THE UNIVERSITY OF GEORGIA
COLLEGE OF AGRICULTURAL & ENVIRONMENTAL SCIENCES

Extension Plant Pathology Update

April 2013

Volume 1, Number 3 Edited by Jean Williams-Woodward

Plant Disease Clinic Report for March 2013

By Ansuya Jogi and Jean Williams-Woodward

The following tables consist of the commercial and homeowner samples submitted to the plant disease clinics in Athens and Tifton for March 2013 (Table 1) and one year ago in April 2012 (Table 2). Sample numbers are starting to pick up, but many of the problems we've seen in March were due to abiotic disorders such as cultural and/or environmental stresses (i.e. cold injury, past drought stress, poor root growth, etc.). Likely, the recent colder temperatures have slowed plant growth and plant disease development. We did have a few interesting samples, including cedar rusts and bulb mites on tulip (see pages 6 and 7).

Looking ahead based upon April samples from last year and current weather conditions, we could expect more fungal leaf spot diseases, fire blight, rust, powdery mildew and downy mildew diseases.

Table 1: Plant disease clinic sample diagnoses made in March 2013

Host Plant	Sample Diagnosis	
	Commercial Sample	**Homeowner Sample**
Arborvitae	Decline; Dieback, Abiotic disorder	
Azalea		Cultural/Environmental Problem, Abiotic disorder
Bentgrass	Anthracnose (*Colletotrichum cereale*)	
Blueberry	*Colletotrichum* sp./spp. Unknown, General	Cultural/Environmental Problem, Abiotic disorder
Boxwood		Root Problems, Abiotic disorder
Camelia		Camellia Petal; Flower Blight (*Ciborinia camelliae*) Root Problems, Abiotic disorder Environmental Stress; Problem, Abiotic disorder Tea Scale (*Fiorinia theae*)
Cantaloupe	Not Pathogen; Saprophyte, Secondary Agents; Saprophytes; Unspecif.	

Centipede	*Rhizoctonia solani* *Bipolaris* sp./spp. Cultural/Environmental Problem, Abiotic No Pathogen Found	
Cherry-laurel		Cultural/Environmental Problem, Abiotic disorder
Creeping Jenny	Unspecified Pathology (*Cladosporium* sp.)	
Cryptomeria	Decline; Dieback, Abiotic disorder	Environmental Stress; Problem, Abiotic disorder
Dogwood	Spot Anthracnose *(Elsinoe corni)*	
Eastern red cedar	Cedar-Apple Rust *(Gymnosporangium juniperi-virginianae)* Cedar-Quince Rust (*(G. clavipes)* Cedar-Hawthorn Rust *(G. globosum)*	
Fungus		Jelly Fungus (*Tremella* sp./spp.)
Holly		Cultural/Environmental Problem, Abiotic disorder
Jasmine	Cultural/Environmental Problem, Abiotic disorder	
Oats	*Drechslera* sp./spp. Cultural/Environmental Problem, Abiotic No Pathogen Found	
Pepper	*Pythium* Root and/or Crown Rot (*Pythium* sp.) Abiotic disorder	
Ryegrass	No Pathogen Found	
St. Augustine grass		Take-all (*Gaeumannomyces* sp.) Rhizoctonia Blight (*Rhizoctonia solani*) Environmental Stress; Problem, Abiotic disorder
Strawberry	*Rhizoctonia* sp./spp. Viruses Spider Mites, Family Tetranychidae	
Tobacco	Sclerotinia Rot (*Sclerotinia sclerotiorum*) *Rhizoctonia solani*	
Tulip	Bulb Mite (*Rhizoglyphus* sp./spp.) Fusarium Basal Rot (*Fusarium* sp./spp.)	
Watermelon	Gummy Stem Blight, [*Didymella* (ana. *Phoma*) *bryonae* (*cucurbitacearum*)] Fusarium Wilt, (*Fusarium oxysporum*)	
Wheat	Powdery Mildew (*Erysiphe* sp./spp.) Tan Spot; Yellow Leaf Spot [*Pyrenophora* (ana. *Drechslera*) *tritici-repentis*] Stripe Rust; Yellow Rust (*Puccinia striiformis* var. *striiformis*) No Pathogen Found, Identification Analysis Cultural/Environmental Problem, Abiotic disorder	

