



Pest e-alerts



*Entomology and Plant Pathology, Oklahoma State University
127 Noble Research Center, Stillwater, OK 74078
405.744.5527*

Vol. 9, No. 14

<http://entopl.okstate.edu/Pddl/>

Apr 28, 2010

Plant Disease Corner - April 2010

Jennifer Olson, Plant Disease Diagnostician

Damon L. Smith, Extension Horticulture Pathologist

John Damicone, Extension Plant Pathologist



Christmas is in April this year! If you are in a County Extension Office and you have not received any phone calls about something orange in cedar trees, just wait a few days. Cedar-apple rust is in “full bloom” and the galls can be easily seen on juniper trees throughout Oklahoma. This disease appears every spring in April or May and is more obvious with abundant rainfall.

Rather than rehashing old information, I would encourage you to review Pest e-Alerts Vol. 5, No. 8 (May 4, 2006) “Cedar-Apple Rust: Christmas in May!” by Brian Olson and Vol. 9, No. 12 (Apr 20, 2010) “Those Aren't Aliens Hanging from Your Red Cedar Trees” by Damon Smith. You may also want to review factsheet EPP-7611 Cedar-Apple Rust.

One piece of information that is lacking from these publications is control of cedar-apple rust with fungicides. Fungicide recommendations are available in publication E-832 “2010 Extension Agents’ Handbook of Insect, Plant Disease, and Weed Control.” Recommendations for apples and also ornamental trees that are affected by cedar-apple rust can be found in the “Commercial Apple” and “Trees, Shrubs, Vines and Flowers – Disease” sections, respectively. For homeowners that wish to protect apple trees they can purchase many of these commercial products at any professional pesticide supply center, however, cost might be prohibitive. A few fungicide formulations may also be found at the local garden centers. Some of the more

common products include those listed in Table 1. These products will be more reasonably priced in most cases. However, no efficacy data for control on apple trees is currently available for these formulations in Oklahoma. Clients should be advised that these may or may not be effective for control of cedar-apple rust in Oklahoma, despite a legal use label. Other products may be available but be sure that the label specifically mentions apple. Clients interested in applying fungicides for the control of cedar-apple rust on apples and ornamental trees should begin preventative sprays at pink bud stage and continue at weekly intervals until they no longer see the bright orange galls on the cedar trees.

Table 1. Some fungicide products and active ingredients that may be found at garden centers for control of cedar-apple rust on apple trees.

<u>Product</u>	<u>Active Ingredient</u>
Captan 50W Fungicide (Hi-Yield)	Captan
Complete Fruit Tree Spray (Bonide)	Captan + insecticides
Fruit Tree Spray (Green Light)	Neem Oil + insecticides
Fungicide 3 Concentrate (Garden Safe Brand)	Neem Oil
Immunox Multi-Purpose Fungicide Spray (Spectracide)	Myclobutanil
Improved Lime Sulfur Spray (Hi-Yield)	Sulfur
Mancozeb Flowable with Zinc (Bonide)	Mancozeb

If clients want to protect cedar trees from cedar-apple rust, they should begin a fungicide program in June and continue through September at 10-14 day intervals. Some products that can be applied to cedar for rust control include those listed in Table 2.

Table 2. Some fungicide products and active ingredients that may be found at garden centers for control of cedar-apple rust on cedar trees.

<u>Product</u>	<u>Active Ingredient</u>
Advanced Garden Disease Control (Bayer)	Tebuconazole
Advanced All-In-One Rose and Flower Care (Bayer)	Tebuconazole + insecticides
Complete Fruit Tree Spray (Bonide)	Captan + insecticides
Fruit Tree Spray (Green Light)	Neem Oil + insecticides
Fung-Away Systemic Fungicide (Green Light)	Triadimefon
Fungicide 3 Concentrate (Garden Safe Brand)	Neem Oil
Immunox Plux Insect and Disease Control (Spectracide)	Myclobutanil + insecticides
Mancozeb Flowable with Zinc (Bonide)	Mancozeb

Over the next few weeks, everyone can expect a few phone calls and should enjoy the orange display in the cedar trees!

