Kentucky Nursery LISTSERV Bulletin

University of Kentucky Nursery Crops Team

End of May 2016

Long Range Outlook Information

The NOAA forecasting for the next few weeks is showing cooler than average temperatures for the next 14 days, but slightly warmer than average over the next month. See **UKAg Weather's Long Range Outlooks** for a variety of forecasts of temperature and precipitation.

Though summer doesn't official start until June 20th, the heat and humidity are here, which means our biological pressures are in full force. This 11 page issue is filled with information on diseases and pests, including resources from the KY Office of the State Entomologist regarding the Cooperative Agricultural Pest Survey.

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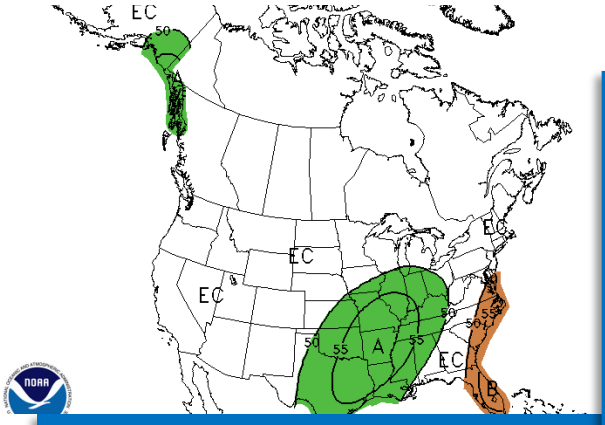


[3-4 Week Outlook, June 11—June 24], Precipitation Probability, Image: NOAA

Leaf distortions caused by arthropods on 'Little King' Fox Valley™ River birch (Betula nigra)

Zenaida Viloria, Extension Associate, Nursery Crops
Winston Dunwell, Extension Specialist, Nursery Crops

Leaf distortion is a common symptom to many pathogens such as fungi, bacteria and viruses. These pathogens can cause the leaf to curl, twist, cup or wrinkle. Some pathogens cause very distinctive symptoms to specific hosts and these symptoms can facilitate the diagnosis. Otherwise, the correct identification relies on an experienced person or plant pathologist. Arthropods such as insects and mites are also associated with leaf distortions and on occasions plant damage can be mistakenly linked to pathogens. Before sending plant samples for disease diagnosis, homeowners, agents and producers should look for the presence of arthropods on symptomatic leaves. In any case, proper identification is essential to manage the problem.

Figure 1. Corrugated galls caused by Spiny withc-hazel gall aphid in 'Little King' Fox Valley™ River birch.

Photo: Zenaida Viloria, UK-Horticulture

This spring, the University of Kentucky Research and Education Center Botanical Garden displays a great diversity of plants with distinct shapes, colors, flowers and fragrances. During this time of rapid growth, fresh leaves and flowers are pests' favorites. All plants looked very healthy, nonetheless, the 'Little King' Fox Valley™ river birch (*Betula nigra*) caught our attention due to the presence of two types of leaf distortions. The first one was corrugated galls; these were the most prominent, visible on the upper leaf surface (Figure 1). This damage is caused by Spiny witch-hazel gall aphid (*Hamamelistes spinosus*), which lives in the concavities of the lower leaf surface covered with wax and silk substances (Figure 2). This aphid species feeds by sucking sap from leaves, causing chlorosis, or necrosis when the damage is severe. These aphids cannot complete their life cycle on river birch alone, they have to migrate to witch-hazels (*Hamamelis* spp).

Figure 2. Colony of Spiny witch-hazel gall aphid on lower leaf surface of 'Little King' Fox Valley™ River birch.

Photo: Zenaida Viloria, UK-Horticulture

The second leaf distortion, less evident due to the small size and quantity, was identified as nipple galls visible on both leaf surfaces (Figure 3). These galls are caused by eriophyid mites (Figure 4), which can be only distinguished under a 10X or higher magnifying glasses.

