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Extension Plant Pathology Update

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Plant Disease Clinic Report for June 2013

By Ansuya Jogi and Jean Williams-Woodward

The following tables consist of the commercial and homeowner samples submitted to the UGA plant disease clinics in Athens and Tifton for June 2013 (Table 1) and for one year ago in July 2012 (Table 2). The wet weather has been great for plant growth, as well as plant diseases. Various root rots, leaf spots and rusts have been diagnosed on almost all crops. The incidence of bacterial diseases will increase through July, as will *Sclerotium rolfsii* and Rhizoctonia diseases. We also continue to confirm Rose Rosette-associated virus on Knock-Out rose samples. Also, Dr. Little has confirmed Cucurbit Yellow Vine Disease on squash, caused by the bacterium, *Serratia marcescens*. She has a graduate student working on this disease and wants to know if you are seeing it. See page 7 for her summary of cucurbit diseases, including cucurbit yellow vine disease. Looking ahead with the current weather pattern, we expect to see more leaf and root diseases on all crops. This isn't a surprise. Warm days, cooler nights, high humidity, wet foliage and saturated soils are the recipe for plant disease development. Again, it is an exciting time to be a plant pathologist.

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

Host Plant	Sample Diagnosis	
	Commercial Sample	**Homeowner Sample**
Apple		Bitter Rot (*Glomerella cingulata*) Alternaria Leaf Spot *Alternaria* sp.) Rust (*Gymnosporangium* sp.)
Assorted Fruits		Insect Damage, Unidentified Insect Nutrient Imbalance; Abiotic
Banana Shrub		Insect Damage, Unidentified Insect Environmental Stress; Abiotic
Beans		Root Problems, Abiotic disorder
Bentgrass	Anthracnose (*Colletotrichum cereale*) *Colletotrichum* sp./spp. Environmental Stress; Problem, Abiotic disorder	
Bermudagrass	*Bipolaris* sp./spp. Fairy Ring, Various fungi Environmental Stresses No Pathogen Found, Identification Analysis Dense Thatch Layer, Abiotic disorder Cultural/Environmental Problem	Take-all (*Gaeumannomyces* sp.) Dollar Spot (*Sclerotinia homeocarpa*) Rhizoctonia Blight (*Rhizoctonia solani*) Environmental Stress; Abiotic Cultural/Environmental Problem

Blackberry	Cane Blight; Canker [*Leptosphaeria* (*Coniothyrium*) *coniothyrium* (*fuckelli*)] *Botryosphaeria* sp./spp. Viruses, Viruses Algae, General	
Blueberry	Phytophthora Crown, Root and/or Stem Rot (*Phytophthora* sp./spp.) *Botryosphaeria* sp./spp. Rhizoctonia Root; Crown Rot (*Rhizoctonia* sp.) Canker (*Leptosphaeria* sp.) Blueberry rust [*Naohidemyces* (*Pucciniastrum*) *vacciniorum* (*vaccinii*)] Nutrient Imbalance, Abiotic disorder Environmental Stresses	Cultural/Environmental Problem, Abiotic disorder
Boxwood		Root Problems, Abiotic disorder Environmental Stress; Abiotic
Cantaloupe	Alternaria Leaf Spot (*Alternaria* sp./spp.) Nutrient Imbalance, Abiotic disorder Abiotic disorder	
Centipedegrass	Root Decline of Warm Season Grasses (*Gaeumannomyces graminis* var. *graminis*) *Rhizoctonia solani* Cultural/Environmental Problem, Abiotic Environmental Stress; Abiotic disorder Soil Compaction, Abiotic disorder	Rhizoctonia Blight (*Rhizoctonia solani*) Fairy Ring, Various fungi Take-all (*Gaeumannomyces* sp.) Algae, General Cultural/Environmental Problem Environmental Stress; Problem
Cherry		Environmental Stress; Problem
Cherry-laurel		Cultural/Environmental Problem
Corn	Northern Corn Leaf Blight; Leaf Spot [*Setosphaeria* (ana. *Exserohilum*) *turcica* (*turcicum*)] Southern Leaf Blight [*Cochliobolus* (ana. *Bipolaris*) *heterostrophus* (*maydis*)] Southern Corn Rust (*Puccinia polysora*) Common Corn Rust (*Puccinia sorghi*) Bacterial Soft Rot (*Erwinia* sp./spp.) Genetic Disorders, Abiotic disorder Chemical Injury, Abiotic disorder Thrips Damage, Unidentified Thrips Fertilizer Injury, Abiotic disorder	
Cotton	*Rhizoctonia solani* Unknown, General	
Crabapple		Insect Damage, Unidentified Insect
Cryptomeria		Environmental Stress; Problem
Cucumber	Phytophthora Crown, Root and/or Stem Rot (*Phytophthora* sp./spp.) Abiotic disorder	
Dogwood		Spot Anthracnose (*Elsinoe corni*) Environmental Stress; Problem
Eggplant	No Pathogen Found Abiotic disorder	
Elaeagnus		Cultural/Environmental Problem
Elm	Black Spot [*Stegophora* (*Asteroma*) *ulmea*]	

