Tennessee State University
Digital Scholarship @ Tennessee State University

Extension Publications | Cooperative Extension

2016

Foliar Diseases of Hydrangea

Fulya Baysal-Gurel
Tennessee State University

Niamul Kabir
Tennessee State University

Adam Blalock
Tennessee State University

Follow this and additional works at: https://digitalscholarship.tnstate.edu/extension

Recommended Citation

Baysal-Gurel, Fulya; Kabir, Niamul; and Blalock, Adam, "Foliar Diseases of Hydrangea" (2016). *Extension Publications*. 121.
https://digitalscholarship.tnstate.edu/extension/121

This Article is brought to you for free and open access by the Cooperative Extension at Digital Scholarship @ Tennessee State University. It has been accepted for inclusion in Extension Publications by an authorized administrator of Digital Scholarship @ Tennessee State University. For more information, please contact XGE@Tnstate.edu.

Foliar Diseases of Hydrangeas

Dr. Fulya Baysal-Gurel, Md Niamul Kabir* and *Adam Blalock

Otis L. Floyd Nursery Research Center
College of Agriculture, Human and Natural Sciences
Tennessee State University

TENNESSEE STATE UNIVERSITY
College of Agriculture, Human and Natural Sciences

ANR-PATH-5-2016

Fig 1. Hydrangea cv. Munchkin

Hydrangeas are summer-flowering shrubs and are one of the showiest and most spectacular flowering woody plants in the landscape (Fig. 1). The appearance, health, and market value of hydrangea can be significantly influenced by the impact of different diseases. This publication focuses on common foliar diseases of hydrangea and their management recommendations.

Powdery Mildew

Causal agents: *Golovinomyces orontii* (formerly *Erysiphe polygoni*), *Erysiphe poeltii*, *Microsphaera friesii*, *Oidium hortensiae*

Class: Leotiomycetes

Fig 2. Powdery mildew

Powdery mildew pathogens have a very broad host range including hydrangeas. Some hydrangea species such as the bigleaf hydrangeas (*Hydrangea macrophylla*) are more susceptible to this disease while other species such as the oakleaf hydrangea (*H. quercifolia*), appear to be more resistant.

In an outdoor environment, powdery mildew pathogens generally overwinter in the form of spores or fungal hyphae. In a heated greenhouse setting, powdery mildew can be active year round. Spores and hyphae begin to grow when humidity is high but the leaf surface is dry. Warm days and cool nights also favor powdery mildew growth. The first sign of the disease is small fuzzy gray circles or patches on the upper surface of the leaf (Figs. 2 and 3). Inspecting these circular patches of fuzzy gray growth with a hand lens will reveal an intricate web of fungal hyphae. Sometimes small dark dots or structures can be seen within the web of fungal hyphae. Powdery mildew can spread easily by air currents and plant-to-plant contact. If plants infected with powdery mildew are not treated, growth may slow or stop altogether. Flowering can also be reduced by powdery mildew infections.

To protect plants against powdery mildew, reduce conditions that are favorable to disease development by increasing air circulation, reducing humidity if possible, and keeping plant debris out of the production area. Fungicide applications will be more effective when used before symptoms development (Table 1).

Fig 3. Powdery mildew

Cercospora Leaf Spot

Causal agent: *Cercospora hydrangea*

Class: Dothideomycetes

Cercospora leaf spot is a destructive leaf disease of hydrangea in the landscape and in nurseries. This disease can affect most of the hydrangea varieties. Low-maintenance landscape plantings are most susceptible to get this disease. The first symptoms of this disease are small circular brown or purple spots, which appear on the leaves near the base of the plant. On the bigleaf hydrangea these spots turn light gray in color and are surrounded by a brown or purple halo (Fig. 4). On the oakleaf hydrangea these spots appear angular in shape and are dark brown to purple in color. Leaves that are severely spotted become a yellow-green color and may fall to the ground. Fallen infected leaves are the main source of the causative fungus spores. These spores can spread very easily by wind and overhead irrigation. For this reason, the rate of the disease spread increases by frequent late summer rain showers. The following management strategies such as longtime drought, removing infected leaves, applying nitrogen containing fertilizer, and surface watering (such as drip irrigation) can be used to reduce this disease. Fungicides are not a good consideration option to reduce this disease, as if symptoms appear late in the season, but they can be effective when first signs of leaf spots are observed. Multiple applications are needed for effective control of Cercospora leaf spot using fungicides.