Eriophyids are translucent, oblong or cigar-shaped mites and highly host specific pests of many ornamentals, fruit, vegetables and field crops. Other types of damages associated with eriophyds are: blisters, erinea (Patches of felty galls), big buds, leaf rolling, and stem deformation.

Figure 3. Nipple galls caused by eriophyds on 'Little King' Fox Valley™ River birch. Left) Upper leaf surface. Right) Lower leaf surface.

Photo: Win Dunwell, UK-Horticulture

Spiny witch-hazel gall aphid and eriophyds do not cause severe injury to river birch but they can cause an aesthetical damage that might reduce the price on ornamental plants.

Figure 4. Eriophyds inside of a nipple gall in 'Little King' Fox Valley™ River birch

Photo: Win Dunwell, UK-Horticulture

Additional information

Gorsuch, C. S. River birch aphid. http://media.clemson.edu/public/esps/pdfs/to17.pdf

Davis, R.S. Eriophyd mites: bud, blister, gall and rust mite. https://extension.usu.edu/files/publications/factsheet/eriophyid-mites2010.pdf

Graham, J. and W. S., Johnson. Ornamental plant damage by eriophyid mites (and what to do about it) https://www.unce.unr.edu/publications/files/nr/2004/FS0447.pdf

Iron in Irrigation Water

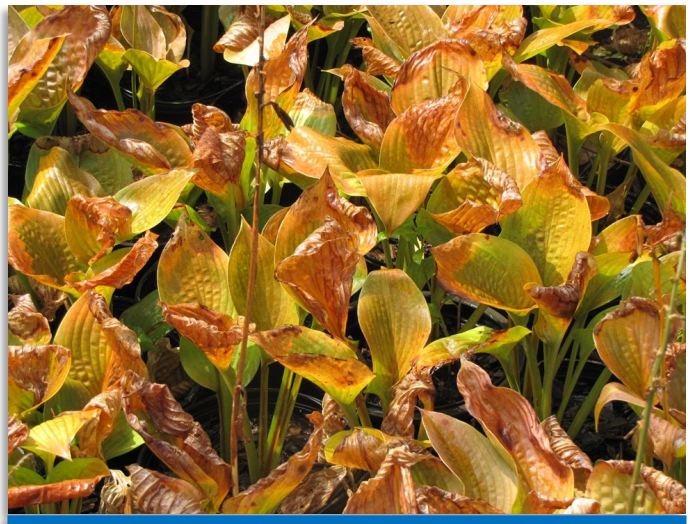
Carey Grable, Extension Associate, Nursery Crops

Water quality is an important issue for growers who irrigate their crops. During the summer months, growers should pay particular attention to iron levels in their irrigation water as high temperatures lead to faster iron oxidation. Iron oxide (or rust) causes several different problems for growers. Aesthetically, iron can cause issues both on your production areas and structures as well as on the plants themselves. It can also lead to clogged emitters, preventing efficient irrigation coverage.

Emitters clogged by iron

Photo: Carey Grable, UK-Horticulture

Iron in irrigation water can be found in four different forms: soluble, chelated, organic, and precipitated. Each form has its own method of treatment. In general, irrigation intakes should be kept between 18 and 30 inches below the reservoir surface to avoid both iron sediment at the bottom of the pond and iron fixing bacteria towards the top. More information on the forms of iron and their treatment can be found in this Rutgers publication. A water test is needed to determine which form of iron may be present. Water samples can be run by the University of Kentucky's Regulatory Services. 50ml sample containers are available at local county Extension offices and instructions on the sampling procedure can be found here.



Plants discolored and burned by iron.

Photo: Carey Grable, UK-Horticulture

Rainy Season Equals Phytophthora Disease

Nicole Ward Gauthier, Extension Specialist, Plant Pathology
Kim Leonberger, Extension Associate, Plant Pathology

Spring rains can create growing conditions that are devastating to most landscape plants. Wet soils are favored by a group of pathogens called water molds, or oomycetes, which cause a range of root and stem diseases.

