

## Diagnosing Plant Diseases

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Real Life Solutions

UWEXTENSION  
INSTITUTE OF AGRICULTURE  
AND FORESTRY

## A correct diagnosis is useful information



- \* Don't guess; have the problem diagnosed
- \* You are able to make better decisions
- \* You may be able to cut losses
- \* Allows you to plan for the future

Bacterial leaf scorch, vascular wilt disease of shade trees, especially pin oak

## Plant Disease Diagnosis, Where do you start?



Is this boxwood blight?

## A common mistake is to focus primarily on the symptomatic tissue



- \* Examine all plant parts:
- \* Roots
- \* Stems
- \* Leaves

## Boxwood Blight – leaf spots



Large circular leaf spots are diagnostic for boxwood blight.

## Boxwood Blight Stem Lesions



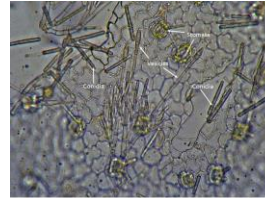
If leaves aren't present, look for purple to black lesions on twigs.

## Sporulation on stem lesion



To confirm a disease we look for the presence of the plant pathogen. In this case, *Calonectria pseudonaviculata*, the causal fungus of boxwood blight. *Calonectria* is sporulating on a stem lesion.

## *Calonectria pseudonaviculata*



\* Microscopy is not the only way to confirm the presence of a fungal pathogen, but works well for many.

## Gray leaf spot/Pyricularia



\* A digital image is helpful, but symptoms aren't distinctive enough to diagnose this disease on a tall fescue lawn.  
\* Ask for a sample; one that's not completely dead

## Pyricularia, the cause of gray leaf spot was sporulating on leaves on this plug.



## Identify the host, Or get derailed from the start

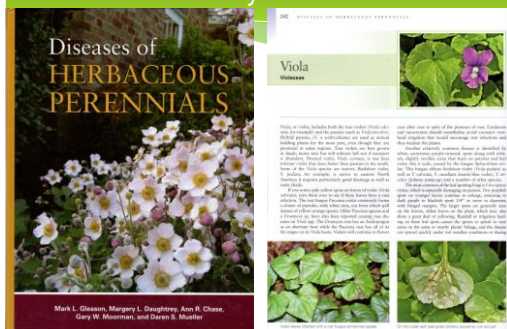
- \* Plants have signature disease and insect pests
- \* It's important to identify the host
- \* Is it KY bluegrass or tall fescue; bermudagrass or zoysia?
- \* A boxwood or Japanese holly?

## Identify host

Turf was misidentified as fescue with brown patch; it was bluegrass with active dollar spot disease.



## Most references list plant problems by host



## A Diagnostician is inquisitive and a good observer

- \* Why is that tree dropping leaves early?
- \* Why does sod pull up easily?
- \* Why is my tree dying?
- \* What's that orange crud on my cedar?
- \* Learn to look for clues that help with diagnosis

## Early Leaf Drop on red maple. Why?

Leaf drop was the result of a leaf spot disease.



## Look closely for clues

The most important clue here was the dead grass along the retaining wall. The grounds manager had improperly used a soil sterilant herbicide which was picked up by the roots of the woody ornamentals. Remember: multiple plant species affected, could mean pesticide injury.



## Consider the weather

- \* Wet weather is favorable for downy mildews, leaf spot, rusts, or root rot diseases.
- \* Cool, humid weather is favorable for gray mold (Botrytis)
- \* Hot, humid weather favors Rhizoctonia diseases
- \* Very hot weather favors southern blight

## Cool, wet = Botrytis Blight



Botrytis cinerea (gray mold) on pansy.



## Southern Blight is a hot weather disease



*Sclerotium rolfsii*, the fungus that causes southern blight, is identified by white mycelium and spherical sclerotia at the base of stems.

## Look for Signs and Symptoms of Disease. Do you know the difference?

- \* Symptoms – damage to plant tissue
- \* Signs – can you see the plant pathogen?

## Symptoms and Signs of Disease



Powdery Mildew/Princeton Elm

Yellow leaf tissue = symptom



White mycelium = sign of disease

## Sign of Disease



### Can you see the pathogen?

Powdery mildew – powdery, white fungal growth is a sign of disease

## Downy Mildew/Impatiens- look for sporulation on the underside of the leaf



## Orange rust/Blackberry



- \* Rusts diseases are often diagnosed by the presence of pustules of orange spores on leaves
- \* Rust spores may be seen en masse on leaves, twigs, fruit or stems

## Bacteria oozing from apple stem infected with fire blight



- \* Fire blight of apple, pear, cotoneaster and pyracantha is most often diagnosed by symptoms (blighted shoots)
- \* It's rare to see signs (bacterial ooze on stems)

## Examples of Disease Symptoms,

- \* Stunting
- \* Chlorosis , Necrosis
- \* Leaf spots, leaf blight
- \* Cankers
- \* Rotted roots
- \* Soft Rot

