

Diagnostic Tips and Tricks

Master Gardener Conference
October 2013
Kissimmee, FL

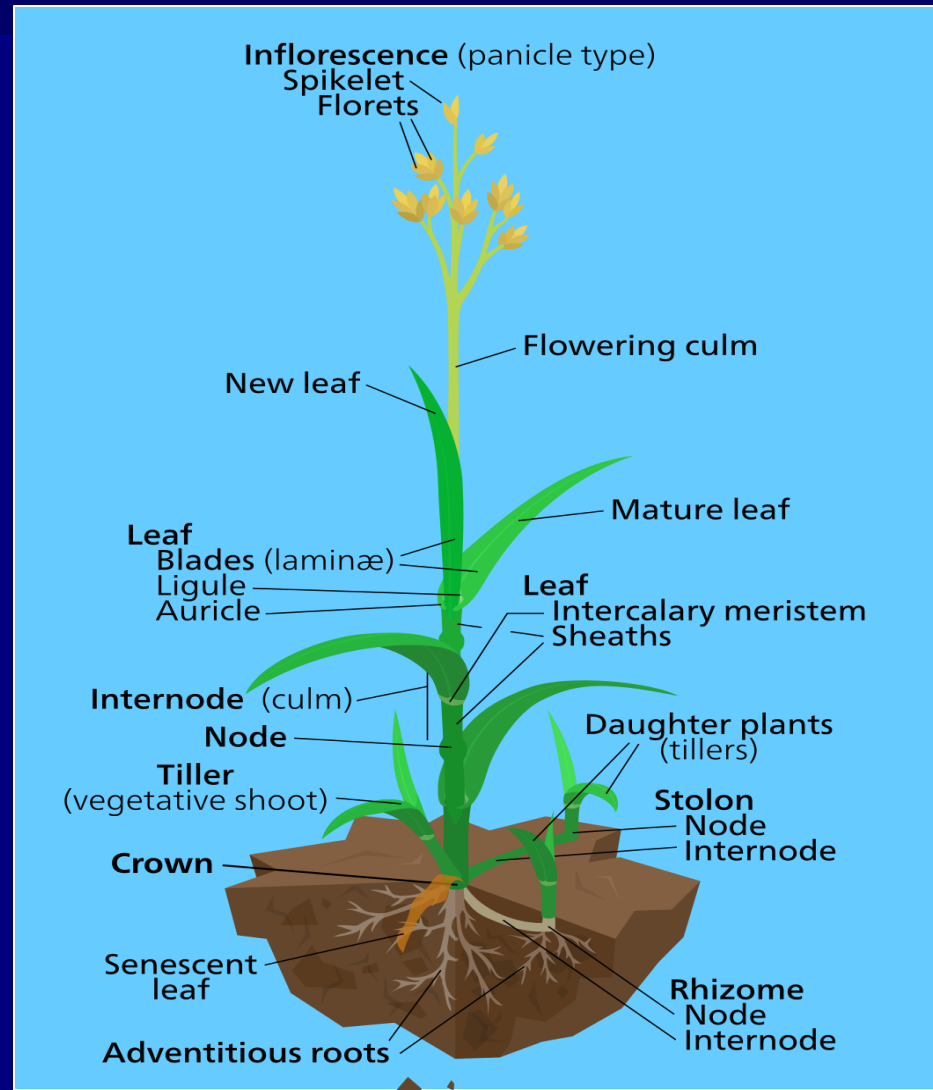