Table 2: Plant disease samples diagnoses from A YEAR AGO – April 2012

Host Plant	Sample Diagnosis	
	Commercial Sample	Homeowner Sample
Apple		Fire Blight (*Erwinia amylovora*) Undetermined Injury or Pest, Identification Analysis
Azalea	No Pathogen Found	
Barley	Spot Blotch (*Cochliobolus* sp./spp.)	
Bean	*Pythium* Root and/or Crown Rot (*Pythium* sp.) Herbicide Injury; Exposure, Abiotic disorder	
Bentgrass	*Rhizoctonia* Root; Crown Rot (*Rhizoctonia* sp.) Pink Snow Mold; Fusarium Patch [*Monographella* (*Microdochium*) *nivalis* (*nivale*) *nivalis*] *Bipolaris* sp./spp. Anthracnose (*Colletotrichum cereal*) No Pathogen Found	
Bermudagrass	Large Patch [*Thanatephorus* (*Rhizoctonia*) *cucumeris* (*solani*)] *Bipolaris* Spot Blotch (*Bipolaris* sp./spp.) Spring Dead Spot (*Ophiosphaerella* sp./spp.) No Pathogen Found Environmental Stress; Abiotic disorder Cultural/Environmental, Abiotic disorder Insect Damage, Unidentified Insect Saprophytic Fungi and Yeasts	Pythium Root and/or Crown Rot, (*Pythium* sp./spp.) Spring Dead Spot (Ophiosphaerella sp./spp.) Environmental Stress; Problem, Abiotic disorder Cultural/Environmental Problem, Abiotic disorder
Blackberry	Orange cane blotch (*Cephaleuros virescens*) Orange Rust (*Gymnoconia nitens*) Unknown Abiotic Disorder, Abiotic disorder	
Blueberry	Chemical Injury, Abiotic disorder Nutrient Imbalance, Abiotic disorder Abiotic disorder Unknown Abiotic Disorder, Abiotic disorder	Cultural/Environmental Problem, Abiotic disorder
Boxwood		Cultural/Environmental Problem, Abiotic disorder
Butterfly-bush	*Phytophthora* Crown, Root and/or Stem Rot, (*Phytophthora* sp./spp.)	
Cabbage	*Rhizoctonia* Crown and Root Rot, [*Thanatephorus* (*Rhizoctonia*) *cucumeris* (*solani*)] Insufficient Sample, Identification Analysis	
Camellia	Oedema; Edema, Abiotic disorder No Pathogen Found	
Cantaloupe	*Phytophthora* Crown, Root and/or Stem Rot, *Phytophthora* sp./spp.	
Cedar		Environmental Stress; Problem, Abiotic disorder

Centipedegrass	Large Patch [*Thanatephorus* (*Rhizoctonia*) *cucumeris* (*solani*)] Root Decline of Warm Season Grasses, [*Gaeumannomyces graminis* var. *graminis*] Fairy Ring, Various fungi Decline; Dieback, Abiotic disorder Environmental Stress; Abiotic disorder Cultural/Environmental Problem, Abiotic	*Rhizoctonia* Blight (*Rhizoctonia solani*) Cultural/Environmental Problem, Abiotic disorder No Pathogen Found
Coleus	No Pathogen Found	
Confederate rose		Unknown, General
Corn	*Rhizoctonia* Root; Crown Rot (*Rhizoctonia* sp.) No Pathogen Found Chemical Injury, Abiotic disorder	
Dogwood	No Pathogen Found	Environmental Stress; Problem, Abiotic disorder
Fescue		Rhizoctonia Blight (*Rhizoctonia solani*)
Fig tree		Winter Injury, Abiotic disorder
Grape		Black Rot [*Guignardia*(*Phyllosticta*) *bidwellii* (*ampelicida*)] Environmental Stress; Problem, Abiotic disorder
Holly		Environmental Stress; Problem, Abiotic disorder
Japanese Cleyera		Cultural/Environmental Problem, Abiotic disorder
Juniper		Phomopsis Tip Blight; Needle Blight (*Phomopsis juniperovora*)
Magnolia		Chemical Injury, Abiotic disorder
Maple		*Raffaelea* Fungus (*Raffaelea* sp.) Cultural/Environmental Problem
Melon	Rhizoctonia Root; Crown Rot (*Rhizoctonia* sp.)	
Oak		Herbicide Injury; Exposure, Abiotic disorder
Pansies	Black Root Rot (*Thielaviopsis basicola*) *Pythium* Root and/or Crown Rot (*Pythium* sp.)	
Peach	*Rhizopus* sp./spp. Scale Insects, Order Hemiptera	
Pecan	Chemical Injury, Abiotic disorder	
Pepper	*Pythium* Damping Off, *Pythium* sp./spp.	
Persimmon		Environmental Stress; Problem, Abiotic disorder
Petunia	Black Root Rot (*Thielaviopsis basicola*)	
Potato	*Streptomyces scabies*	
Rose		No Pathogen Found Unknown Abiotic Disorder