Grape	Unknown cause	
Holly		Environmental Stress; Problem
Jasmine	Anthracnose; Twig Dieback (*Colletotrichum* sp.) Mites, Order Acari	
Juniper		Environmental Stress; Problem
Loropetalum		Bacterial Gall (*Pseudomonas syringae savastanoi*)
Magnolia	No Pathogen Found	Environmental Stress; Problem
Maple		Scorch, Abiotic disorder Armored Scales, Family Diaspididae Cultural/Environmental Problem
Oak	No Pathogen Found	Oak Leaf Blister (*Taphrina caerulescens*)
Palm		Unknown cause
Peanut	Insects, Class insecta	
Pear		Cedar-Quince Rust (*Gymnosporangium clavipes*)
Pecan	Unknown cause	
Pepper	Southern Stem Rot (*Sclerotium rolfsii*) *Rhizoctonia solani* Pythium Damping Off (*Pythium* sp./spp.) Abiotic disorder	
Petunia	No Pathogen Found	
Plum		Brown Rot (*Monilia* sp./spp.) Insect Damage, Unidentified Insect
Rose	Root Problems, Abiotic disorder Phytophthora Crown, Root and/or Stem Rot (*Phytophthora* sp./spp.) Rose Rosette- associated virus (RRaV) Insufficient Sample, Identification Analysis Unknown Agent	Crown and Root Rot (*Phytophthora* sp./spp.) Herbicide Injury; Exposure, Abiotic disorder
Seashore Paspalum	Environmental Stresses	
Squash	Powdery Mildew (*Erysiphe* sp./spp.) Abiotic disorder No Pathogen Found	Cucurbit Yellow Vine Disease (*Serratia marcescens*) Insect Damage, Unidentified Insect Chemical Injury, Abiotic disorder
St Augustinegrass	Fairy Ring, Various fungi Root Decline of Warm Season Grasses (*Gaeumannomyces graminis* var. *graminis*) Gray Leaf Spot (*Pyricularia grisea*) *Rhizoctonia solani* Cultural/Environmental Problem, Abiotic Environmental Stress; Problem, Abiotic	Rhizoctonia Blight (*Rhizoctonia solani*) Cultural/Environmental Problem, Abiotic disorder Unknown cause
Tobacco	Tomato Spotted Wilt Virus (TSWV) *Rhizoctonia solani* Black Shank (*Phytophthora nicotianae*) Southern Stem Rot (*Sclerotium rolfsii*) Pythium Root and/or Crown Rot (*Pythium* sp.) No Pathogen Found	

Tomato	Fusarium Wilt Complex (*Fusarium* sp./spp.) Rhizopus Head Rot (*Rhizopus* sp./spp.) Unknown Bacterial Disease Herbicide Injury; Exposure, Abiotic disorder Unknown Agent No Pathogen Found	Early Blight (*Alternaria solani*) Fusarium Wilt(*Fusarium oxysporum*) Fusarium sp./spp. Bacterial Pathogens, General Undetermined Injury or Pest Cultural/Environmental Problem Herbicide Injury; Abiotic disorder
Unknown		Euonymus Scale (*Unaspis euonymi*)
Watermelon	Fusarium Wilt (*Fusarium oxysporum*) Gummy Stem Blight [*Didymella* (ana. *Phoma*) *bryonae* (*cucurbitacearum*)] No Pathogen Found Physiological Responses, Abiotic disorder Insufficient Sample, Identification Analysis	
Zinnia	Pythium Blight (*Pythium* sp.)	
Zoysiagrass	Root Decline of Warm Season Grasses, (*Gaeumannomyces graminis* var. *graminis*) *Rhizoctonia solani* No Pathogen Found	Rhizoctonia Blight (*Rhizoctonia solani*) Take-all (*Gaeumannomyces* sp.) Cultural/Environmental Problem Environmental Stress; Abiotic

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

Host Plant	Sample Diagnosis	
	Commercial Sample	**Homeowner Sample**
Arborvitae	No Pathogen Found	
Bahiagrass	No Pathogen Found	
Bean	Rhizoctonia Crown and Stem Rot (*Rhizoctonia* sp.) Phytophthora Crown, Root and/or Stem Rot (*Phytophthora* sp./spp.) Pythium Root and/or Crown Rot (*Pythium* sp.)	
Begonia	No Pathogen Found	
Bentgrass	Anthracnose (*Colletotrichum cereale*) Brown Patch (*Rhizoctonia* sp./spp.) *Rhizoctonia* sp./spp. Pythium Root and/or Crown Rot (*Pythium* sp.) Fairy Ring, Various fungi Cultural/Environmental Problem, Abiotic disorder No Pathogen Found	
Bermuda	*Bipolaris* sp./spp. Dollar Spot (*Sclerotinia homeocarpa*) Spring Dead Spot (*Ophiosphaerella* sp./spp.) Root Decline of Warm Season Grasses (*Gaeumannomyces graminis* var. *graminis*) Pythium Root and/or Crown Rot (*Pythium* sp.) Not Pathogen; Secondary Agents; Saprophytes Environmental Stress; Problem, Abiotic disorder No Pathogen Found	Cultural/Environmental Problem, Abiotic disorder