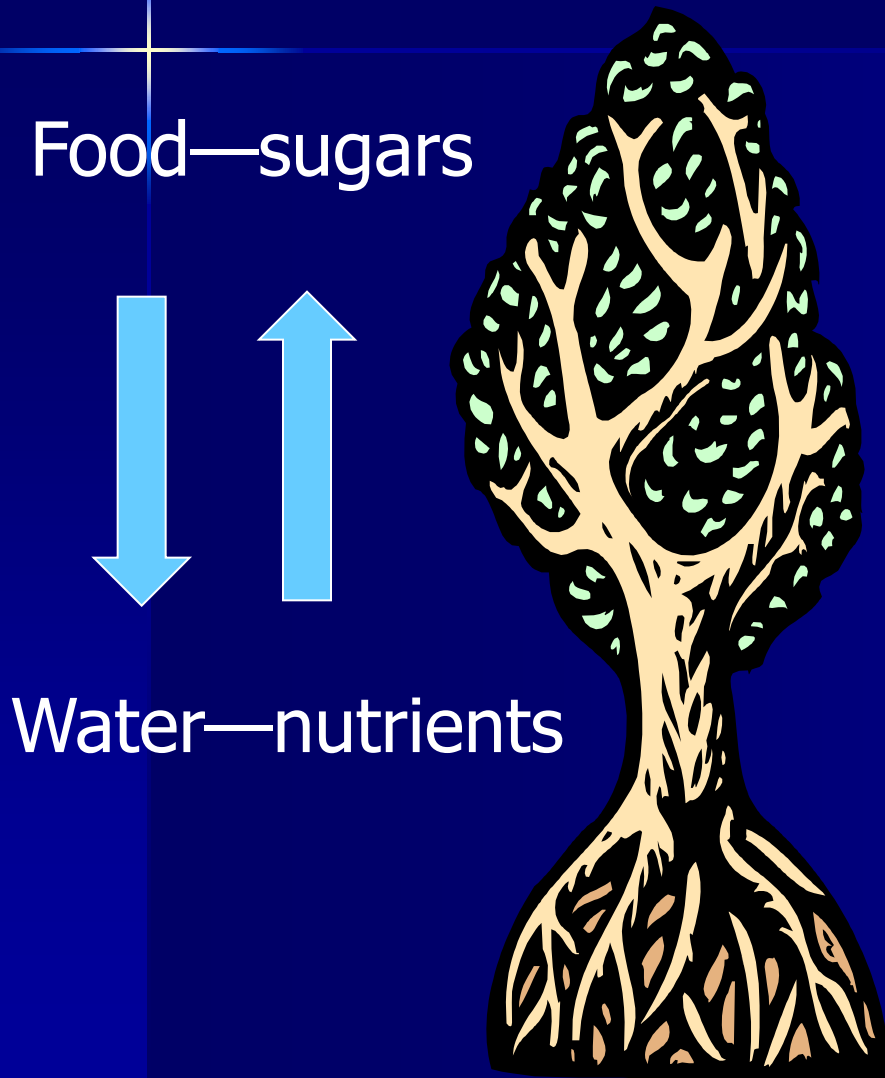
Philip F. Harmon, Ph.D.
Associate Prof. and Extension Specialist
Plant Pathology Dept., UF Gainesville