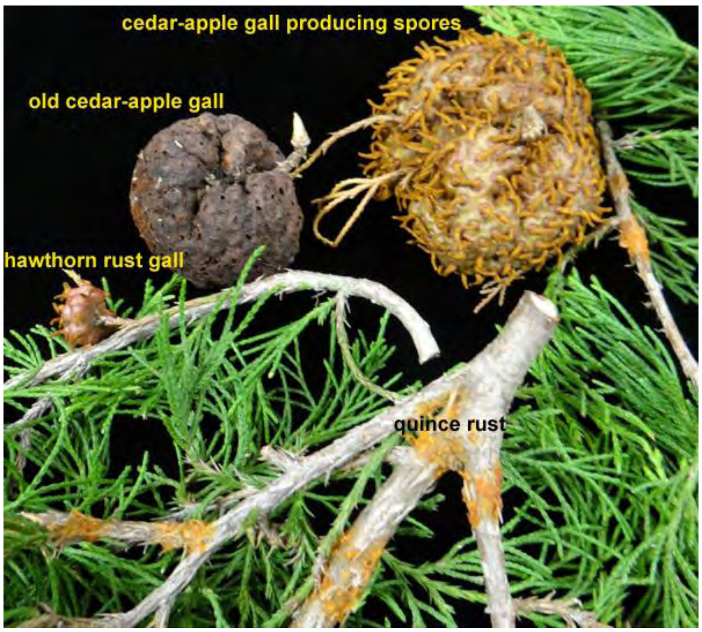
Squash	Powdery Mildew (*Sphaerotheca* sp./spp.) *Rhizoctonia* Root; Crown Rot (*Rhizoctonia* sp.) Bacterial Leaf Spot (*Pseudomonas syringae*) Physiological Responses, Abiotic disorder	
St. Augustine grass	Root Decline of Warm Season Grasses, (*Gaeumannomyces graminis* var. *graminis*)	Take-all (*Gaeumannomyces* sp.) Gray Leaf Spot [*Magnaporthe* (ana. *Pyricularia*) *grisea*]
Strawberry	*Rhizoctonia* Crown and Stem Rot (*Rhizoctonia* sp./spp.) *Phytophthora* Crown, Root and/or Stem Rot, (*Phytophthora* sp./spp.) Anthracnose; *Colletotrichum* Leaf Spot, (*Colletotrichum* sp./spp.) Spider Mites, Family Tetranychidae	
Tea Olive		Environmental Stress; Abiotic
Tobacco	*Pythium* Damping Off (*Pythium* sp./spp.) *Pythium* Root and/or Crown Rot (*Pythium* sp.) *Rhizoctonia* Foliar/ Aerial/ Web Blight, (*Rhizoctonia solani*)	
Tomato	Tomato Spotted Wilt Virus (TSWV) *Fusarium* Wilt (*Fusarium oxysporum*) Abiotic disorder	Unknown, General
Watermelon	*Fusarium* Wilt (*Fusarium oxysporum*) Gummy Stem Blight [*Didymella* (ana. *Phoma*) *bryonae* (*cucurbitacearum*)] *Pythium* Root and/or Crown Rot (*Pythium* sp./spp. *Rhizoctonia* Stem and Root Rot (*Rhizoctonia* sp./spp.) No Pathogen Found Unknown Abiotic Disorder, Abiotic disorder Chemical Injury, Abiotic disorder	
Wax Myrtle	No Pathogen Found	
Wheat	Tan Spot; Yellow Leaf Spot [*Pyrenophora* (ana. *Drechslera*) *tritici-repentis*) Leaf Rust; rust (Puccinia sp./spp.) Powdery Mildew (Erysiphe sp./spp.) Fusarium Stem Rot (Fusarium sp./spp.) Environmental Stress; Abiotic disorder No Pathogen Found	
Zoysiagrass	Large Patch [*Thanatephorus* (*Rhizoctonia*) *cucumeris* (*solani*)] *Curvularia* Blight; Leaf Spot (*Curvularia* sp./spp.) Fairy Ring, Various fungi Insect Damage, Unidentified Insect Environmental Stress; Abiotic disorder Cultural/Environmental Problem, Abiotic	*Pythium* Root and/or Crown Rot (*Pythium* sp./spp.) *Rhizoctonia* Blight (*Rhizoctonia solani*) Cultural/Environmental Problem, Abiotic disorder Unknown Abiotic Disorder