Blueberry	*Botryosphaeria* sp./spp. Drought Stress Damage, Abiotic disorder Scorch, Abiotic disorder No Pathogen Found	
Boxwood	Planting Too Deep, Abiotic disorder	
Cedar	Decline; Dieback, Abiotic disorder No Pathogen Found	
Centipedegrass	Root Decline of Warm Season Grasses, (*Gaeumannomyces graminis* var. *graminis*) Large Patch [*Thanatephorus* (*Rhizoctonia*) *cucumeris* (*solani*)] Cultural/Environmental Problem, Abiotic disorder Not Pathogen; Secondary Agents; Saprophytes No Pathogen Found	Take-all (*Gaeumannomyces* sp.)
Cherry		Environmental Stress; Abiotic
Coleus	No Pathogen Found	
Corn	Northern Corn Leaf Blight [Leaf Spot, *Setosphaeria* (*Exserohilum*) *turcic* (*turcicum*)] Smut (*Ustilago* sp./spp.) Common Corn Rust (*Puccinia sorghi*) Southern Corn Rust (*Puccinia polysora*) Corn Eyespot [*Kabatiella* (*Aureobasidium*) *zeae*] Charcoal Rot (*Macrophomina phaseolina*) Fusarium Ear Rot (*Fusarium* sp./spp.)	
Cotton	Corynespora Leaf Spot (*Corynespora* sp./spp.) Stemphylium Leaf Spot (*Stemphylium* sp.) Cercospora Leaf Spot (*Cercospora* sp./spp.) Alternaria Leaf Spot (*Alternaria* sp./spp.) Chemical Injury, Abiotic disorder Unknown, General	
Crabapple	Unknown, General	
Cucumber	Unknown, General	
Cypress	No Pathogen Found	
Eggplant	Physiological Responses, Abiotic disorder	
Elephant Ear Plant		Environmental Stress; Abiotic
Grape	Grapevine Pierce's Disease (*Xylella fastidiosa*)	
Hibiscus	Alternaria Leaf Spot (*Alternaria* sp./spp.)	
Hosta		Cultural/Environmental Problem
Hydrangea	Cercospora Leaf Spot (*Cercospora* sp./spp.) Sunscald, Abiotic disorder	
Impatiens	Downy Mildew (*Plasmopara obducens*) No Virus Found No Pathogen Found	Downy Mildew (*Plasmopara obducens*) No Pathogen Found
Ivy		Environmental Stress; Abiotic
Juniper	No Pathogen Found	
Lettuce	Pythium Damping Off (*Pythium* sp./spp.)	
Liriope		Cultural/Environmental Problem Environmental Stress; Abiotic
Loropetalum		Environmental Stress; Abiotic
Muscadine	Cercospora Leaf Spot (*Cercospora* sp./spp.)	

Oak	Wood Boring Insect Damage No Pathogen Found	
Peanut	Early Leaf Spot [*Mycosphaerella* (ana. *Cercospora*) *arachidis* (*arachidicola*)] Leaf Scorch; Pepper Spot (*Leptosphaerulina crassiasca*) Tomato Spotted Wilt Virus (TSWV) Chemical Injury, Abiotic disorder No Pathogen Found Unknown, General	
Pear		Fire Blight (*Erwinia amylovora*)
Pecan	Pecan Scab (*Cladosporium caryigenum*) *Lasiodiplodia* (*Diplodia*) *theobromae* (*gossypina*) Anthracnose (*Gloeosporium* sp./spp.) Pecan Leaf Scorch Mite (*Eotetranychus hicoriae*) Chemical; Environmental Injury, Abiotic disorder Undetermined Injury or Pest, Identification No Pathogen Found	
Pomegranate	Crown and Root Rot, Pathogen complex Anthracnose Fruit Rot(*Colletotrichum* sp./spp.) No Pathogen Found	
Pumpkin	Powdery Mildew (*Sphaerotheca* sp./spp.)	
Rose	Phytophthora Crown, Root and/or Stem Rot (*Phytophthora* sp./spp.) *Phomopsis* Dieback; Canker (*Phomopsis* sp.) Root Girdling, Abiotic disorder No Pathogen Found	
Rosemary		Chemical Injury, Abiotic disorder
Sorghum	No Pathogen Found	
Soybean	Chemical Injury, Abiotic disorder No Pathogen Found Unknown, General	
Squash		Cultural/Environmental Problem
St. Augustinegrass		Take-all(*Gaeumannomyces* sp.) Unknown, General
Sunflower	No Pathogen Found	
Sweet potato	Unknown, General	
Tomato	Early Blight; Leaf Spot (*Alternaria solani*) Bacterial Leaf Spot (*Xanthomonas* sp./spp.) No Pathogen Found	Septoria Leaf Blight (*Septoria lycopersici*) Rust Mites, Order acari Spider Mites, Family Tetranychidae Cultural/Environmental Problem
Tulip Tree		Tar Spot (*Rhytisma* sp./spp.) Environmental Stress; Abiotic
Vinca	Phytophthora Crown, Root and/or Stem Rot Aerial Stem Blight (*Phytophthora* sp./spp.) Fusarium Stem Rot (*Fusarium* sp./spp.) Alternaria Leaf Spot (*Alternaria* sp./spp.)	
Watermelon	Gummy Stem Blight [*Didymella* (ana. *Phoma*) *bryonae* (*cucurbitacearum*)] Anthracnose (*Colletotrichum* sp./spp.) No Pathogen Found Unknown, General	

Zoysiagrass	Leaf Rust; rust (*Puccinia* sp./spp.) No Pathogen Found	Cultural/Environmental Problem Environmental Stress; Abiotic

Update: Home Garden/Small Farm IPM

Cucurbit Diseases in the Home Garden

By Elizabeth Little

Summer is a great time for fresh local produce although Georgia summers can present many challenges for keeping crops healthy and alive. This is especially true for tomatoes and cucurbits. Cucurbits, especially squash and cucumbers, can be challenging crops to grow due to pests and diseases. Wet weather will compound the problems. Some of the more common diseases include powdery and downy mildew, anthracnose, and cucurbit yellow vine disease.

Top: Downy mildew; Middle: Powdery mildew on watermelon; Bottom: Anthracnose (Images by Elizabeth Little and IPM Images)

The **downy mildew** pathogen survives the winters mainly in southern frost free regions. The disease spores reach Georgia from late May into June. This year the arrival appears to be delayed but with this wet weather disease potential may be severe. The symptoms start as bright yellow angular spots on the leaf surface. Leaves later turn brown often starting from the edges (see image) causing a progressive defoliation from older to younger leaves. Management involves using a combination of cultural practices, resistance, and, if desired, targeted sprays. Certain cultivars have some resistance and keeping plants healthy with balanced nutrition and an open sunny location will help lessen the effects of this and other diseases.