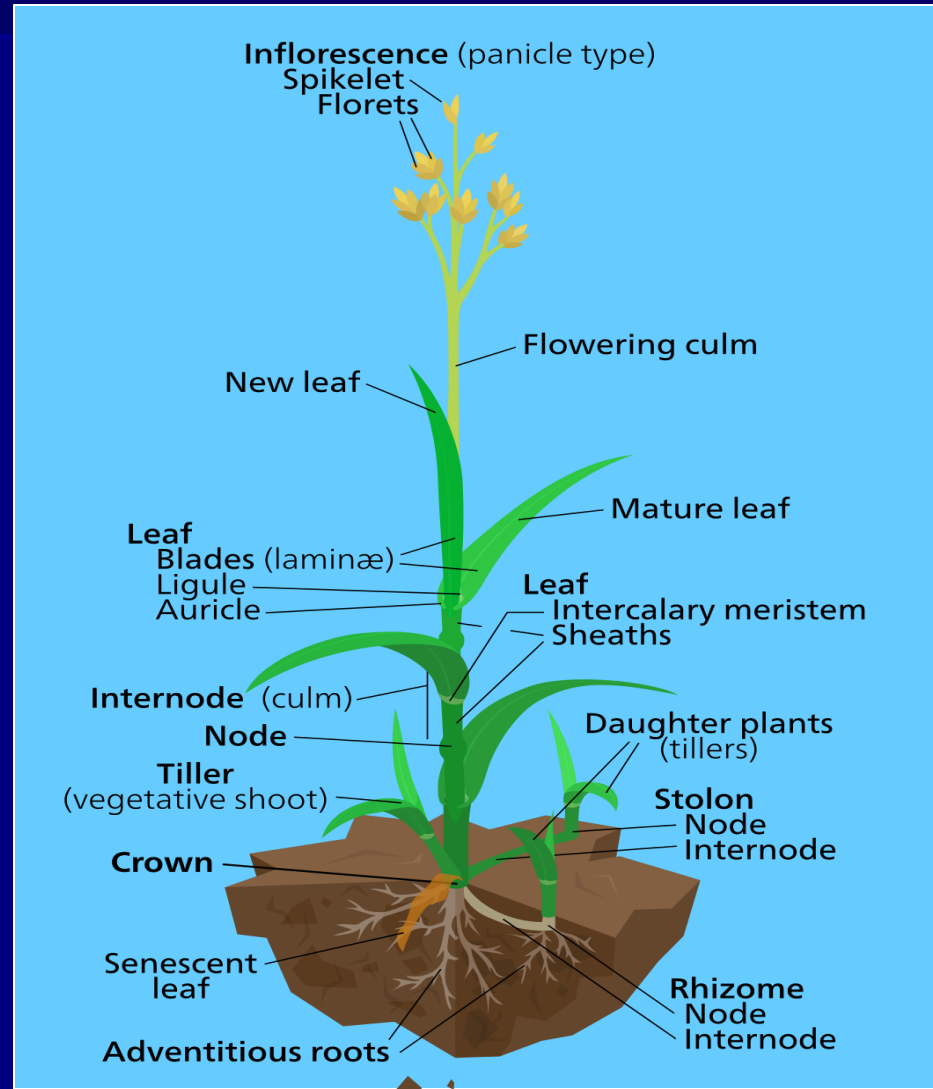
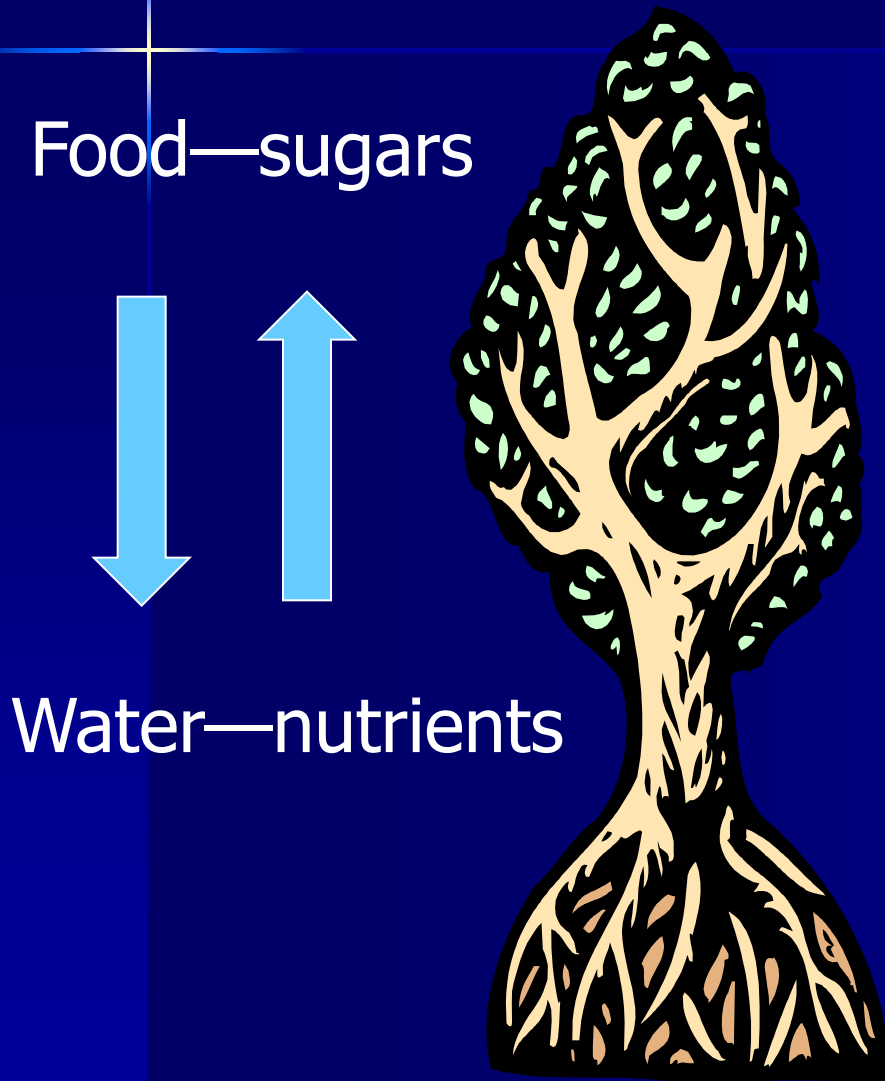
UNIVERSITY OF
FLORIDA
IFAS EXTENSION