Update: Home Landscapes

Rust Fungi in Eastern Red Cedar Trees

By Elizabeth Little

Each spring, as the leaves of Rosaceous plants such as apple, pear, and hawthorn are emerging, the Eastern Red Cedar (*Juniperus virginiana*) produces the bright orange fructifications of a group of rust fungi in the genus *Gymnosporangium*. Early spring rains induce the cedar rust galls to break hibernation and produce gelatinous orange protrusions that release basidiospores. However, these basidiospores do not re-infect the cedar tree but instead drift off to find the appropriate secondary Rosaceous host. On the leaves and/or fruit of the secondary host, the fungus will mate and produce a different type of brightly colored spores. These spores only infect the cedar tree and this infection results in the cedar galls that can take up to two years to mature.



Quince rust on Bradford pear fruit

The most common and visible cedar rust is cedar-apple rust (*G. juniperi-virginianae*). Cedar-apple rust forms large round galls on the small branches of the cedar trees. The basidiospores produced by the galls infect the newly emerging leaves of apple and crabapple. On susceptible cultivars, the resulting leaf lesions can cause the leaves to fall during years of heavy infection. Fungicide sprays may help on susceptible trees. However, in the home and/or organic garden, the use of apple cultivars with resistance to both cedar apple rust **and** fireblight is highly recommended. Removal of cedar trees in the immediate area can help but may not be practical. Check the Georgia Homeowner's Pest Management Guide for recommended treatments and cultivars.

Two other cedar rusts are common in Georgia, quince rust (*G. clavipes*) and hawthorn rust (*G. globosum*). The perennial galls of quince rust are formed under the bark on the cedar branches and are nearly invisible until the gelatinous protrusions emerge from cracks in the bark (see image). The spores produced by these galls infect the fruits of the apple, quince, mayhaw, and pear (see image). Hawthorn rust produces small inconspicuous galls on the cedar (see image). This rust infects the leaves and shoots of ornamental hawthorn.

Interesting samples: Spot Anthracnose on dogwood and Bulb mites on tulips

By Jean Williams-Woodward

Spot Anthracnose of Dogwood: Spot anthracnose, not to be confused with the lethal canker disease, dogwood anthracnose, is common on flowering dogwoods in the Spring. Spot anthracnose, caused by the fungus, *Elsinoe corni*, causes small, circular, reddish spots on the bracts and leaves. Severe infection can cause leaf and bract distortion. Spot anthracnose is mostly an aesthetic disease. It will not kill the trees or significantly affect tree growth. Once spots are seen, it is too late to manage the disease with fungicides. Fungicides are generally not needed nor recommended unless in nurseries where tree's aesthetics can affect sales. Fungicides needed to be applied at bud break to reduce infection and disease development.

Reddish, circular lesions due to Spot Anthracnose on dogwood bracts (far left) and leaves (left). (Photos by Alan Windham, University of Tennessee)

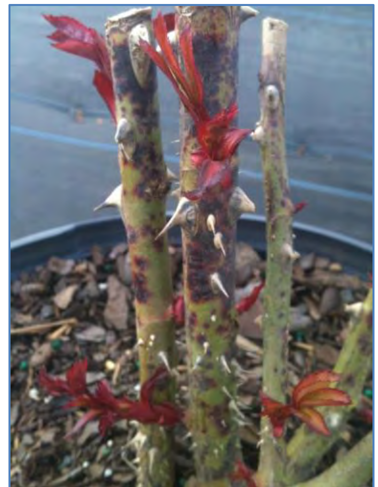
Bulb Mites: A commercial tulip sample was submitted with foliage dieback and poor growth symptoms (see image). What was interesting about this sample was that based upon the symptoms, the problem was likely due to a bulb rot. However, after examining the bulbs, the bulbs were intact with only a minor amount of decay. When examining the bulbs under the dissecting microscope, the cause of the foliage decline was evident. The culprits were bulb mites (*Rhizoglyphus robini*). The mites enter the bulb, feeding between bulb scales. Infestation often results in secondary infection by soil pathogens, including *Fusarium*, causing a basal rot. Infested bulbs should be removed and discarded.

Bulb mites in between bulb scales (left); mite (above); damaged tulips showing scorching foliage (right).

Watch out for Downy Mildews on Ornamental Plants

By Jean Williams-Woodward

The cooler, wet weather in late March and now, early April, is the perfect environment for downy mildew diseases. In the March Extension Plant Pathology Update, I wrote about downy mildew on shrub roses. If roses were wintered within poly houses, then it is likely downy mildew symptoms may be seen on the foliage. On newly canned bare-root plants, I have seen the purplish lesion symptoms of downy mildew on the canes/stems (see image to the right). Plants in nurseries need to be sprayed with fungicides to protect the foliage from infection. See the March update for a list of fungicides.