Water molds are found in most soils, but plant stress and high pathogen numbers can lead to severe disease. One common water molds is *Phytophthora.* This pathogen is common in Kentucky and has recently been diagnosed as a root rot on numerous plant such as blueberry, arborvitae, and Colorado blue spruce.

Figure 1. Upper portions of the plant may decline or die-back as a result of Phytophthora root rot. Note excess water puddling

Photo: Nicole Ward Gauthier, UK Plant Pathology

Figure 2. Phytophthora root rot results in root reduction.

Photo: William M. Brown Jr., bugwood.org

***Phytophthora* Facts**

- Symptoms vary greatly due to disease severity and host characteristics
- Roots are concealed, so disease often goes undetected until plants begin to decline or upper plant parts wilt (Figure 1) as a result root reduction (Figure 2).

Continued...

- Disease often begins during rainy spring weather, but it is typically not noticed until hot dry weather initiates wilting.
- Above ground infections may result in yellow mottling of leaves to water-soaked lesions on leaves or succulent stems. Woody tissues may develop cankers, often near the soil line.
- Free water is required to allow for "swimming" spores to move to new sites of infection.
- Spores are spread by splashing water and movement of contaminated soil particles.
- The pathogen can produce survival structures that allow them to lie dormant during hot dry seasons or during winter.

Management

Most *Phytophthora* diseases can be prevented or managed using cultural practices. Consider the management tips below to prevent infections or to help manage infected nursery or landscape plants.

- Improve drainage through management of surface water, limited irrigation, diverting downspouts, or planting in raised beds.
- Disinfest tools and containers.
- Dispose of infested potting media.
- Inspect plants prior to purchase, or during production to insure that plants are healthy prior to installation.
- Do not compost infected plant material.
- Remove plant debris and other sources of inoculum.
- Mulch plant to reduce spore splash.
- Use resistant cultivars whenever possible.

Phytophthora spp. are not true fungi, so not all fungicides will be effective against these pathogens. Fungicides must be specifically labeled for oomycetes. Homeowners can utilize fungicides containing phosphorus acid to protect plants from infection or suppress disease development. Commercial production fungicides include products containing cyazofamid, etridiazole, mefenoxam, or phosphorus acids. For additional information on fungicide use, please contact a local UK Extension agent. Always follow label directions when utilizing fungicides.

Resources

- Landscape Sanitation (PPFS-GEN-04)

http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-GEN-04.pdf

- Homeowner's Guide to Fungicides (PPFS-GEN-07)

http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-GEN-07.pdf

- Fungicides for Management of Landscape Woody Ornamental Diseases (PPFS-OR-W-14)

http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-OR-W-14.pdf

- Fungicides for Management of Diseases in Commercial Greenhouse Ornamentals (PPFS-GH-03)

http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-GH-3.pdf

- Relative Effectiveness of Various chemicals for Disease Control of Ornamental Plants (PPFS-GEN-13)

http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-GEN-13.pdf

The Dark Side of Black Root Rot

Kim Leonberger, Extension Associate

Nicole Ward Gauthier, Extension Plant Pathologist

Recent rainy weather in Kentucky has favored black root rot disease development. Black root rot can affect a wide range of ornamentals in home and commercial landscapes, nurseries, and greenhouses. Black root rot is commonly observed on Japanese and blue hollies, inkberry, pansy, petunia, and vinca. In addition to ornamentals, numerous vegetable and agronomic crops are susceptible.

Figure 1. Plants affected by black root rot often wilt and die.

Photo: Elizabeth Bush, Virginia Tech,

Black Root Rot Facts

- Symptoms are first noticed on above grown plant parts. Plants may exhibit poor vigor or stunting. Leaves may develop a yellow color, wilt, and die (Figure 1). Infected plants may collapse or die back, with severe infections leading to plant death. Above-ground symptoms result from root system decay. Root symptoms begin as dark brown to black lesions often in the middle of roots (Figure 2).
- Disease is favored by wet soils with mild temperatures or a high pH. Stressed plants are also more prone to disease.
- The pathogen can persist indefinitely in soils or survive on plant debris.
- Contaminated soil, infested plant material, and water can spread black root rot.
- Caused by the fungus *Thielaviopsis basicola*.