What does a plant do?



What if it can't do this?



1. Determine if a 'REAL' problem exists...

- Identify the plant—observe.
 - Learn about it's normal characteristics.
 - Determine normal vs abnormal characteristics.
 - Look for symptoms and signs.
 - Symptoms: Changes in growth or appearance of a plant in response to a damaging factor.
 - Sign: Evidence of the damaging factor.



Types of symptoms

What abnormal does the plant do?

- **Necrosis:** diebacks, blights, leaf spots, and fruit, root, and flower rots.
- **Underdevelopment:** stunting, shortened internodes, yellowing
- **Overdevelopment:** galls, witches' brooms, and profuse flowering or leafing.
- **Alteration of normal appearance:** mosaic patterns, altered coloration of leaves and flowers, wilting.

Common symptoms: Necrosis

- Leaf spots
- Cankers
- Foliar blights
- Root rots





Cercospora leaf spot of crinum lily (symptoms no signs)



Common symptoms: Necrosis

- Leaf spots
- Cankers and diebacks
- Foliar blights



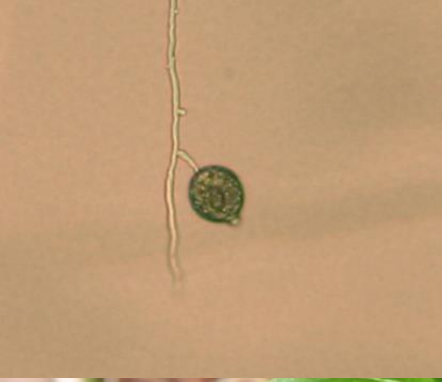
Photo by Dean Gabriel

Photo by A. L. Jones

Common symptoms: Necrosis

- Leaf spots
- Cankers
- Foliar blights
- Root rots





Foliar Phytophthora on Vinca

Common symptoms: Necrosis

- Leaf spots
- Cankers
- Vascular wilts
- Root rots



Soil borne organisms, usually fungi cause root rot. Abiotic factors also cause root rot—water logged soil.





healthy

inoculated

Plants on the left were not inoculated. Plants on the right were inoculated (note the lack of roots and the black coloration).



Common symptoms: Underdevelopment



Fusarium wilt of chrysanthemum, caused by
Fusarium oxysporum f. sp. *chrysanthemi*.

Common symptoms: Underdevelopment



Common symptoms: Overdevelopment



Peach leaf curl, caused by
Taphrina deformans.

**Overgrowth of leaf tissue
causes thickening and
distortion.**



**Galls form on all plant
parts, caused by
many pathogens.**

Crown gall of yononymous



jasmine



oleander

Common symptoms: Abnormal growth + appearance

- Wilting



Stem wilt of *Exacum* from INSV infection

Common symptoms: Abnormal growth + appearance



Common symptoms: Abnormal growth + appearance



Unknown ringspot virus symptoms on phalenopsis orchids

**Common symptoms:
Abnormal growth + appearance**



viburnum



Common signs: Mushrooms



Common signs: Fungus and mold



Armillaria produces white fungal growth under the bark of diseased plants. This sign is diagnostic. Removing the bark allows you to see the fungus.

Common signs: Fungus and mold

Sclerotinia sclerotiorum produces two distinct signs



**Common signs:
Fungus and mold**



Common signs: Spores and mildew



Credit: Doug Caldwell

Common signs: Spores and mildew



Credit: Stephen Brown

Common signs: Spores and mildew



Pustules on leaf of Eugenia

Credit: Stephen Brown

Common signs: Spores

Spores are usually too small to see. In this case many spores are released from the "puffball" mushroom together and they look like smoke rising from the fruiting body of this fairy ring causing fungus.



**Common signs:
Spores and slime**



Common signs: Spores and slime



In this case, many spores of *Colletotrichum* form on this rot blueberry and appear orange in

**Common signs:
Spores and mildew**





Powdery on Phlox

2. Look for Patterns...

- Look for patterns in the plant community.
 - Is the damage on more than one plant?
 - Is the damage on more than one plant species?
- Look for patterns on an individual plant.
 - Is the damage on the entire plant or certain parts?
 - Is the damage on certain age of growth?
- Look for patterns on an individual plant part.

Patterns of damage...

- Non-uniform, expanding damage patterns are usually caused by living factors, because of movement of feeding sites, life cycles, and population increases and decreases.
- Uniform, non-expanding damage patterns are usually caused by non-living factors such as chemical injuries, temperature changes, and mechanical damage.