__Above:__ Downy mildew infected rose canes. __Below:__ Downy mildew sporulation on the underside of an impatiens leaf and infected plants in a landscape bed (below). (Impatiens images by Alan Windham, UT)

Downy mildew on basil has also been seen in a greenhouse. Basil downy mildew causes significant problems within greenhouses. Infected leaves will yellow, wilt, and decay quickly. The pathogen, *Peronospora* sp., produces heavy sporulation on the leaf underside. The sporangia are spread via irrigation water splash and air currents. This mildew is also known to survive in seed and seed contamination has been identified as a possible source of the disease. Discard and destroy infected plants as soon as detected. Some products that are labeled for management of downy mildew on herbs that can be used in greenhouses are: Ranman (cyazofamid) and several phosphite fungicides (including Fosphite, ProPhyt, K-Phite, and Rampart).

Downy mildew on impatiens is also likely to be present within the state. I have not as of yet confirmed the disease in Georgia this spring; however, it has infected impatiens in Florida throughout the winter and has been identified within new impatiens crops in greenhouses in surrounding states. Infected plants need to be discarded immediately upon detection to reduce disease spread. The pathogen, *Plasmopara obducens*, produces oospores (survival spores) within stems and roots that allow the pathogen to survive within landscape beds and pots. If downy mildew was present within a landscape bed last year, then impatiens (*Impatiens walleriana* and *I. walleriana* hybrids) cannot be safely planted in the bed again. Commercial landscapers should seriously consider other plants for shady areas, such as New Guinea impatiens, Coleus, Lobelia, Begonia, and Caladium as impatiens alternatives.

Spring Pepper Fungicide Spray Guide – 2013

By David Langston

Bacterial spot
(J. Williams-Woodward)

As with most crops, disease management begins prior to planting the crop to be protected. By using such methods as disease-free seed and transplants, proper rotation, disking and plowing, and resistant varieties, growers can minimize the amount of disease that is available to attack their crop. Using many practices takes all the weight off of any one practice and gives growers more disease management options at lower risk. Once plants are in the field, however, fungicide sprays are relied on heavily for effective and economical management of plant diseases.

This spray guide is designed to encompass many diseases that attack peppers in Georgia in the Spring, including bacterial spot, Phytophthora crown rot (*Phytophthora capsici*), and anthracnose. Diseases, particularly bacterial spot, are typically worse in the Fall than Spring. Therefore, the spray schedule for the Spring has been reduced as opposed to the more intense schedule for the Fall. All fungicides listed in the table are applied on a 7-day spray schedule.

Pepper Spray Fungicide Guide – Spring		**(7-day Spray Schedule)**
Spray #	**Fungicide(s)**	**Disease activity**
Pre-plant	Methyl bromide or Georgia 3-way	All
1	Actigard at 0.75 oz/acre Ridomil at plant drench or drip Copper fungicide + Manzate	Bacterial Spot *Phytophthora* crown rot (PCAP) Bacterial Spot
2	Copper fungicide + Manzate	Bacterial Spot
3	Actigard at 0.5 oz/acre Quintec and copper fungicide Presidio through the drip	Bacterial Spot Bacterial Spot PCAP
4	Actigard at 0.33 oz/acre Copper fungicide + Manzate	Bacterial Spot Bacterial Spot
5	Quintec and copper fungicide Zampro or Revus	Bacterial Spot PCAP
6	Copper fungicide + Manzate Cabrio or Quadris	Bacterial Spot Anthracnose
7	Copper fungicide + Manzate Presidio through the drip Chlorothalonil (Bravo, Echo, Equus, etc.)	Bacterial Spot PCAP Anthracnose
8	Copper fungicide + Manzate Cabrio or Quadris	Bacterial Spot Anthracnose
	and so on until harvest or pre-harvest interval…….	

- NOTE: Always read the label for detailed application instructions or consult the Georgia Pest Management Handbook.