Powdery mildew also does not survive winters in the field although greenhouses may provide a potential early source of spores. Powdery mildew has been prevalent this year and the disease has the potential to defoliate plants. This is one of the easiest of diseases to diagnose since this is the only foliar disease where the fungus grows on the surface (see image). Because of this surface growth there are more alternative and organic control products that may potentially prevent powdery mildew. There are also more cultivars available with powdery mildew resistance.

Anthracnose is mainly a concern on cucumbers and melons. The symptoms include leaf spots (see image), defoliation and sometimes fruit lesions. The diseases survive in the infected debris, so rotation and the destruction of plant debris at the end of the season are important preventative measures. Wet weather is a major contributing factor. Trellising and/or the use of high tunnels, especially with cucumbers, can help reduce infections.

Cucurbit yellow vine disease is a new bacterial disease in Georgia that mainly affects squash and pumpkins. The disease is spread by

squash bugs and results in the sudden yellowing, wilting, and collapse of plants. The symptoms may be confused with stem borer damage. Squash bug management is the best way to prevent this disease. Losses have been substantial where the disease occurs.

Dr. Little is currently mapping the extent of the cucurbit yellow vine problem in Georgia. If you suspect that you have this disease, please contact Dr. Little at elittle@uga.edu or at 706-542-4774

See the Homeowner Edition of the Georgia Pest Management Handbook for recommendations on control products.
http://www.ent.uga.edu/pmh/

Right: Cucurbit yellow vine disease showing yellowing and collapse of vines. (Image by Elizabeth Little)

Update: Row Crops

Rains Continue to Drive Concerns for Disease Management

By Bob Kemerait

Rain may be a "good thing" but too much of a good thing can become a problem. Take for example the torrential rains we have experienced in recent weeks. Not only are the rains creating perfect conditions for fungal (and bacterial) diseases to occur, but the soggy fields are also keeping growers from making timely fungicide applications. Even when the grower is able to make a fungicide application, there have been many instances where rains fall quickly follows the application and the fungicide is washed from the plant without sufficient drying time.

If the rains and the diseases were not causing enough headaches for the growers, the cotton, peanuts, corn and soybean crops are reaching critical stages of growth where judicious use of fungicides is an important management tool. However, rains may make this very difficult.

Update for July:

Peanut:

Disease update: many growers are delayed by days and even weeks from making timely fungicide applications. Dr. Tim Brenneman reports that white mold is quite active in extreme southern Georgia and has even killed young plants.

Much of the peanut crop is at least 30 days after planting and some is much older. Current conditions are perfect for the development and spread of leaf spot diseases, white mold and Rhizoctonia limb rot. This season, both because of conditions that are extremely favorable for disease and the likelihood that important fungicide applications will be delayed, growers are strongly encouraged to consider using the most effective products for disease management, even if these fungicides are more costly, to minimize losses to diseases.

Note to Agents: Peanut Rx is an extremely effective tool for assessing risk to tomato spotted wilt, leaf spot and white mold. Due to weather conditions that are extremely favorable for disease, all growers should add increased risk to their fields. In fact, many fields should be considered at high risk now and reduced input programs are less appropriate.

Corn:

Disease update: Southern corn rust has been reported from across the Coastal Plain- from Seminole County to Macon County, from Jefferson County to Wayne County to Pierce County and all points in between.

Although I do not know of any situations where southern rust has caused significant damage yet, significant damage could easily occur given the widespread distribution of the disease. I believe that our aggressive use of fungicides has helped to contain the disease thus far. Northern corn leaf blight and southern corn leaf blight are also found regularly.

The most common question regarding corn is "when is my crop safe?" Southern rust affects the crop in two ways- it can reduce grain fill (reducing yields) and weaken the stalks (increasing risk to lodging and poor yields). Dr. Dewey Lee and I both believe that the grower is fairly safe if the crop is protected until the dough stage with a fungicide. Others believe that the crop remains susceptible to yield losses if not protected to a later growth stage, for example to "black layer". I continue to believe that once the crop reaches dough stage and has been adequately protected, there is not enough time for a sufficient epidemic of rust to develop to affect yield.

Note: Growers who have late-planted corn should consider making a fungicide application in the V6-V10 stage to protect against rust, southern corn leaf blight and northern corn leaf blight. Late planted corn does not have the yield potential of corn planted earlier; however I believe that well-timed fungicide applications can net the grower 25-50 bu/A when disease is an issue.

Soybeans:
Disease update: Asian soybean rust has been found in kudzu in Appling and Miller Counties and is found in northern Florida and in central Alabama. Conditions are extremely favorable for the spread of rust and also other diseases affecting soybeans. All soybean producers should be prepared to make a timely fungicide application to the soybean crop sometime between bloom and early pod development stages. I strongly believe that with the risk to rust, anthracnose, frogeye leaf spot, and Phomopsis pod and stem blight, judicious use of fungicides is quite important.

Cotton:
Disease update: Conditions should excellent for the development of target spot again this season. Although none has been diagnosed yet in Georgia, it has been found in the Panhandle of Florida. To reduce the impact of target spot requires management of the crop to reduce rank growth and use of fungicides before the disease is well established in the field when good coverage of the crop is possible. Based upon data from last season (which could change), the single best time for an application of a fungicide was the 3rd week of bloom. Fungicide applications at 1st and 3rd weeks of bloom (a total of two applications) gave the most consistent control; however the differences in yield between one spray and two sprays was not always significant.

I was asked today, "Bob, should I just tell my growers to spray fungicide on their cotton, like we do in peanuts, when they reach the blooming stage? I am scouting the cotton and I just don't find any target spot yet." This former agent brings up a great point- "NOT all cotton needs to be treated for target spot, even in a year like 2013, but it is critical to make sure of your decision." I will be the first to admit that there is so much we do not understand about target spot; however I do know that judicious use of fungicides can provide growers with increased yields and profit.