Fig 4. Cercospora leaf spot

Botrytis Blight

Causal agent: *Botrytis cinerea*

Class: Leotiomycetes

Almost all of the species of hydrangea are susceptible to Botrytis blight, but most of the damage is reported on the bigleaf hydrangea. First symptoms of this disease can be observed on the plant's flower buds, petals and blossoms. Suitable conditions for the development of Botrytis blight are several days of cloudy, humid and rainy weather. Small water-soaked spots are often observed on hydrangea flower petals, which quickly expand into reddish brown irregular blotches and are often covered with *B. cinerea* sporulation. Gray spores can easily be seen on the infected fallen leaves with the help of a hand lens. Suitable environmental conditions such as cool (65˚F), humid, wet conditions can increase the growth and reproduction rate of *B. cinerea.* As these fungal spores survive for a long time in plant debris they are easily dispersed to healthy tissue by wind. Once they land on a healthy plant, they can germinate and start new infections. Management of Botrytis blight requires a combination of sanitation, cultural practices and protective fungicide applications. Before bringing fresh plant material into the greenhouse, previous debris must be cleared from benches and beds. Continuous disposing of infected plants, blooms, and other debris are also required. Disinfectants can be used to clean surfaces and tools in propagation and production areas. Disease free cutting stock must be collected for propagation and cuttings needs to be handled carefully to minimize wounding of the tissues. Proper irrigation, ventilation, reduced relative humidity and blocking UV radiation can reduce the rate of spore germination and infection by *B. cinerea*.

Anthracnose

Causal agents: *Colletotrichum gloeosporioides, Colletotrichum dematium*

Class: Sordariomycetes

Anthracnose pathogens have a broad host range, which includes a wide variety of commonly grown woody shrubs and trees. The fungus *Colletotrichum* can attack both leaves and blooms in the lower and upper part of bigleaf hydrangea plant canopy. Development of this disease is favorable in wet weather conditions. Heavily fertilized hydrangea may become more susceptible to anthracnose disease. First symptoms of this disease are the circular or slightly irregular brown spots forming on the leaves. The center of these brown spots turns to tan in color. Sometimes larger spots appear on border mid vein or other major veins in the leaf and they become clearly more angular in shape. When anthracnose developed under favorable environmental conditions, large, dark brown, irregular spots can spread across the whole leaves and flower petals. Several continuous days of wet conditions can produce masses of spores, which can be embedded in hydrangea leaf debris. Spores may spread by splashing water to the leaves and bloom clusters. Repeated showers, dew, and lengthened periods of heavy fog can speed up the rate of infection and the appearance of symptoms. The main source of anthracnose inoculum is the infected hydrangea. The following options are available for managing anthracnose on hydrangea such as taking cuttings from healthy plants; collecting fallen diseased leaves and

removing blighted blooms from landscape plantings. Proper fungicide treatments can also protect susceptible hydrangea from anthracnose.

Alternaria Leaf Spot

Cause: *Alternaria* spp.

Class: Dothideomycetes

Alternaria leaf spot is a problem of *Hydrangea macrophylla and H. anomala* subsp. *petiolaris* in the landscape. Symptoms of Alternaria leaf spot include spots on the upper side of the leaves surrounded by a chlorotic halo (Fig. 5). Lesions may coalesce into necrotic areas and necrosis may develop on the leaf margins and near the petioles. The following options are available for managing Alternaria leaf spot on hydrangea such as collecting fallen diseased leaves from the landscape plantings and fungicide applications.