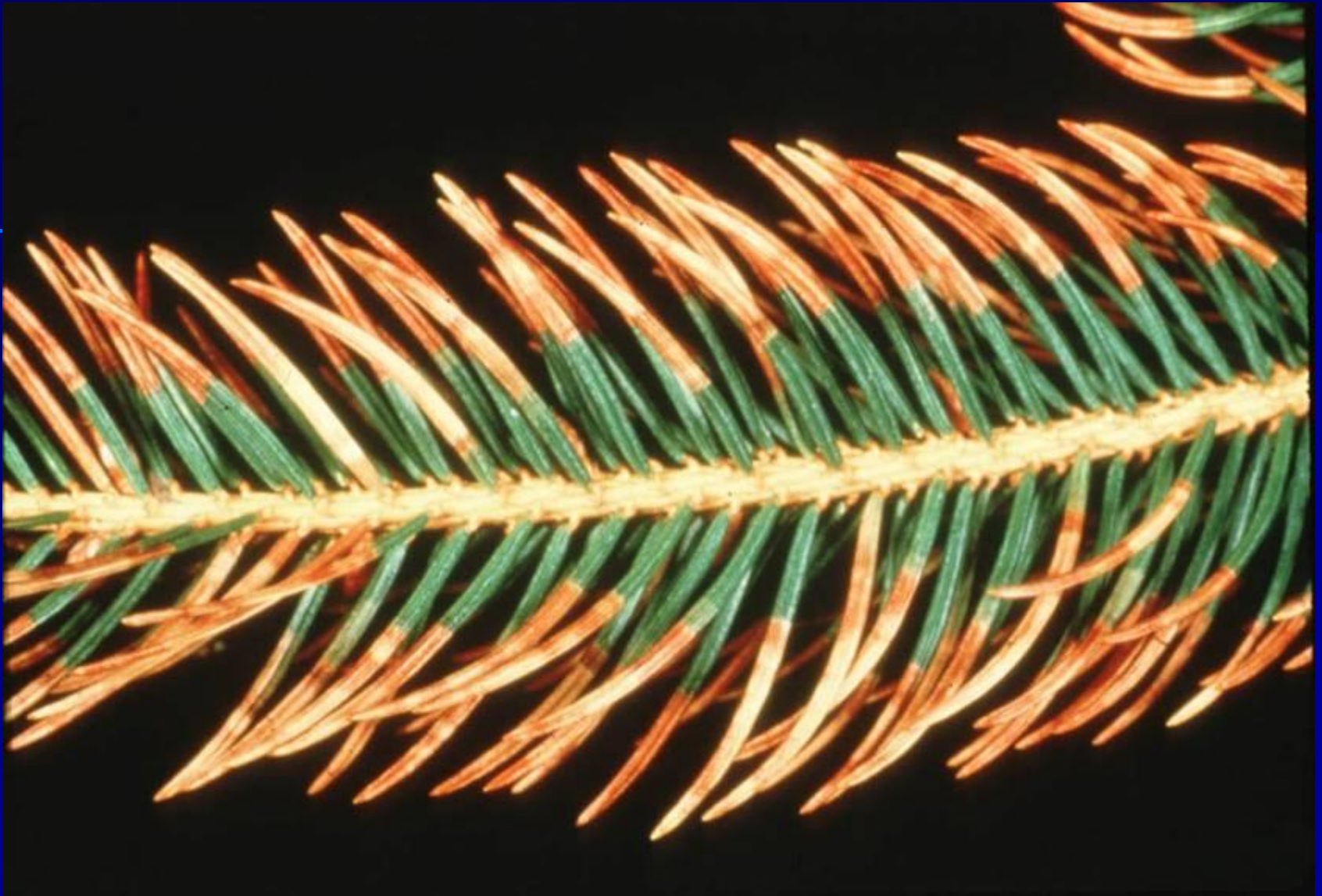


Woody container plants with Chemical injury .

Damage patterns on an individual plant part...



Douglas Fir with Rhabdocline Needlecast.