To effectively manage target spot, growers should continue to scout their cotton and notify you, their county agent, of suspicious leaf spots. (Note: Ascochyta wet-weather blight is very common this year. Go figure….. and it can look similar to target spot.) Growers who have fields where target spot has been problematic in the past are likely to see it again this season. These growers should be very careful in deciding if and when to use a fungicide. Where target spot will be a problem, it is important to protect the crop with a fungicide (Headline, Quadris, or Twinline) before disease is well established. I have included a draft of my efforts to develop a risk index for spotted wilt with this article.

I hope the rains fill our ponds; however I think we can all use a little dry weather now.

Update: Cotton

Below is a draft of a risk-management tool for target spot on cotton in Georgia.

Assessing Risk to Target Spot in Georgia

A draft of a risk-management tool to be assessed and refined in Georgia/Revised 12 February 2013

R.C. Kemerait, Jr., PhD, Department of Plant Pathology, The University of Georgia

Factor with the **HIGHEST impact** on increased risk to target spot:

- **a. Location of the field.** The risk to significant outbreaks of target spot seem greatest in SW Georgia, SE Alabama and NW Florida. 25 pts
- b. **Location of the field.** Field is located in central and SE Georgia. 15 pts
- c. **Location of the field.** Field is located in eastern Georgia. 5 pts

Factors with **MODERATE impact** on increased risk to target spot:

1. **Field History.** Target spot is likely to occur again if fields where it has been severe in the past if environmental conditions are favorable.
   - a. **Target spot has been severe** in the field in the past. 15 pts
   - b. **Target spot has been observed** but has not been severe. 5 pts
   - c. **Target spot has not been observed.** 0 pts
2. **Rank cotton growth.** The development and spread of target spot seems closely tied to extended periods of leaf wetness. Foliage within the dense canopy of cotton stays wet longer and is thus more prone to target spot.
   - a. **Rank cotton with dense canopy.** 15 pts
   - b. **Cotton with complete closure but growth well managed.** 5 pts
   - c. **Cotton with open canopy and good airflow.** 0 pts
3. **Irrigation.** As above, irrigation can both improve the growth of the cotton plants and extend periods of leaf wetness, thereby increasing the risk to target spot.
   - a. **Cotton irrigated during day, greatly extending dew period from previous night.** 10 pts
   - b. **Cotton is irrigated at night or early morning to minimize leaf wetness period.** 5 pts
   - c. **Cotton is not irrigated.** 0 pts
4. **Extended periods of rainfall and cloudy weather.** Such conditions create conditions where disease is favored.
   - a. **Frequent periods of extended rainfall of cloudy conditions.** 10 pts
   - b. **Rainfall events "normal" for the season.** 5 pts
   - c. **Growing season is extremely dry.** 0 pts

Factors with **LOW impact** on increased risk to target spot**:**

1. **Tillage.** Spores of the target spot pathogen, *Corynespora cassiicola*, will survive in the crop debris from previous cotton crops. Spore survival is expected to be longer in reduced-tillage conditions and spores may also be splashed to cotton leaves easier from such debris.
   - a. **Conservation tillage/reduced tillage.** 5 pts
   - b. **Conventional tillage with deep turning.** 0 pts
2. **Crop rotation.** Although this remains to be proven, it is likely that target spot on cotton will be more severe in fields where cotton is planted behind cotton or in in short rotations. This is because the spores of the pathogen will survive among the debris from recent cotton crops.
   - a. **Cotton planted behind cotton.** 5 pts
   - b. **At least one year of another crop between cotton crops.** 0 pts

Factor that **MAY have impact** on risk to target spot**. Variety Selection.**

> **Variety selection.** It is likely that some varieties of cotton may be more susceptible to target spot than are others. However it is not clear whether such an increase in susceptibility is because the pathogen can more easily infect the leaves of the cotton plant or because of the growth habit of the variety tends to be more-rank and thus prone to longer periods of leaf wetness. Also, the exact relationship between defoliation and yield loss is not completely understood. For example a variety with more defoliation than another variety may not necessarily yield less.

YOUR RISK

High Risk: Growers with the greatest risk to target spot and most likely to see some benefit to use of a fungicide program are those with a total risk of **40 points or more**.

Moderate Risk: Growers at **moderate risk to target spot** and could benefit from the use of a fungicide are at risk levels from **25 to 35 points**.

Low Risk: Growers with the **least risk to target** spot are those with risk levels below **25 points**.

Timing of fungicide applications: Growers are advised to begin scouting their fields at the approach of first bloom to determine if target spot is present in the crop. From research conducted in Georgia, the optimum timing for an initial fungicide application is sometime between the first and third week of bloom; an additional fungicide application may be needed approximately 3 weeks after the first application.

Target Spot: Target spot is caused by the fungal pathogen ***Corynespora cassiicola*** and is most severe during periods of extended leaf wetness. Target spot is easily identified by the presence of marble-size spots on a leaf that frequently demonstrate a pattern of concentric rings. Infection and premature defoliation typically begin in the lower leaves of the plant and progress up the plant. Significant defoliation can occur very quickly after initial detection of the disease. Defoliated leaves typically retain their green or green-yellow color. Lesions are also found on the boll bracts and possibly on the bolls themselves. Fungicides have been shown to aide in the management of this disease.

Stemphylium Leaf Spot: Stemphylium leaf spot is caused by the fungal pathogen *Stemphylium solani* ; however the underlying cause of this disease is actually the result of a deficiency in potassium in the plant. This disease is analogous to Alternaria leaf spot (*Alternaria macrospora*) in Texas. Symptoms of this disease include a sudden reddening of the foliage of the cotton plant and the raqpid appearance of numerous spots with ashy-gray centers and a dark purple margin. The centers of the spots frequently detach from the leaf giving the leaf a shot-hole appearance. The use of fungicides to manage Stemphylium and Alternaria leaf spot diseases has been largely unsuccessful.