Continued on next page...

Figure 2. Lateral view: Black root rot results in roots with dark brown to black lesions, contrasting sharply with healthy white roots.

Photo: Elizabeth Bush, Virginia Tech, bugwood.org

Management

- Avoid planting susceptible plants. Refer to Table 1 for a partial listing of some of the hosts susceptible to black root rot.
- Remove and destroy infected plants. Fungicides do not cure black root rot.
- Maintain a strict sanitation program. Keep floors and benches clean. Do not reuse soil. Clean tools and containers between use.
- Avoid stressing plants by proper site selection, nutrition, and irrigation.
- There are no effective fungicide drenches available for homeowner use. Landscape professionals may treat established plants with low levels of infection to suppress black root rot.

Susceptible plants		
Woody ornamentals	*Herbaceous ornamentals*	*Agronomic crops*
Barberry	Astilbe	Alfalfa
English boxwood	Begonia	Cotton
Euonymus	Dianthus	Cowpea
Holly, blue (including these cultivars)	Fuchsia	Soybean
▪ Blue Angel	Gloxinia	Tobacco
▪ Blue Maid	Impatiens	
▪ Blue Prince	Pansy/Viola	
▪ Blue Princess	Petunia	*Vegetable crops*
▪ Blue Stallion	Phlox	Cucurbits
▪ China Boy	Poinsettia	Eggplant
▪ China Girl	Rosemary	Okra
▪ Dragon Lady	Sweet pea	Peanut
Holly, Japanese	Vinca/Catharanus	Snap bean
Inkberry	Zinnia	Tomato

Resistant hollies	**Moderately resistant hollies**
English holly	American holly
Chinese holly	Yaupon holly

Table 1. Plants resistant and susceptible to black root rot.

Image: Plant Pathology Fact Sheet, Black Root Rot of Ornamentals, PPFS-OR-W-03

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In greenhouses and nurseries, disease free stock plants should be used. Soil should not be reused and all tools, equipment, containers, and surfaces should be disinfested. Plants should be monitored regularly for disease development, and disposed of immediately if black root rot is detected. Soil drench fungicides may be applied preventatively. Always follow label directions when utilizing fungicides.

Resources

- **Black Root Rot of Ornamentals (PPFS-OR-W-03)**

http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-OR-W-3.pdf

- **Landscape Sanitation (PPFS-GEN-04)**

http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-GEN-04.pdf

- **Greenhouse Sanitation (PPFS-GH-4)**

http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-GH-4.pdf

- **Woody Plant Disease Management Guide for Nurseries and Landscapes (ID-88)**

http://www2.ca.uky.edu/agcomm/pubs/id/id88/id88.pdf

KYOSE Update

Katie Joya, Nursery Inspector, Office of the State Entomologist

Spring is in full force, and so is the **Kentucky Office of the State Entomologist**. We're gearing up for trapping and inspecting season and have already gotten our feet wet a little bit. Here's a list of the surveys we're doing this year with links to our **CAPS (Cooperative Agricultural Pest Survey)** website where you can find out more information about the pests we're looking for

Apple Orchard Survey Corn
Grape Soybean
Nursery
Sudden Oak Death Thousand
Cankers Disease
Forest Pests in KY State Parks
Gypsy Moth
Imported Fire Ant
Pine Shoot Beetle

Our State Survey Coordinator, Janet Lensing, has a lot more information on our CAPS website. If you want to know about current surveys, past surveys, or need pest fact sheets, please visit http://ky-caps.ca.uky.edu.

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The University of Kentucky's **Nursery Crop Extension Research Team** is based out of two locations across the bluegrass to better serve our producers.

The **University of Kentucky Research and Education Center (UKREC)** in **Princeton** serves western Kentucky producers while our facilities and personnel on main campus in **Lexington** serve central and eastern Kentucky producers.

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