Update: Small Grains

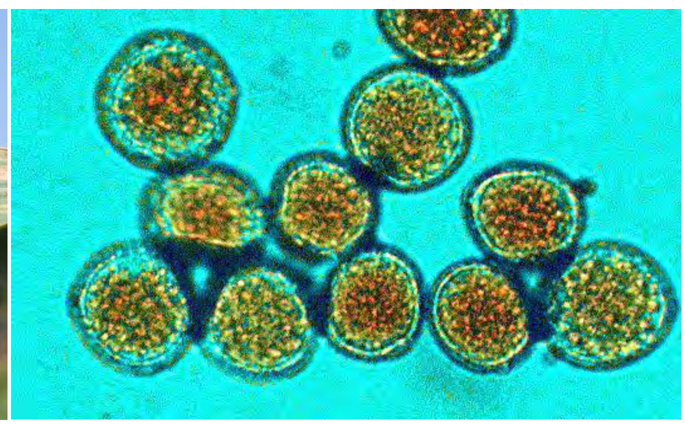
Wheat Foliar Disease Update

By Alfredo Martinez

1. Stripe/yellow rust. Stripe rust infections in wheat fields were reported and confirmed in South Georgia. Stripe rust can have a potentially devastating effect on yield on susceptible varieties. If stripe rust is present in your field this warrants a fungicide application. A complete list of wheat fungicides including application rates and specific remarks and precautions can be found on page 59 of the 2012-13 Wheat Production Guide (http://www.caes.uga.edu/commodities/fieldcrops/gagrains/documents/2012_13WheatProductionGuideComplete.pdf) or on page 480 of the 2013 Georgia Pest Management Handbook. Always read the label for fungicide applications restrictions.

2. Powdery Mildew (*Blumeria graminis*-Syn. *Erysiphe graminis*) is still active on wheat fields across the state. Weather has been conducive for the disease. If powdery mildew progresses up the plant and is found on the upper leaves (flag leaf minus 2) you might consider a fungicide application. Powdery mildew tends to diminish as temperatures consistently reach above 75°F and relative humidity falls below 85%. More information on powdery mildew: http://plantpath.caes.uga.edu/extension/plants/fieldcrops/WheatPowderyMildew.html

3. Time to scout for leaf rust. Look for red to reddish-brown pustules that develop on leaves and sheaths. These pustules, which are randomly distributed on the leaves, are filled with spores (urediniospores) of the fungus. Under the microscope, the urediniospores are round to slightly oval and slightly rough (see figure below). Leaf rust is favored by temperatures from 60 to 80°F. Because infection occurs quickly, brief showers or overnight dew are sufficient for infection to begin. Leaf rust is best controlled by planting resistant cultivars– refer to page 11 of the 2012-13 Wheat Production Guide for wheat varieties response against leaf rust. If leaf rust is present in your field this warrants a fungicide application. More information on leaf rust can be found at http://plantpath.caes.uga.edu/extension/plants/fieldcrops/WheatLeafRust.html



4. All small grains disease physical samples should be sent to the Plant Disease Clinic in Athens. We are still getting samples at the Tifton disease clinic or in Griffin, which will delay timely handling and diagnosis. For the proper mailing address, sample type and preparation please refer to http://plantpath.caes.uga.edu/extension/clinic.html

Update: Commercial Turfgrass

Turfgrass Disease Update

By Alfredo Martinez

Centipede decline. During green-up in the spring of 2012, a large number of centipede samples were received at the plant disease clinic. We have already received several samples of centipede in 2013. Centipedegrass is subject to a condition called "centipedegrass decline". Failure to green-up in the spring or successful green-up followed by decline and death in late spring and summer. For information on centipede decline visit http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=7946&pg=dl&ak=Plant%20Pathology

Other useful sites include:
http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=7974&pg=dl&ak=Plant%20Pathology
http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=7149&pg=dl&ak=Plant%20Pathology

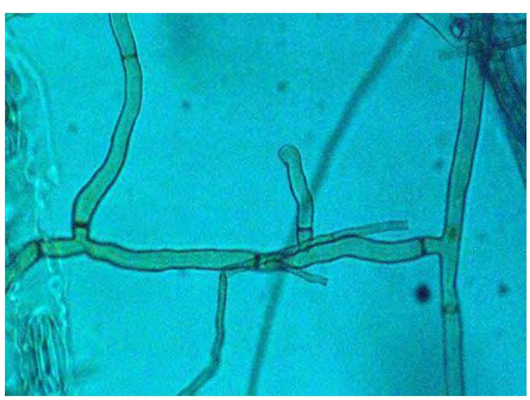
Large patch of warm season grasses. Large patch disease of turfgrass is most common in the fall and in the spring as warm season grasses are entering or leaving dormancy. The fungus *Rhizoctonia solani* causes large patch and it can affect zoysiagrass, centipedegrass, St. Augustinegrass and occasionally bermudagrass.