Cercospora Leaf Spot: Like Stemphylium leaf spot and Alternaria leaf spot, Cercospora leaf spot (*Cercospora gossypina*) is often linked to a nutrient deficiency in the cotton crop and may form a disease complex with Alternaria mascrospora and Stemphylium solani. Spots begin as small, reddish lesions that larger circular lesions with light brown centers; zonation similar to that of target spot may be observed. As this disease is associated with nutrient deficiencies, fungicides are not considered to be an effective control measure.

Areolate Mildew: Areaolate mildew, cause by the fungal pathogen *Ramularia areola*, is of limited importance in Georgia and is generally confined to the southeastern region of the state, especially during periods of abundant rainfall. The disease is easily identified by the presence of abundant white-to-gray sporulation on

the underside of the affected leaves. The affected leaves often drop prematurely resulting in significant defoliation. This disease can be effectively managed with the use of fungicides, especially strobilurin fungicides; however it is not clear at this time how much yield loss is associated with the disease.

Ascochyta (wet weather) blight: Ascochyta blight, caused by *Ascochyta gossypii*, is a disease of sporadic importance in Georgia, especially during periods of cool weather with abundant rainfall early in the season. Hence, young plants are most often affected. The spots in the field can be tentatively diagnosed by the presence of tan lesions bordered by a dark ring; embedded in the lesion are dark fungal structures that appear like pepper grains. Though use of fungicides for effective management has been reported, such is generally considered unnecessary in Georgia. This disease tends to become of little significance as conditions become drier.

Angular (bacteria) Leaf Spot: Angular leaf spot is caused by the bacterial pathogen *Xanthomonas campestris* and is of limited importance to cotton producers in Georgia. The disease is most common in periods of extend rainfall. Lesions/spots on the leaves are quite distinctive as they are defined by the veins on the leaf, thus creating the "angular" appearance. This pathogen can also cause water-soaked lesions on the bolls themselves leading to rot. As this is a bacterial pathogen, use of fungicides is not an effective management tool. This pathogen can be seed transmitted.

Update: Commercial Blueberries

Dodder Management in Blueberries

By Phil Brannen (UGA Plant Pathology) and Mark Czarnota (UGA Horticulture)

Dodder (*Cuscuta* spp.) is a parasitic seed plant that is also considered a weed in agronomic situations. If left unattended, it can cause severe growth inhibition, stunting, malformation, and death of blueberry plants (Figs. 1 and 2). Drs. Wendy Zomlefer and Joel McNeal (UGA Plant Biology), Mark Czarnota (UGA Horticulture), and Richard Carter (Valdosta State) helped to confirm dodder in several blueberry fields in South Georgia. Dr. Neal indicated that we definitely have "*Cuscuta compacta* (a dodder), which is known to parasitize blueberries from time to time. It is a wetland species that likes sapling-sized plant species like *Alnus serrulata*, *Aralia spinosa*, *Clethra*, and *Vaccinium* [blueberry]. It's native to the Southeast and not usually weedy, except for blueberries – unfortunately."

Dodder is in the morningglory family (Convolvulaceae), so the seeds are about as big as a BB. There are several (8-10) dodder seed in each dodder fruit (pod), and each plant has the potential to produce thousands of seed which are dispersed when the fruit dries and shatters. Dodder is not really considered an invasive (doesn't really occupy that much undisturbed land), but it is on the federal noxious weed list (an effort to prevent seed movement). It has also been reported that dodder could potentially transfer some disease-causing viruses and phytoplasmas – another good reason to keep fields clean of this plant.

Dodder usually occurs in isolated spots in a field, but these gradually increase if dodder is not controlled; rapid removal is important, as you do not want dodder to produce haustoria (modified roots that penetrate the host plant to absorb nutrients/moisture and which can produce new plantlets) and/or seeds. The hard seed coats have been reported to give long-term survival of dodder seed, as the seed can lay dormant in the field for years and only germinate when conditions are optimum.

Bill Cline (NC State) indicates that dodder is a recurring problem in North Carolina blueberry fields. Bill states that "the seed pods should be collected by carefully pruning out infested branches and bagging to avoid scattering seeds. We have spots at the Castle Hayne station where dodder has recurred every year for the last 25 years, because we made the mistake of letting it go to seed." If producers identify dodder on blueberry plants, they should immediately destroy the dodder and plant parts which have been attacked. Simply having dodder does not automatically result in plant mortality or require complete plant destruction, but where the plants are inundated with dodder (Fig. 1) or actually dead, this would be the easiest way to remove seeds and infested plant parts from the site. Dodder does not generally penetrate bark, but it will penetrate plant foliage, producing haustoria that embed themselves in the plant tissues. Therefore, in addition to controlling seeds, infested stems and canes must be destroyed in order to keep the haustoria from regenerating to produce a new infestation.

Growers who have been most successful in controlling dodder are the ones who have managed to catch it in the early stages of growth and actually hand-remove the strands; this is labor-intensive but effective, especially when it has just gotten started and is only in a single bush or two. If plant parts or plants must be destroyed, it is best to break down the plants by cutting them up and placing all seed pods in a large trash bag; once removed from the field, the dodder and infested plant segments should be destroyed by thorough burning. If dodder is left unattended, mechanical harvesters and tractors with spray rigs, sickle-bar pruners, etc. will do a great job of both opening pods and moving seeds from a localized source. In some cases, producers have simply removed plants with a tractor and chain – dragging the plants to the edge of the field and leaving a trail of seeds along the row for subsequent germination; obviously, this is not the recommended "school solution."

