, and nutrient related problems.

**http://ddis.ifas.ufl.edu/**

Search DDIS | Go

**Quick Links**

IFAS Diagnostic Services >>

DDIS Mobile >>

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# Sample Submission Exception

## Giant African Land Snail

1. **Do not collect live suspect samples**
2. Call the FDACS-DPI Hotline: 1-888-397-1517
3. See the DPI website for more information: https://www.fdacs.gov/Agriculture-Industry/Pests-and-Diseases/Plant-Pests-and-Diseases/Invasive-Mollusks/Giant-African-Land-Snail

# ID Resources

- IFAS EDIS and Featured Creature fact sheets
  - http://edis.ifas.ufl.edu; https://entnemdept.ifas.ufl.edu/creatures/
- IFAS Entomology Insect I.D. Lab – Lyle Buss
  - http://entnemdept.ufl.edu/insectid/ ; ljbuss@ufl.edu; (352) 273-3933
- IFAS Nematode Diagnostic Lab – Dr. Billy Crow
  - http://nematology.ifas.ufl.edu/assaylab/index.html ; NEMALAB@ifas.ufl.edu; (352) 392-1994
- IFAS UF/IFAS Plant Diagnostic Center - Dr. Carrie Harmon
  - https://plantpath.ifas.ufl.edu/extension/plant-diagnostic-center/; pdc@ifas.ufl.edu; (352) 392-1795
- Commodity-specific specialists around the state
  - http://entomology.ifas.ufl.edu/extension/; http://entomology.ifas.ufl.edu/people-directory/

# UF/IFAS Resources

- EDIS – Online Publications on Vegetable Production & Diseases
- UF/IFAS Faculty – Gainesville campus
  - Plant Pathology Department
  - Horticultural Sciences Department
  - Entomology and Nematology Department
  - Center for Organic Agriculture
- UF/IFAS Extension & Research Faculty – County & REC vegetable specialists

# Lab Team

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**Lab Director**

**Amanda Hodges**, Ph.D. - Extension Scientist and DPM Director, Department of Entomology and Nematology, University of Florida

# Collaborating Agencies

- U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS)
- Cooperative Agricultural Pest Survey Program (CAPS)
- Florida Department of Agriculture and Consumer Services (FDACS)
- National Plant Diagnostic Network (NPDN)
- Sentinel Plant Network (SPN)
- University of Florida Institute of Food and Agricultural Sciences (UF-IFAS)
- Protect U.S.

# Educational Disclaimer and Citation

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- Citation:

  –University of Florida, Entomology and Nematology Department, Biosecurity Research and Education Lab. May 2024. Collaborative and Enhanced First Detector Training: Sample Submission, *Day Accessed*