Fig 5. Alternaria leaf spot

Rust

Causal agent: *Pucciniastrum hydrangeae*

Class: Pucciniomycetes

Rust is a destructive leaf disease of *Hydrangea arborescens*, commonly known as smooth hydrangea, in landscape and nurseries. The first signs of rust disease are brown to orange pustules on the underside of leaves and yellow spots on the upper side. The pathogen is an obligate parasite so it needs living tissue to grow. The pathogen needs two hosts to complete its life cycle. Thinning the inside of the hydrangea bush, cleaning rust infected leaves and fallen plant debris around both hemlock and hydrangea may help to manage this disease. Many products can be used to disinfect cutting tools. The cultivar ‘Frosty’ shows resistance to rust disease so it should be preferred.

Phyllosticta Leaf Spot

Cause: *Phyllosticta hydrangeae-quercifoliae*

Class: Dothideomycetes

The first symptoms of this disease are small water soaked areas on the leaves. Those areas turn to circular spots with brown borders. Fungal fruiting bodies can be seen on the leaf spots with a hand lens. Removing infected leaves will help to reduce pathogen inoculum. Proper fungicide treatments can also protect susceptible hydrangea from Phyllosticta leaf spot.

Bacterial Foliar Diseases of Hydrangea

Bacterial leaf spot and bacterial wilt are important bacterial diseases of hydrangea. *Hydrangea quercifolia* (Oakleaf hydrangea), *H. macrophylla*, and *H. arboreacens* are most commonly affected by bacterial leaf spot disease. *Xanthomonas campestris* is the causal agent of bacterial leaf spot diseases. The bacterial pathogen mostly enters into the plant through stomata, other natural openings, and/or plant wounds. Symptoms of bacterial leaf spot disease first appear as water-soaked spots. The spots become more darken and develop an angular shape; some of the spots may enlarge, coalesce and eventually cause death of mature leaves. Bacterial wilt disease in hydrangea occurs mainly after heavy rains and hot weather.

The causal pathogen of bacterial wilt disease is *Ralstonia solanacearum*. Symptoms of bacterial wilt disease are it may blight the flower clusters and leaves, but in severe conditions wilting and root rot occur, followed by plant death. Eradicate the infected plant parts can help to reduce bacterial leaf spot and bacterial wilt diseases. Proper bactericide treatment can also protect susceptible hydrangea from bacterial leaf spot but there is no chemical control available for bacterial wilt disease.

Virus Diseases of Hydrangea

In nursery production and landscape planting of hydrangea, so far fifteen viruses have been reported as pathogens for hydrangea. Viruses affect almost all cultivated Hydrangea spp. but *H. macrophylla* are most susceptible to viral diseases. The following fifteen viruses are reported as main viral pathogens on Hydrangea spp.: Alfalfa mosaic virus (AMV), Arabis mosaic virus (ArMV), Cherry leaf roll virus (CLRV), Cucumber mosaic virus (CMV), Hydrangea mosaic virus (HdMV), Hydrangea latent virus (HdLV), Hydrangea ringspot virus (HdRSV), Hydrangea chlorotic mottle virus (HdCMV), Impatiens necrotic spot virus (INSV), Tobacco necrosis virus (TNV), Tobacco rattle virus (TRV), Tobacco ringspot virus (TobRSV), Tomato blackring virus (TBRV), Tomato ringspot virus (TomRSV), and Tomato spotted wilt virus (TSWV). The visual symptoms include leaf mottling, blistering, leaf distortion, leaf chlorosis with green blotches or brown leaf spots on leaves, reddening, both chlorotic and ring spots, stunting and sometimes flower virescence. Viruses can be transmitted on hydrangea mechanically by leaf contact, knives, and aphids such as the green peach aphid. Sometimes viruses can be transmitted by nematodes or by the western flower thrips as well. Basically there is no cure for viruses in plants, as the infection is systemic, most of the tissues in plant can carry the viruses. Effective cultural practices can reduce the risk of damage by viruses. Some examples of cultural practices are removal of infected plants and plants parts as soon as possible, surface sterilization of knives before cutting with disinfectants, planting clean stock in containers in soilless media to avoid nematode - vectored viruses, controlling weeds and also insect vectors.