Several preemergence herbicides will likely control dodder from seed. No published research exists on control of dodder seed in blueberry fields with labeled active ingredients. However, products that control morningglory plants from seed will probably work well for dodder management. These products include Karmex (diuron), Chateau (flumioxazin), Solicam (norflurazon), Kerb (proamide), and Princep/Surflan (simazine/oryzalin) combinations. Other products on the horizon, such as Zeus (sulfentrazone) and Alion (indaziflam), also look promising. To insure the best control of dodder, make preemergence herbicide applications in December-January and again in March-April. As with all pesticides, be sure to follow label application instructions.

See the following sites for additional information on Dodder:
http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7496.html

http://plants.usda.gov/java/profile?symbol=CUCO2

Figure 1. *Blueberry plants (flagged) showing signs of dodder growth along stems and branches.*

Figure 2. *(Far Left) Close-up of blueberry plants showing dodder seed pods (fruit) in winter and early summer. Stems are completely inundated by this parasitic seed plant as seed pods develop and mature. (Left) By early summer, seed have been released by shatter of the seed pods, and the stems are dead or dying. (photos courtesy of Erick Smith, UGA Horticulture)*

Update: Commercial Turfgrass

Turfgrass Disease Update – Gray Leaf Spot and Rust

By Alfredo Martinez

Time to scout for gray leaf spot: Gray leaf spot is a fungus disease that affects St. Augustinegrass, perennial ryegrass and tall fescue in Georgia. Hot humid summer weather and high nitrogen levels can make turf susceptible to this disease. The fungus causing the disease is *Pyricularia grisea*.

Gray leaf spot on St. Augustinegrass (Image by Alfredo Martinez)

Symptoms: The symptoms of gray leaf spot vary depending on the grass cultivar. On St. Augustinegrass, gray leaf spot first appears as small, brown spots on the leaves and stems. The spots quickly enlarge to approximately ¼ inch in length and become bluish-gray and oval or elongated in shape. The mature lesions are tan to gray and have depressed centers with irregular margins that are purple to brown (see image). A yellow border on the lesions can also occur. In cool-season turfgrass, the symptoms are similar to those of melting out.

Conditions Favoring Disease: Gray leaf spot is favored by daytime temperatures between 80°F to 90°F and night temperatures above 65°F. It is also found in areas with high nitrogen levels and that are stressed by various factors, including drought and soil compaction. This disease is most severe during extended hot, rainy and humid periods.

Disease Management Tips: Avoid medium to high nitrogen levels during mid-summer. Irrigate turf deeply and as infrequently as possible to avoid water stress. Allow water to remain on leaves for only a short period of time. Reduce thatch. When possible, plant turfgrass that is resistant to gray leaf spot. Avoid using herbicides or plant growth regulators when the disease is active.

Fungicides are available to control the disease. Consult the current *Georgia Pest Management Handbook* -- www.ent.uga.edu/pmh/.

For more information or photos of gray leaf spot http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=7149&pg=dl&ak=Plant%20Pathology#GrayLeafSpot

Rust on zoysiagrass: Several zoysiagrass samples infected with rust were recently submitted to our plant disease clinic. Rust is a disease caused by fungi belonging to the genus *Puccinia* and/or *Uromyces*. In Georgia, we usually find it more prevalent in ryegrass, certain types of *Festuca* sp (tall fescue), and zoysiagrass. The rust pathogen survives as mycelium and spores (urediniospores and teliospores) in thatch, infected plants and soil. Rust spores can also be spread and disseminated long distances by air currents and locally by people, animals and equipment. Weedy grasses may be a source of some rust fungi. When there is disease-conducive weather, spores or mycelium germinates and new foliar infections are initiated. There is a range of temperatures where rust can grow depending on the rust type and turfgrass species interaction. In Georgia, rust infections are common throughout the summer. Leaf wetness, moisture on the turfgrass canopy, and heavy dews favors rust development. Rust diseases initially cause light-yellow flecks on the leaf blades and sheaths. The flecks enlarge, elongate, and turn yellow in color. The infected areas rise above the leaf epidermis and then rupture, releasing the yellowish-orange to reddish-brown urediniospores (see images to right). The leaf blade turns yellow starting at the tip and progressing to the base. Overall, rust as a whole causes relatively minor turfgrass stand losses. However the disease has the potential to cause severe outbreaks in stressed, weakened turfgrass areas.

Top; Rust on zoysia (image by Jake Price, CEC and A&NR Extension Agent, Lowndes County). Bottom; rust on tall fescue (image by Alfredo Martinez)

Control: Rust infections occur on slow-growing turfgrass particularly those areas with low nitrogen levels, imbalanced soil fertility, plant water stress, and shaded-low lighted areas and/or soil compaction. Therefore rust severity can be greatly reduced by maintaining a healthy, vigorous turf stand. Maintain recommended soil fertility and soil pH levels. Following nitrogen fertility recommendations is a critical factor in controlling rust in warm season grasses. Proper irrigation practices such as avoiding irrigation during early evening, will limit the spread of the disease by diminishing the chance of extended dew periods. Proper mowing heights and removal of clippings can help to reduce inoculums levels. Improve air circulation and light penetration on shaded, closed areas. Fungicides are rarely required for rust control in turfgrass. However, in some cases, fungicides are needed. There are a variety of fungicides that are effective

against turfgrass rust diseases. Demethylation inhibitors (DMI's) fungicides, the QoI (strobilurins), or the benzimidazole fungicides are effective against rust.