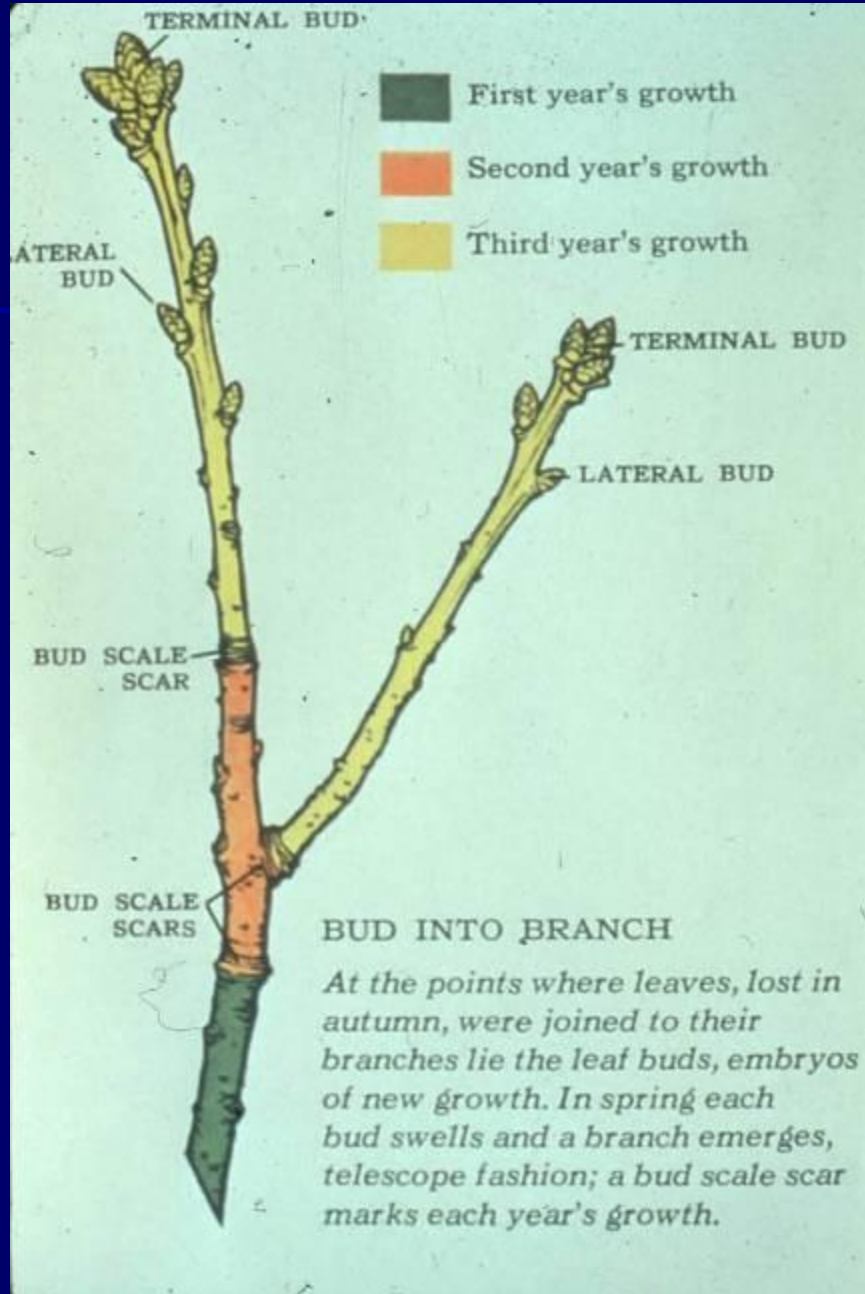
Fir with Freeze Injury.



3. Determine the **TIME development of the damage pattern...**

- Progressive spread with time to other areas is characteristic of living factors.
- Intensification of symptoms where damage first occurred but no spread to new sites is characteristic of non-living factors.







4. Ask QUESTIONS...

- Get a history of the problem.
- Get a history of all pesticides and fertilizers that have been applied.
- Find out the history of the site.
- Could environmental conditions explain the problem?
- Look for obvious symptoms and signs...
- Don't ignore the roots...
- Beware of secondary insects and pathogens...
- Be patient and avoid jumping to conclusions...

5. SYNTHESIZE the information...

- Refer to literature... Florida is different



University of Florida IFAS Extension

EDIS

Home FAQs & Help Local Offices IFAS Bookstore Advanced Search

- ▼ **Topics**
 - Agriculture
 - Community Development
 - Environment
 - Families & Consumers
 - 4H Youth Development
 - Lawn & Garden
- ▼ **Feature Pages**
 - Handbooks
 - Series
 - Curricula
- ▶ **Departments & Programs**
- ▶ **Authors**
- ▶ **Faculty & Staff Resources**

New and Revised Publications

The Green Value of Your Woods: A Summary of Ecosystem Services Provided by Forest Stewardship Lands in Florida

Lands enrolled in voluntary forest management and conservation programs, like the Forest Stewardship Program, promote good land management practices. In addition to benefiting the landowners enrolled in these programs, good land management provides ecosystem services to society. The Stewardship Ecosystem Services Survey calculated the physical and economic benefits of water resource protection, carbon sequestration and storage, timber production, and wildlife conservation. This 2-page fact sheet was written by Rose Godfrey, Chris Demers, Francisco Escobedo, Damian Adams, and Michael Andreu, and published by the UF Department of School of Forest Resources and Conservation, September 2013.
<http://edis.ifas.ufl.edu/fr381>

Pesticide Applicator Certification and Training

Certification is a process that allows a person to qualify to use pesticides in the course of his or her occupation. In Florida, the Florida Department of Agriculture and Consumer Services (FDACS) administers the certification process. Training provides instruction on proper pesticide use and handling to individuals who want to obtain or retain certification. In Florida, UF/IFAS Extension primarily conducts pesticide training, but other associations, industry, non-profit organizations, private companies, and federal and state government agencies also provide and assist with training. This 3-page fact sheet was written by F. M. Fishel, and published by the UF Department of Agronomy, October 2013.
<http://edis.ifas.ufl.edu/pi247>

How do we approach a plant problem?

A Five Step Process...

1. Determine that a **'REAL'** problem exists.
2. Look for **PATTERNS**, in the community, on an individual plant and on an individual plant part.
3. Determine the **TIME** development of the damage pattern.
4. Ask **QUESTIONS**.
5. **SYNTHESIZE** the information.