See for more information:
http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=7149&pg=dl&ak=Plant%20Pathology#BrownPatch

http://www.ugaurbanag.com/content/fall-management-large-patch-disease-turfgrass

While scouting in the field look for circular patches of diseased turf, ranging in diameter from less than 3 ft up to 25 ft (see figure below). Leaves of recently infected turf, located at the periphery of the patch, may appear orange in color. Some patches may be perennial, recurring in the same location and expanding in diameter year after year. *R. solani* infection of warm-season grasses occurs on the leaf sheaths, where water-soaked, reddish-brown or black lesions are observed. Foliar dieback from the leaf tip toward the base occurs as a direct result of these leaf sheath infections.

Under the microscope: Look for septated hyphae with a uniform diameter and right angle branching and constrictions at the base of branching (see figure below). The color of hyphae is tan to light brown. *Rhizoctonia* does not form spores.



Update: Row Crops

Winter in March could have important impact for row crops

By Bob Kemerait

As I type this, "Colder Weather" by the Zac Brown Band is on the radio and I am watching rain come down in sheets out my window in Tifton. The weather this past winter and now into the spring has been almost upside down; warm when it should have been cold and cooler when it should have been warmer. These topsy-turvy conditions could have significant impact for row-crop production in Georgia in 2013.

For a long while, it seemed that the winter of 2012-2013 was the winter that wasn't. For many row crop growers across Georgia, autumn continued well into January before giving way to springtime in February. As a result, concerns were raised throughout the winter meeting season as to the possible repercussions for the 2013 growing season when cold weather didn't develop through much of the season. For example, warmer soil temperatures might allow populations of **plant-parasitic nematodes** to feed, reproduce and remain active through late 2012 and reemerge from dormancy earlier in 2013 hungry and ready to attack our cotton, peanuts, corn and soybeans. Warmer-than-normal soil temperatures could also result in early outbreaks of **white mold on peanuts**, thus making decisive use of fungicides soon after plant emergence an important consideration. Warm weather throughout last winter also allowed **kudzu and Asian soybean rust** to survive well into February, possibly leading to an early outbreak of this disease in 2013. Although not currently known in Georgia at this time, **Asian soybean rust** is known to exist on kudzu in multiple locations in Mobile and Baldwin Counties in Alabama. Mild conditions this past winter may also allow **southern corn rust** to survive in Florida closer to the Georgia line this year, again allowing for earlier reintroduction into our corn crop in 2013.

As if in defiance of the mild winter, our conditions this spring have been anything but mild. Cooler temperatures and abundant rainfall have delayed corn planting and caused soil conditions to plunge. Delays in planting corn increase the risk to **southern corn rust** on the crop as this disease is more common later in the growing season. The frosts that have occurred in March have killed-back much of the kudzu that had survived the winter, though, again, **Asian soybean rust** is currently as close as southern Alabama. If cooler and wetter conditions continue into the planting season for cotton, peanuts and soybeans, there is a greatly increased risk to **seedling diseases** and an investment into additional fungicide seed treatments for the cotton and soybean seeds may be justified. Equally important for peanut farmers would be the increased risk to **Cylindrocladium black rot (CBR)** under such conditions and a decrease in the risk to early-season white mold.

As I finish this, the radio has moved on from "Colder Weather" to Old Crow Medicine Show and "Wagon Wheel" but the rain continues to fall. Georgia's row crop growers need to continue to pay careful attention to weather forecasts for the coming planting season and use all available tactics and tools to minimize losses to diseases that are likely to become more severe as a result of the unusual conditions.

Asian soybean rust on kudzu
(From University of Kentucky Extension Plant Pathology; http://www.ca.uky.edu/agcollege/plantpathology/extension/soybean_rust/pics.html*)*

Update: Blueberries

UGA Department of Plant Pathology research results in additional cultural management recommendations for Bacterial leaf scorch (*Xylella fastidiosa*)

By Phillip M. Brannen, Harald Scherm, and Renee Holland

Many southern highbush blueberry varieties are susceptible to bacterial leaf scorch, a lethal disease caused by the bacterium *Xyllella fastidiosa*. The bacterium infects the xylem (water-conducting tissue) of plants, thereby reducing water flow to the growing tissues and resulting in a scorch symptom (Fig. 1). The bacterium is transmitted to the plant by certain leafhopper species while they feed on blueberry shoots. There are currently no reliable management options for this disease on susceptible cultivars.

Two important cultural management recommendations have recently been derived from a two-year research project (Holland 2013). For one research objective, the question of whether apparently healthy cuttings from symptomatic plants could result in disease spread was addressed. In this research, asymptomatic softwood cuttings were collected in June or September from plants with symptomatic shoots elsewhere on the bush. The resulting young plants did not generally show symptoms, even after two years in the field (actually in screen houses to prevent insect spread of the disease). However, about 5% of the plants (1 in 20) were positive for the *Xyllella* bacterium, indicating that these plants were carriers and that they would eventually succumb to the disease. In fact, some showed symptoms intermittently during the two-year period.