More information on turfgrass rust diseases:
http://www.lawnandlandscape.com/Article.aspx?article_id=119001
http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=7149&pg=dl&ak=Plant%20Pathology#Rust

Update: Commercial Landscapes

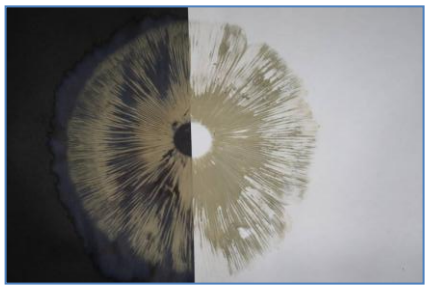
Mushrooms are everywhere By Jean Williams-Woodward

With the wet weather, mushrooms are popping up everywhere, particularly in lawns. I get numerous calls and emails concerning their identification. People are curious and they always want to know if the mushrooms are poisonous. Dogs (Labradors in particular) seem to eat mushrooms and we do get calls from vet offices about identifying mushrooms because dogs are in liver failure or very sick. First and foremost, we cannot positively identify mushrooms from a picture. Even if we can identify the mushroom, there is no guarantee that the mushroom growing right next to the one imaged is the same species; therefore, one may be OK and the other highly toxic. For this reason, I will never comment on the edibility of a mushroom from an image. There is a saying about mushrooms, "All mushrooms are edible, just some are only edible ONCE!"

To help with mushroom or conk identification, answer these questions:

- Does it have a stipe (i.e. stem)?
- Is the cap hard or soft, smooth or rough?
- Does it have pores, tubes, gills, or teeth on the underside of the cap/conk?
- What color is its flesh (cap, stipe, etc.)?
- What color are the spores (from a spore print)?
- Does it change color when bruised?
- Any other distinguishing features?
- What is the host it is growing in/on (i.e. turf, oak, etc.)?

For example, the mushrooms in the image to the right are growing in a lawn. The mushroom has a stipe and has a white cap and gills. I made a spore print by removing the stipe and placing the cap gill-side down on paper (see images below). I used white and black construction paper and placed the cap so half of it was on the white and half on the black so that if the mushroom had white spores I would be able to see this on the black paper. From the spore print, I can see that the spore color is olive-green. There is only one fungus that has these characteristics and that is *Chlorophyllum molybdites*, a common fairy ring mushroom. Although this mushroom is usually not lethal, it is poisonous and will cause severe gastrointestinal distress (vomiting and diarrhea) if eaten.



Above: Chlorophyllum molybdites mushroom in a lawn. Far left: Making a spore print on mushroom on black and white paper. Left: Print of spores that have fallen out of gills 24-48 hrs after placing the cap on paper. Images by Jean Williams-Woodward

Wood decay and falling trees are of great concern

By Jean Williams-Woodward

Damage from past years of drought have taken a toll on our trees. Drought stress, construction injury, soil compaction and root girdling injures tree roots and provides an entry point for wood decay fungi. Storm damage, improper pruning, and wounding of trunks and branches also leads to wood decay fungi entry and infection. What we are seeing now are many trees across the state falling due decayed roots and saturated soils from recent rains. A full canopy of leaves acts like a sail in the wind, which puts pressure on the roots. Trees infected with wood decay fungi will fail at some point. It's not a question of whether a tree showing signs of wood decay fungi will fail. It is a question of when

Wood decay fungi can be classified into two broad categories: white-rot and brown-rot fungi. White-rotters are those fungi that rapidly breakdown lignin and eventually cellulose. The infected wood becomes soft, spongy and stringy. It is usually a root and butt rot by a white-rot fungus that causes hardwood trees to fail and fall (see images of *Inonotus dryadeus*). Brown-rotters are those fungi that breakdown cellulose and eventually lignin. Wood crumbles and shrinks. These rots are often referred to as a cubical or dry rot.

Regardless of the type of rot and what fungus is infecting the tree, if you see conks or mushrooms growing on the tree trunk or root flare, then the tree is in advanced stages of infection and decay and there is a concern for possible tree failure. It takes years for infection and growth of the fungus in the wood to produce outward signs of conks and mushrooms. At present, methods to accurately detect how much rot is present in the wood do not exist. There are methods to detect internal cavities in trees to determine the thickness of a trunk shell, but measurements of spongy wood is difficult. There is no cure for wood decay. The best management approach is preventing injury to trunks, branches, and roots.

Top: Fallen pecan with Inonotus butt rot; above left and right: Inonotus dryadeus basidiocarps (conks) at base of oak tree. Tree should be removed due to its location and the potential hazard it poses. Images by J. Williams-Woodward

Who to contact in Extension Plant Pathology?

Alfredo Martinez, Extension Coordinator	Turfgrass (commercial, professional lawncare, sod, golf, sports fields); Small grains and non-legume forages	amartine@uga.edu	770-228-7375
Phil Brannen	Commercial fruit	pbrannen@uga.edu	706-542-2685
Jason Brock	Commercial pecans	jbrock@uga.edu	229-386-7495
Bob Kemerait	Row crops – corn, cotton, soybean, peanut	kemerait@uga.edu	229-386-3511
David Langston	Commercial vegetables	dlangsto@uga.edu	229-386-7495
Elizabeth Little	Home turfgrass, landscapes, and gardens, small farm and organic production	elittle@uga.edu	706-542-4774
Jean Williams-Woodward	Commercial ornamentals in greenhouses, nurseries, and landscapes, Christmas trees, forestry, urban forestry, wood rots, legume forages	jwoodwar@uga.edu	706-542-9140
John Sherwood	Department Head	sherwood@uga.edu	706-542-1246

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
All samples for nematode analysis	**Ganpati Jagdale** Phone: 706-542-9144 gbjagdal@uga.edu Fax: 706-542-5957	UGA - Plant Pathology Nematode Laboratory 2350 College Station Road Athens, GA 30602-4356

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