Anthracnose is popping up throughout Oklahoma Throughout much of Oklahoma; we have experienced a rainy spring with moderately warm temperatures. These conditions favor fungal diseases such as anthracnose. The word anthracnose is a general term that describes a certain set of symptoms on many trees and shrubs. The symptoms include brown to black spots on leaves, deformed leaves, and often results in defoliation and/or tearing and loss of necrotic (dead) leaf material from the centers of leaf spots. Anthracnose is usually specific to the kind of plant it occurs on. For example, anthracnose on oak will not be a problem on ash and anthracnose on ash will not spread to sycamore. However, since the fungal pathogens that cause the diseases are related, they have similar temperature and humidity requirements. Therefore, the symptoms may be observed on several types of trees or shrubs in the landscape at relatively the same time if the appropriate pathogens are present.



**Brad Bain, McCurtain Co.
Extension Office**

The pathogens survive the winter in diseased plant material. In the spring, they will produce spores from fruiting bodies which can blow or splash (depending on fungal species) to young leaves and cause leaf symptoms. If the infection is severe, small or immature twigs can be infected and a limited amount of dieback can occur. Anthracnose diseases are more common in wet springs. The infected trees and shrubs may look poor for several weeks and will often lose a significant number of leaves. A healthy tree will produce a second flush of leaves and

recover. If anthracnose disease is a problem every year, the tree will become weak which can predispose the tree to other diseases, insect pests, or environmental stress.

Anthrachnose can be managed by removing dead and dying branches. Fallen leaves and debris should be raked up and discarded (not composted). In most cases where the tree is established and in otherwise good health, it is not necessary to apply fungicides. It may be helpful to make an application of an appropriate tree and shrub fertilizer this spring to promote health and vigor of the tree. Fertilizer should be applied carefully and only if needed. For information on fertilizing trees consult fact sheet HLA-6412 "Fertilizing Shade and Ornamental Trees and Shrubs." If fungicides are desired, consult E-832 "2010 Extension Agents' Handbook of Insect, Plant Disease, and Weed Control" for product information. Applications should be made every 7-14 days, especially if rain is in the forecast.

For more information, please review EPP-7634 "Anthracnose and other Common Leaf Diseases of Shade Trees."



Fig 1. Unusual line patterns on Camellia leaves most likely caused by a plant virus.

Be on the Lookout for Plant Viruses Over the past few weeks, we have started to receive plant samples with symptoms of viruses. These samples have primarily come from commercial sources. It is likely that infected plants in the home garden will begin to show symptoms as temperatures across the state warm and plants begin actively growing. If you suspect that a plant is infected with a plant virus, a sample should be submitted to the PDIDL for confirmation. Environmental factors, damage from chemicals and other diseases can cause similar symptoms depending on the host.

The symptoms caused by viruses are variable and may include chlorotic (yellow) spots or line patterns, ringspots, distorted foliage which may have unusual outgrowths, veinal or interveinal chlorosis (yellowing), distorted or unusual flowers, and mottling or mosaic pattern (broken coloring) on the leaves (Fig 1). For many

viral diseases, the obvious symptoms are observed in the spring and early summer or fall, but are not present during the summer

although the plants may show poor growth and vigor.

All types of plants are susceptible to viruses—agricultural crops, annuals, perennials, vegetables, and woody shrubs and trees. Depending on the type of plant and setting, management recommendations may vary. In the case of annual ornamentals or vegetables, the symptomatic plant(s) should be removed and discarded. Some of the viruses on annual plants are transmitted by insects. If a virus infection is detected, it may be necessary to review the insects that have been observed on these plants and monitor the populations on the remaining crop for the remainder of the season. Some commonly found viruses that affect annual plants include tomato spotted wilt virus (TSWV), impatiens necrotic spot virus (INSV), cucumber mosaic virus (CMV), tobacco mosaic virus (TMV) and beet curly top virus (BCTV) (Fig 2). Do not be fooled into thinking that these viruses only affect the plants in their name. For example, TMV affects many plants, not just tobacco. Rather, many viruses have a wide host range and can affect a number of plant types. The name is often historical and reflects the plant that the virus was first identified from.



Fig 2. Stunted tomato plant with curled leaves, chlorosis and poor vigor due to Beet Curly Top Virus.

Plant viruses can also cause damage to herbaceous perennials, woody shrubs and trees. If possible, the symptomatic plant(s) should be removed and discarded. For larger plants, if only a single or few branches are affected, it may be possible to save the plant by removing the affected part(s). However, the remaining portion of the plant should be closely monitored.