Send a sample to the Plant Disease Clinic

Mail samples to:
UF Plant Diagnostic Center
 Bldg 1291, 2570 Hull Rd
 Gainesville, FL 32611-0830
 Carrie L. Harmon, Plant Pathologist
 pdc@ifas.ufl.edu
 Phone (352) 392-1795
 Fax (352) 392-3438



Plant Disease Diagnosis Form (#2901, 1-3-13)

Clinic Staff Only:
 County: _____
 PDC #: _____
 Date: _____
 Pmt: _____

Submitter Information:

Name or reference ID: _____
 Company: _____
 Address: _____
 City/Zip: _____
 Phone No. _____
 Fax No.: _____
 Email: _____

Check all that apply:

Commercial
 (grower, consultant, pest control)
 Homeowner
 UF Extension or Research

Client Information:

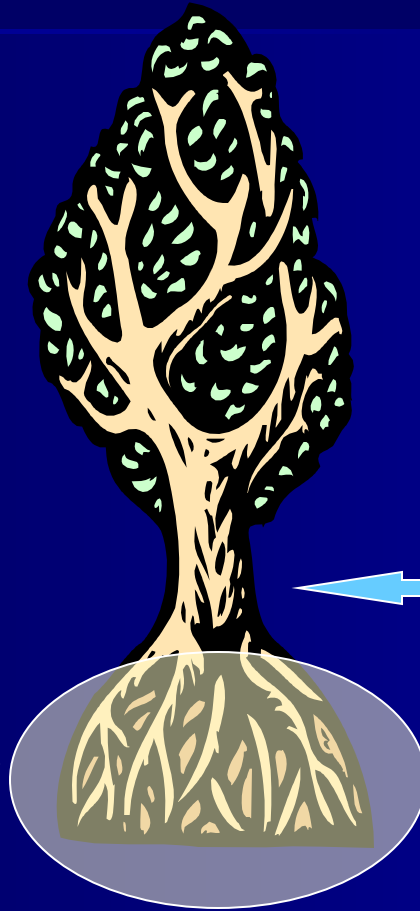
Information requested: <input type="checkbox"/>	Problem ID <input type="checkbox"/>	Control Recommendations <input type="checkbox"/>	Specimen ID <input type="checkbox"/>
Mail results to: <input type="checkbox"/> Submitter <input type="checkbox"/> Client Fax results to: <input type="checkbox"/> Submitter <input type="checkbox"/> Client Email results to: <input checked="" type="checkbox"/> Submitter <input checked="" type="checkbox"/> Client <small>(email is preferred to ensure timely delivery of your report)</small>	Bill to: <input type="checkbox"/> Submitter <input type="checkbox"/> Client OR <input checked="" type="checkbox"/> PAID - check enclosed or credit card info below	\$40 per sample, make check payable to University of Florida - FEPDC	

Samples must contain the right material:
an entire plant or several plants if practical.

Foliage diseases



Diseases may
show up on any
part of the
plant.



Keep most roots and
soil intact if possible



Check for injuries, disease
on the main stem/trunk



Dead Plants Tell no Tales



- Avoid dead plants
- Choose plants which show a range of symptoms: moderate to severe