Reference

Gould, A. 2012. Disease Control Recommendations for Ornamental Crops
http://njaes.rutgers.edu/pubs/publication.asp?pid=E036

For additional information, contact your local nursery specialist office.

Tennessee State University
College of Agriculture, Human and Natural Sciences
3500 John A. Merritt Blvd., Box 9635 Nashville, TN 3720 -1561
http://www.tnstate.edu/extension

Tennessee State University, Otis L. Floyd Nursery Research Center
472 Cadillac Lane McMinnville, TN 37110 http://www.tnstate.edu/agriculture/nrc/

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication. Use of trade, brand, or active ingredient names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar and suitable composition, nor does it guarantee or warrant the standard of the product. The author(s) and Tennessee State University assume no liability resulting from the use of these recommendations.

Dr. Chandra Reddy, Dean, Tennessee State University, College of Agriculture, Human and Natural Sciences

Dr. Latif Lighari, Associate Dean Extension, Tennessee State University, College of Agriculture, Human and Natural Sciences

Dr. Nick Gawel, Superintendent, Otis L. Floyd Nursery Research Center, Tennessee State University, College of Agriculture, Human and Natural Sciences

TSU-16-0236(A)-15-61065 – Tennessee State University does not discriminate against students, employees, or applicants for admission or employment on the basis of race, color, religion, creed, national origin, sex, sexual orientation, gender identity/expression, disability, age, status as a protected veteran, genetic information, or any other legally protected class with respect to all employment, programs and activities sponsored by Tennessee State University. The following person has been designated to address inquiries regarding non-discrimination policies: Tiffany Cox, Director, Office of Equity and Inclusion, tcox9@tnstate.edu, or Justin Harris, Assistant Director, Office of Equity and Inclusion, jharri11@tnstate.edu, 3500 John Merritt Blvd., McWherter Administration Building, Suite 260, Nashville, TN 37209, 615-963-7435. The Tennessee State University policy on nondiscrimination can be found at www.tnstate.edu/nondiscrimination.

Table 1. Selected lists of fungicide/bactericide and biopesticide groups that may help control foliar diseases of hydrangeas (Gould, 2012).

Active Ingredient	FRAC code	Powdery Mildew	Cercospora Leaf Spot	Botrytis blight	Anthracnose	Alternaria Leaf Spot	Rust	Phyllosticta Leaf spot	Bacterial Leaf Spot
Azoxystrobin	11	+	+	+	+	+			
Boscalid + Pyraclostrobin	7 + 11	+	+	+	+	+	+	+	
Chlorothalonil	M5	+	+	+	+	+	+	+	
Chlorothalonil + Thiophanate-methyl	M5 + 1	+	+	+	+	+	+	+	
Copper (octanoate, pentahydrate)	M1	+	+	+	+	+	+	+	+
Dicloran	14			+					
Fenarimol	3	+							
Iprodione	2			+		+			
Iprodione + Thiophanate-methyl	2 + 1	+	+	+		+			
Kresoxim-methyl	11	+				+		+	
Mancozeb	M3		+	+		+	+	+	
Myclobutanil	3	+	+				+		
Neem oil		+		+	+	+	+		
Piperalin	5	+							
Polyoxin-D	19	+		+	+				
Pyraclostrobin	11	+	+	+	+	+			
Streptomycin sulfate	25								+
Sulfur	M2	+		+					
Tebuconazole	3	+			+		+		
Thiophanate-methyl	1	+	+	+	+				
Tri oxystrobin	11	+		+	+	+			
Tri umizole	3	+		+		+			
Triadimefon	3	+	+		+				

NOTE: Before applying ANY disease management product, be sure to: 1) read the label to be sure that the product is allowed for the crop and the disease you intend to control; 2) read and understand the safety precautions and application restriction.