Viruses that affect herbaceous perennials and woody plants exhibit highly variable symptoms and the transmission method varies (Figures 3-6). Many have insect vectors which need to be monitored similar to annual crops while others can be spread by plant-to-plant contact. Some of the viruses may be spread by plant pathogenic nematodes in the soil and may require that these populations be monitored. Many viruses of woody plants are transmitted by taking cuttings from infected mother plants and/or grafting and have been introduced to new sites by installing infected plants. Herbaceous perennials often decline and die over time. On woody plants, the viruses may not kill the host, but slowly reduce health and vigor so that they are susceptible to other diseases, insects, or environmental stresses. Plants are often removed because they become unsightly, hazardous, or are no longer productive. There is no cure for a plant virus once the plants have been infected.



Fig 3. Hosta leaf dark green islands and distortion caused by Hosta virus X.



Fig 4. Rose leaves with chlorotic line patterns and distortion, symptoms of Rose Mosaic.

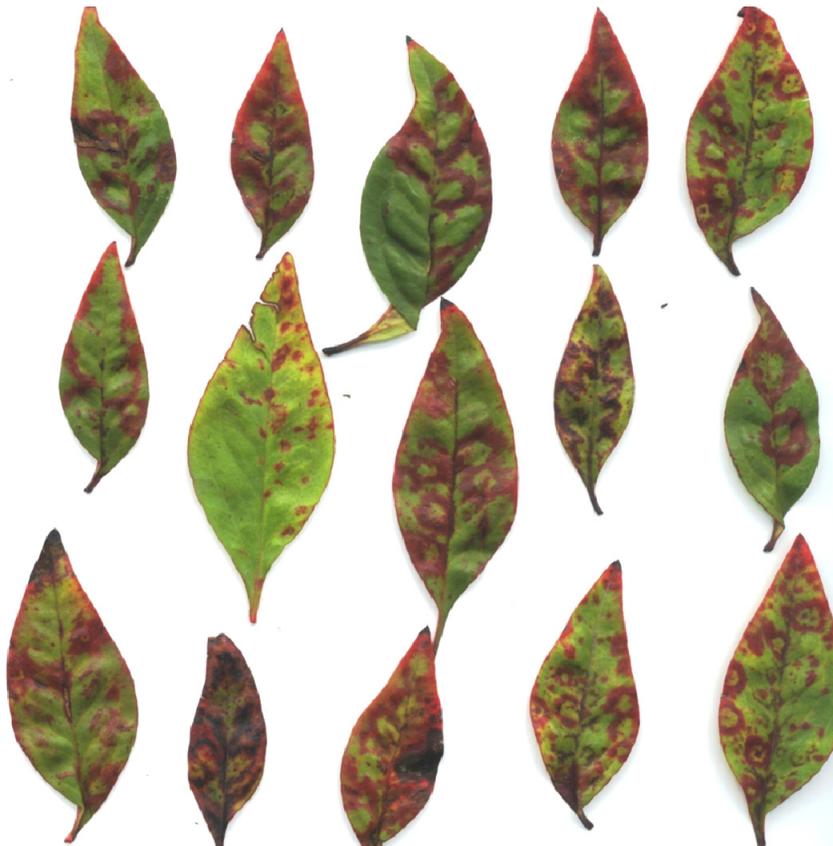


Fig 5. Ringspots such as those observed on these Nandina leaves frequently indicate infection with a plant virus.



Fig 6. Mandevilla leaves with unusual line patterns suspected to be caused by a plant virus.

Large Patch is Active

Damon L. Smith, Extension Horticulture Pathologist

Nathan R. Walker, Turfgrass IPM Scientist

Most of the warm-season turf that hasn't succumbed to winterkill this season is greening up nicely. Now diseases like spring dead spot are showing up. Now is the time to note where these diseased areas are in bermudagrass turf so that if the plan is to apply fungicides this fall, the applicators know where the diseased areas are (remember, the turf will be green and look healthy in the fall).

Another disease now on the prowl is large patch. I was scouting and rating turfgrass plots at our turfgrass research center this week and noticed that large patch was active in our 'Meyer' zoysiagrass plots. Large patch can occur in residential, landscape, and recreational warm-season turfgrass areas. In Oklahoma, the disease is most noticeable in early spring when turfgrasses are breaking dormancy and weather conditions are wet and mild. In some years, the disease is evident in the fall; however, activity by the pathogen may not always result in visible symptoms. Zoysiagrass is most susceptible to large patch, but bermudagrass and St. Augustinegrass can also be damaged.