The take-home message is that when softwood cuttings are taken in the summer for propagation, they must be collected from healthy plants. Even apparently healthy-looking cuttings that come from plants that are unhealthy as a whole may result in spread of this pathogen and others, such as viruses (e.g. red ringspot). In addition, new more aggressive strains of the pathogen could be introduced from imported plants. If workers are "skimming" for cuttings, it is best that they only work in areas with 100% healthy plants, and they need to be trained as to the importance of their jobs to the overall health of the blueberry industry.

In a second objective, a question that has frequently been asked by blueberry producers was addressed: can early-stage infections in bacterial leaf scorch-affected plantings be pruned out by removing shoots that are just starting to show symptoms? A related question is whether more seriously affected plantings can be cured by flail-mowing or severe-pruning plants to ground level at the end of the season when symptoms are most apparent. Whether or not these strategies would be successful depends on where the bacterium is located in plants at the time of pruning. For example, if the bacterium had already moved through the xylem to points below the cut, pruning would be of no value.

Research from this project has shown that the bacterium distributes quickly within plants once the first symptoms become apparent, rendering attempts to remove infections by pruning or mowing ultimately useless. Three southern highbush blueberry fields naturally infected with bacterial leaf scorch were sampled to determine the distribution of *X. fastidiosa* in different tissue types, from the top of the plant down to the stem base and the roots. In each field, 10 asymptomatic plants as well as 10 plants each with light, moderate, or severe symptoms of bacterial leaf scorch were selected in September or October – when symptoms were most pronounced. Xylem sap was extracted from stem or root segments located at different sites (small upper stems through roots) on the symptomatic and asymptomatic plants, and concentrations of *X. fastidiosa* in the sap were determined.

The bacterium was not detected in the top sections (youngest growth) and roots of asymptomatic plants, but it was sometimes detected at low levels in middle and base stem sections of such plants. In plants with light symptoms, the bacterium was readily detected in all stem sections (top, middle, and lower) as well as in roots, indicating that *X. fastidiosa* spreads quickly as symptoms become apparent. To reiterate, bacterial concentrations were highest in middle and lower stem sections. In plants with moderate and severe symptoms, bacterial concentrations were highest in middle and lower stem sections as well as in roots, indicating that the pathogen accumulates in the roots over time.

Because the bacterium is already present in lower sections of the plant when symptoms first become apparent, selective pruning is not a suitable management practice for removal of bacterial leaf scorch infections. Similarly, because of the presence of the bacterium in the roots of moderately or severely affected plants, radical flail mowing of such plantings will also be ineffective in eliminating the disease. Prior to this research being conducted, some innovative producers tried severe pruning as a management method. Early results were encouraging, as new shoots did not initially show symptoms. However, these new shoots eventually developed scorch symptoms, and plant death followed. This research explains why this is the case. Pruning, although of value for horticultural reasons, will not be an effective management tool for bacterial leaf scorch, and we now more fully understand the reasons for this unfortunate fact.

Collaborators on this project included Danny Stanaland, John Ed Smith, James Jacobs, and Elvin Andrews.

Literature Cited

Holland, R. M. 2013. Location, transmission, and impact of *Xylella fastidiosa* in southern highbush blueberries. M.S. thesis, University of Georgia, Athens.

Figure 1. Bacterial leaf scorch of blueberry symptoms. Leaf margins are scorched, and the leaves eventually abscise to produce a skeletonized plant that dies over time. Stems are often yellowed.

Who to contact in Extension Plant Pathology?

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Clinic Sample Type	Contact Name & Number	Shipping Address
Christmas trees, fruit, ornamentals, forestry, all homeowner samples, legume forages, mushrooms, turf and small grains, urban ornamental landscapes, wood rots	**Ansuya Jogi** Office Phone: 706-542-8987 Clinic phone: 706-542-9157 ansuya@uga.edu Fax: 706-542-4102	UGA - Plant Pathology Athens Plant Disease Clinic 2106 Miller Plant Sciences Bldg. Athens, GA 30602-7274
Tobacco, pecan, cotton, soybean, peanut, corn, kenaf, commercial vegetables	**Jason Brock** Phone: 229-386-7495 jbrock@uga.edu Fax: 229-386-7415	Tifton Plant Disease Clinic Room 116 4604 Research Way Tifton, GA 31793
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