## Downy Mildew-garden impatiens



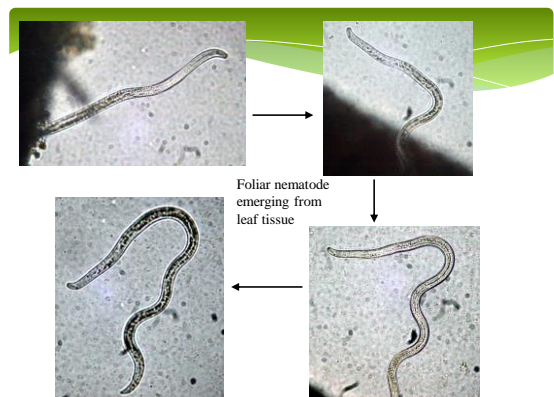
- \* Symptoms
- \* Leaf drop
- \* Lack of flowers
- \* "Stemmy" plants – the "stick" phase of disease



## Foliar nematode damage



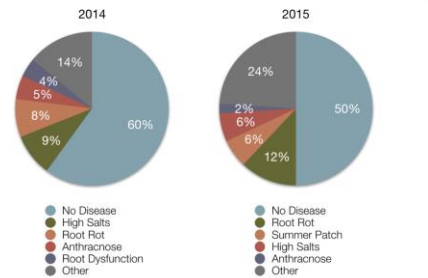
- Leaf is backlit by the sun to observe symptoms of foliar nematode.
- Nematode movement is restricted by veins in the leaf
- Common on shade loving perennials



## Abiotic Problems

- \* Water stress or excess
- \* Cold or heat injury
- \* Pesticide injury
- \* pH/ nutritional problems

## Bentgrass Putting Greens Diagnoses



Keep in mind that many of the plant problems are abiotic issues.

## Chlorosis on dogwood due to nutrient deficiency



## Herbicide injury to maple



## Compare plants to clearly see the differences



- \* How are the diseased plants different than the healthy?
- \* Different variegation and clearly stunted from the virus infection

## Hosta 'August Moon'

Why does one have green stripes? It's infected with Hosta Virus X





## Assist with diagnosis

- \* One of the most helpful things that you can do for a diagnostician is to supply a series of images that will aid with diagnosis.
- \* Take images that tell a story. The whole plant, the site, close ups of symptomatic plant tissue.

## Helpful- send a digital image

Pythium blight on a golf green.



This image shows the movement of a disease on a golf green. Few fungi move with water, but Pythium is one.

## Red Thread



This turf disease is diagnosed by a symptom (patch of diseased turf) and sign (red threads of mycelium).

## Collect a Proper Specimen

- \* When possible send the whole plant with soil or growing medium to the diagnostic lab
- \* If the plant is too large, collect symptomatic leaves, stems and or roots. Include a pint bag of soil or growing medium
- \* Ship or deliver to the lab as soon as possible before the sample deteriorates.

## Phytophthora root rot

Collect the whole plant if possible. Don't forget to look at roots.



## Use a moist chamber to make things pop

- \* Place a plug of diseased turf or leaves/stems in a plastic box or bag with a moist paper towel for 24-48hrs at room temp
- \* Check daily for fungal mycelium or sporulation
- \* Moist chambers work well for fungal pathogens that produce abundant mycelium (Rhizoctonia, Sclerotium, Sclerotinia) and for those that cause leafspots, blights, anthracnose, downy mildew

## Using a moist chamber to encourage the growth of Pink Snow Mold



Place specimen in a plastic storage container or plastic bag with a moistened paper towel. Place at room temperature, away from sunlight. Check daily.

## Pink Snow mold 24hrs later



The pink snow mold pathogen was visible within 24 hours in a moist chamber.

## Resources for Plant Problem Diagnosis

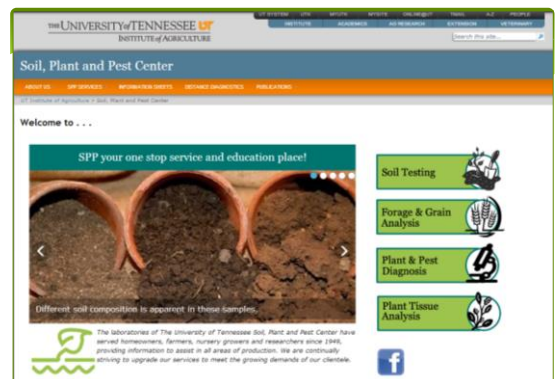
## Soil, Plant and Pest Center Ellington Agricultural Center, Nashville



## Soil, Plant and Pest Center

- \* Soil Testing
- \* Insect Identification
- \* Plant Problem Diagnosis

Ellington Agricultural Center  
Nashville, TN





## New Presentations, Publication, Information

**Soil, Plant and Pest Center**

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Publications • Presentations • New Information

Updated February 2016

- Insect Management: Alternatives to Neonicotinoid use in Landscapes and Garden Centers
- Edible Ornamental Plant Pest Management: Options for Controlling Arthropod Pests on Fruiting Trees and Shrubs in Residential Landscapes
- An Ornamental Plant Pest Management Guide and Pesticide Rotation Planning Aid: Control Options for Nursery, Greenhouse, Interiorscape, and Commercial Landscape Use Sites
- Nursery Inspectors 2016
- Systems approach to disease management 2016

**For the latest news and information, be sure to visit us on Facebook**

**External Links**

- Activistive testimony: a new pest of aborigine in Tennessee

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Respond faster to turn on this badge

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Write something...

## Root knot damage to tomato

**Soil, Plant and Pest Center**

Root knot nematodes are one of the biggest problems facing home gardeners. Once your garden dirt is infested, what are your options? Below is a link to an updated publication by Dr. Bob on Tennessee Control in Home Gardens.

[Tennessee Control in Home Gardens](#)

## Publications from UT Extension

**UT Extension Publications**

Advancing Tennessee • Publications • Insects, Plant Diseases and Weeds

**Insects, Pests, Plant Diseases and Weeds**

The Site: Publications

- IP 214-P • IP 243-16 Insects: The Garden Test Catalogue and the Control of the system test category: including control measures. [Insecticide Pests in use](#)  
Price: \$5.00  
Web: \$10.00 (1-100)
- IP 341-P • IP 343-15 Insects: The System and its Control: Overview of the system test category: including control measures. [Insecticide Pests in use](#)  
Price: \$5.00  
Web: \$10.00 (1-100)
- IP 210-P • IP 210-15 Insects: Systemized Insecticide Overview of the system test category: including control measures. [Insecticide Pests in use](#)  
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## Apps for your smart phone or tablet

## IPMPro App

**IPM Pro**

Flatheaded Appletree Borer

1 2 3 4

**IPM Pro**

Powdery Mildew 2013

**Container nursery:** Acetamiprid (Heritage)[11], Chloranthal (Daconil Ultra and Weatherstrips)[MS], Chloranthal phosphate methyl (Spectro)[1-16], Chloranthal propiconazole (Concert)[MS], Kresoxim-Methyl (Cygnus)[11], Mybuhalan (Eagle, Synthene, Novit)[3], Thiophanate Methyl (Clearys 3336, OHP 8072)[1], Tefluthiazole (Tongue)[3], Pyrethrin D (Affirm, Veranda-D)[19], Pyridostrobin (Imagryl)[11], Pyridostrobin Boscalid (Paganet)[11-17], Trifluoromethyl (Strike)[3], Trifluoromethyl (Compass O)[11], Trifluoromethyl (Tenguard)[3].

**Field nursery:** Acetamiprid (Heritage)[11], Chloranthal (Daconil Ultra and Weatherstrips)[MS], Chloranthal phosphate methyl (Spectro)[1-16], Chloranthal propiconazole (Concert)[MS]

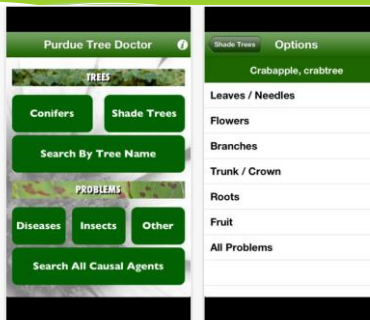
**IPM Pro**

Last Date to Apply CRF in Summer

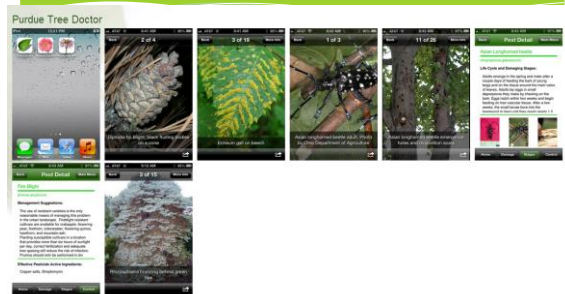
**Brief Explanation**  
Apply a short longevity CRF now (dependent upon release rate) to stimulate a growth flush that should adequately harden off before the first frost. However, dependent upon formation and release rate of CRF applied in the spring, CRF application may not be necessary. Only apply a CRF if a soil test indicates additional fertilization is necessary.

**Consequences of Delay/Incomplete**  
Later CRF application could result in a growth flush that does not adequately harden off, and tissue will be susceptible to freeze damage. Damaged tissue is not aesthetically pleasing, and could be more susceptible to pest infestation. CRF release over winter results in money loss and

## Purdue Tree Doctor



## Purdue Tree Doctor App



## Final Thoughts

- \* To be good at plant problem diagnosis you need to do it often.
- \* A good diagnostician is inquisitive, persistent and a good observer.
- \* Training and experience are key.

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