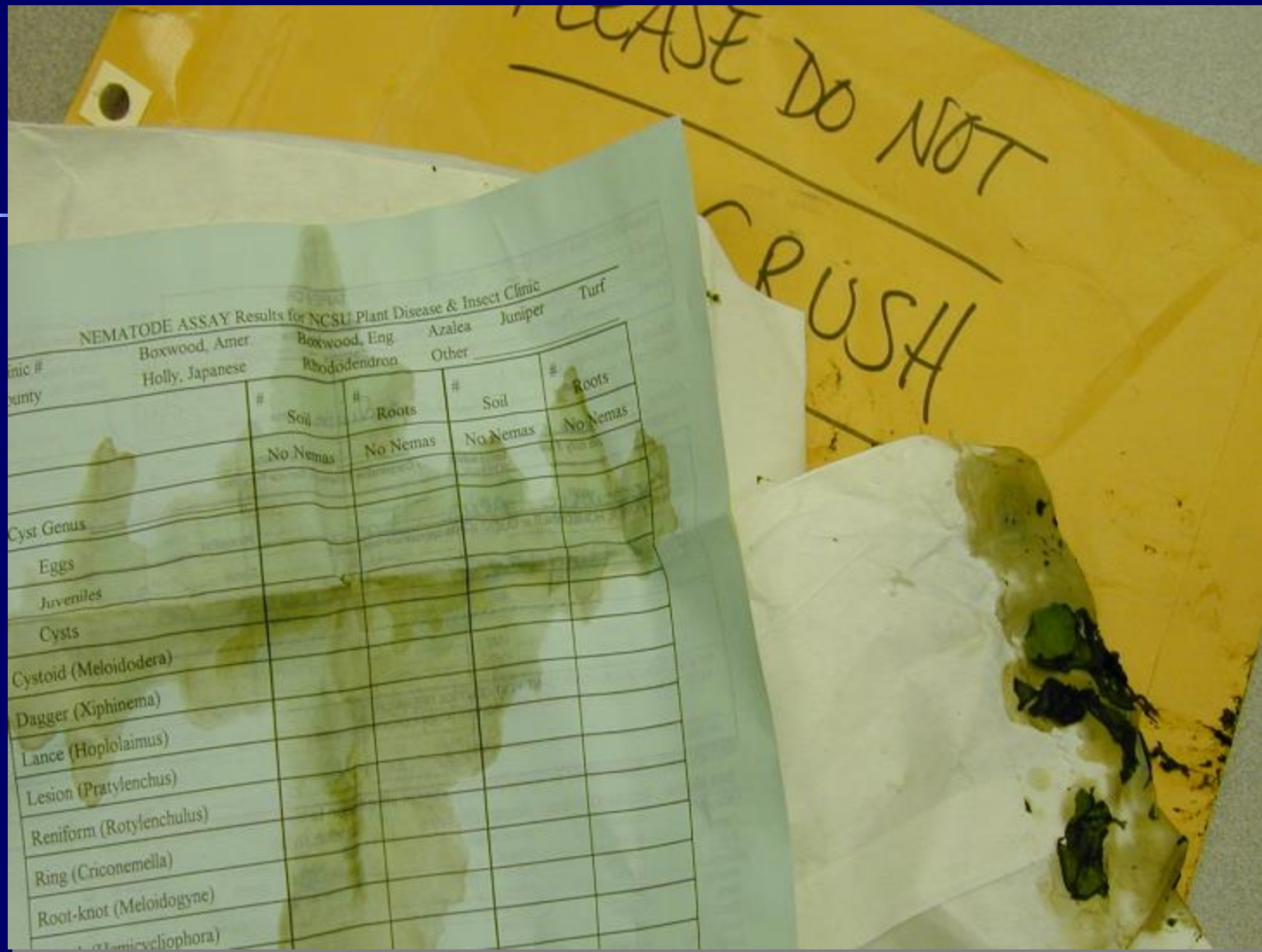
Sample Quality: Packaging & Shipping

- Keep soil on roots
- No extra water
- Wrap in dry paper then double bag in plastic
- Disinfect exterior of bags
- Strong crush-proof box, tape all seams

Packaging & Shipping



*Good
Intentions*



Actual Results

Packaging and Shipping blunders



Soil on foliage during shipping creates “diseases” that were not there when the sample was collected.

Packaging and shipping blunders

Sample
Soup



Don't add water or wrap in wet paper towels

Good Packaging



- Plastic bag to keep soil on roots
- Dry paper towels to protect leaves from contact with plastic bag

Thanks.

Phil Harmon
pfharmon@ufl.edu

Questions?

Phil Harmon
Department of Plant Pathology, UF
1453 Fifield Hall
Gainesville, FL 32611

Phone: 352 273-4622
Email: pfharmon@ufl.edu



Diagnostic results

Fungicide recommendations given

- Compare active ingredients to the list of available products for homeowners
- Homeowner's guide to fungicide on EDIS—availability varies from location to location and store to store

Common Name	Brand Name*	Turf**	Orna.
Captan	Hi-Yield, Bonide	X	X
Chlorothalonil	Ortho, Hi-Yield, Bonide, Monterey, Dexol, Fertilome		X
Chlorothalonil + Diazinon	Fertilome		X
Copper Ammonium***	Fertilome		X
Copper Hydroxide	Fertilome, Hi-Yield	X	X
Copper Sulfate	Hi-Yield, Dexol, Bonide		X
Fosetyl-Al	Monterey	X	X
Lime Sulfur	Bonide, Hi-Yield		X
Maneb	Hi-Yield		X
Myclobutanil	Spectracide	X	X
Neem Oil	Bonide, Green Light		X
Phosphorous acid	Monterey	X	X
Potassium bicarbonate	Bonide, Monterey		X
Propiconazole	Fertilome, Bonide		X
Quaternary Ammonium	Hi-Yield, Parkway	X	X
Sulfur	Green Light, Fertilome, Hi-Yield, Safer, Bonide		X
Tebuconazole	Bayer Advanced		X
Thiophanate Methyl	Green Light, Fertilome, Scotts, Bonide		X
Triadimefon	Green Light, Hi-Yield, Bayer Advanced, Bonide	X	