The turf in affected areas will thin and individual grass leaves may appear bleached or yellow (Fig. 1). Large circular, semi-circular, or arcs of damaged turf will be apparent. When large patch is active, diseased turf may appear bright orange (Fig. 2). Leaf lesions, a white, cottony growth (mycelium) and smoke rings at the edge of the diseased areas will be absent. Patches are perennial, typically expand in size and often can reach several yards in diameter. Affected shoots can be easily pulled from sheaths or point of attachment and the base of the shoot may appear water soaked. As plant stand density is reduced, weed encroachment is common both during and after disease activity.



Fig 1. Bleached symptoms of large patch on bermudagrass.



Fig 2. Early development of large patch on bermudagrass.

The fungus that causes large patch, *Rhizoctonia solani*, overwinters as dormant mycelium (body of the fungus) in infected plants or as special survival structures. In Oklahoma, infection of susceptible grasses can begin in late September when soil temperatures are above 50° F and moisture is adequate and continue until dormancy. Fungal activity can resume in early spring but is suppressed by soil temperatures greater than 85° F. Turfgrass grown under high nitrogen fertility that is applied too late in the year or very early in the spring is more prone to the development of large patch. Turfgrass that is also excessively irrigated, has abundant thatch, or low air movement above the canopy can be predisposed to disease. Extended periods of wet, mild weather can lead to severe epidemics. During summer months the disease subsides and the fungus typically survives in thatch or in resting structures.

Large patch management: Large patch usually does not kill the stolons or rhizomes and surviving plants can fill in the affected areas during summer months. Do not apply nitrogen fertilizers in early spring when the pathogen is active; wait until soil temperatures are warmer. Do not apply nitrogen after September 15th. When water is required, apply a sufficient amount to wet the soil and then water as infrequently as possible without causing drought stress between irrigation events. Wait and remove excessive thatch or aerify in the summer; these activities may help reduce disease severity. For chemical control to be effective, fungicides should be applied in the fall before disease development is evident. A repeated fungicide

application 30 days later may be required if environmental conditions are still conducive for disease. It is recommended that the affected areas are photographed in the spring and that fall fungicide applications are targeted to only those areas where the disease was present. Spring applications are generally not effective.

Last fall, I reported the results of a large patch fungicide trial conducted at Oklahoma State University in Pest e-Alert Vol. 8, No. 26, but will reiterate those results here. All fungicide treatments were applied to 'Meyer' zoysiagrass with first sprays initiated on September 26, 2008. A second treatment of the same fungicide and rate was applied 28 days later on October 24, 2008. Large patch severity and also overall quality were evaluated on May 15, 2009. All fungicides controlled large patch better than not treating (Table 1). However, no one fungicide was statistically better than another. Numerically triadimefon (Bayleton) was the best performing product; but registration for application on home lawns has been removed. Overall turfgrass quality was acceptable for all fungicide treated plots. Plots not treated with fungicide were considered visually unacceptable. Fluoxastrobin (Disarm), Flutolanil (Prostar), and Triadimefon (Bayleton) resulted in the highest overall turfgrass quality and lowest levels of disease.

Table 1. Relative performance of select fungicides for controlling large patch of Zoysiagrass.

Fungicide Active Ingredient (Formulation Used)	Average Diseased Area (%) ^A	Overall Turfgrass Quality (1-9 scale) ^B
Non-treated	47.5 A	4.0 C
Propiconazole (Banner Maxx)	13.7 B	7.0 B
Pyraclostrobin (Insignia)	4.9 B	7.7 AB
Azoxystrobin (Heritage)	1.8 B	7.5 AB
Fluoxastrobin (Disarm)	1.3 B	8.5 A
Flutolanil (Prostar)	0.6 B	8.5 A
Triadimefon (Bayleton)	0.0 B	8.7 A

^A Letters next to numbers within the same column, indicate that those numbers are not statistically different.

^BTurfgrass quality is based on a scale of 1 - 9 where 1 = no turf present, 5 = unacceptable turfgrass, 7 = acceptable turf, 9 = dense, dark color, thick stand of turfgrass. Letters next to numbers within the same column, indicate that those numbers are not statistically different.

Dr. Richard Grantham
 Director, Plant Disease and Insect Diagnostic Laboratory

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural.