

PLANT & PEST ADVISORY

LANDSCAPE, NURSERY & TURF EDITION \$1.50

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Bacterial Leaf Scorch of Oak in the Landscape

Ann B. Gould, Ph.D., Specialist in Plant Pathology



Oaks with **Bacterial leaf scorch (BLS)** have been symptomatic for several weeks now. It appears that the marginal leaf scorch associated with this disease is quite pronounced this year, and diseased trees are easy to spot while driving through affected neighborhoods.

BLS is caused by the xylem-limited bacterium, *Xylella fastidiosa*. In New Jersey, BLS affects landscape populations of red and pin oak in most counties, but is particularly troublesome in certain sections of Burlington, Camden, Gloucester, Salem, Mercer, and Middlesex. In some locations, more than 30% of street tree and landscape oaks are symptomatic for this disease. Although BLS affects shade trees such as elm, red maple, sweet gum, sycamore, London plane, and flowering dogwood, the incidence in these hosts in New Jersey is extremely rare.

Symptoms

The primary symptom associated with BLS is a marginal scorch of affected leaves on one or more branches in the canopy. This symptom appears later in the growing season (mid-August through October). The scorching is often irregular in shape, and frequently a dull red or yellow band is apparent between healthy and scorched (necrotic) tissues. Affected leaves may curl and drop prematurely, leaving much of the canopy relatively transparent. As the infection progresses over several years, branches die and the tree declines. Affected trees eventually decline to the point where they must be removed. The process of tree decline may occur quickly or slowly depending on the tree or the environment.

Disease Spread

As its name suggests, *Xylella fastidiosa* colonizes the xylem and is spread from tree to tree by xylem-feeding insects such as **sharpshooter leafhoppers**. These insects subsist on the fluid within xylem vessels and pick up bacteria when feeding on infected trees. When an insect carrying the bacterium subsequently feeds on a healthy tree, the new tree becomes infected. Both nymphs and adults can spread the disease; adults remain infective for the remainder of their life, nymphs are infective only until their next molt. The particular species of insects that spread *Xylella* to oaks and other shade trees is currently unknown.

SEE BLS ON PAGE 2

INSIDE

Bacterial Leaf Scorch of Oak in the Landscape	1
Diseases of Turfgrass	2
Plant Diagnostic Lab Highlights ...	3
Weekly Weather Summary	3
Compost on the Links	4

Diagnosis

Symptoms of BLS are very similar to those caused by agents such as moisture stress and excessive salt. It is not surprising, therefore, that the disease is frequently misdiagnosed. To diagnose this disease, submit a small branch specimen (pencil-width in diameter), with scorched leaves attached, to the Rutgers Plant Diagnostic Laboratory for analysis. The laboratory will identify BLS through the use of a selective antibody (ELISA) technique. Proper sampling is necessary for an accurate diagnosis; the best samples have leaves that are symptomatic for the disease.

Management

Residents, landscapers, arborists, and golf course superintendents in New Jersey should look for BLS of oak from now through mid-October. Since there is no cure for this disease, proper management strategy includes the maintenance of tree vigor for as long as possible. If possible, water affected trees during times of water stress to reduce the debilitating affects of this disease. In addition, other diseases, insects, and environmental stresses (including drought) enhance the development of bacterial leaf scorch. This disease may also predispose infected trees to other disease and insect problems. Branches and infected trees in a severe state of decline should be routinely removed as they are potential hazards. Expensive tree injections reduce symptom development, but do not cure the disease and must be repeated. In areas known to be affected by this disease, plant trees that are not known hosts of the bacterium.

For diagnosis of BLS, send a sample to the Rutgers Plant Diagnostic Laboratory. Submit pencil-width branches with symptomatic leaves attached; do not wrap the sample in plastic. For more information on mailing and fees, see the following link:
<http://www.rce.rutgers.edu/plantdiagnosticlab/>
or call the lab at 732-932-9140. □

Diseases of Turfgrass

Bruce B. Clarke, Ph.D., Specialist in Turfgrass Pathology

General

Anthracnose, dollar spot, gray leaf spot, rust, and brown patch are all active at this time. Refer to recent issues of this newsletter for additional information about the identification and management of these diseases.

Gray Leaf Spot

Gray Leaf Spot has started to develop recently on perennial ryegrass in several locations in New Jersey. Symptoms typically begin as tiny brown leaf and stem lesions covering 1 to 2 inch patches of susceptible turf. In severe cases, the leaves curl and lesions may extend the entire width of the blade. As the disease progresses, patches coalesce into large (one to two feet) areas of blighted turf. Extensive blighting may occur during warm weather (i.e., 75-85°F days and 60-65°F nights), particularly when the foliage is subjected to alternating wet and dry cycles over a 24 hour period. Newly seeded areas that have been well watered and recently fertilized are particularly susceptible to infection. When conditions are conducive to gray leaf spot, the causal agent (*Pyricularia grisea*), produces abundant one to two-celled, pear-shaped spores. For best results, avoid high rates of quick release nitrogen sources during late summer and early fall and extended periods of leaf wetness (i.e., therefore water in the early morning hours). Armada, Compass, Headway, Heritage, Insignia, Tartan, and thiophanate-methyl (e.g., 3336) are most effective when applied on a preventive basis every 14 to 28 days beginning in late July. Chlorothalonil and the DMI fungicides, such as Banner and Bayleton, have also provided effective control when disease pressure was moderate. Combination products containing chlorothalonil and thiophanate-methyl (e.g., ConSyst and Spectro), or chlorothalonil and mancozeb (e.g. Zyban), have also performed well in field trials at Rutgers University.

Stem and Crown Rust

Stem and Crown Rust are evident on susceptible Kentucky bluegrass and perennial ryegrass cultivars, respectively, at this time. As rust intensifies, the turf prematurely yellows and orange pustules called uredia (reproductive structures) appear on affected blades. To control both stem and crown rust, maintain adequate fertility and soil moisture and apply Armada, Banner, Bayleton, chlorothalonil, Compass, Eagle, Headway, Heritage, Insignia, mancozeb, Tartan, or thiophanate-methyl per manufacturer's recommendations

Turf Expo

This year's Turf Expo will be held at the Trump Taj Mahal Casino/Resort on December 5-7, 2006. This is an excellent opportunity to receive the latest turf management information from nationally renowned speakers. For additional information, please contact Michelle Rickard (215) 757-6582 or e-mail njtadirector@yahoo.com or Marlene Karasik (732) 932-9400 ext. 339 or e-mail mkarasik@aesop.rutgers.edu. □

Plant Diagnostic Laboratory Highlights

Richard J. Buckley, Laboratory Coordinator

Turf

Early-September and the tropical warm and wet weather brought a couple lingering samples of **brown patch** from residential lawns and **summer patch** from golf turf. **Summer patch** continues to wreak havoc on area golf courses. It is not uncommon to get late-season flare-ups as preventive fungicide programs run out and stress periods linger. Several samples of the disease were sent to the laboratory from sites in Maryland, New York and New Jersey.

Landscape

Red oak and pin oak with **bacterial leaf scorch** (BLS) are the main focus of the laboratory at this time. Symptoms on trees known to be infected are quite spectacular this year. **BLS** is a slow killer, so sadly we can watch the decline of large specimens over time. To date, all of the new samples with positive tests come from trees in and around Trenton and Princeton in Mercer County. Other diseases of note include: **Phytophthora crown and root rot** on Frasier fir samples from Warren and Sussex Counties; and **Botryosphaeria canker** on rhododendron from Union County. ☐

Weekly Weather Summary

Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged below normal, averaging 65 degrees north, 68 degrees central and 70 degrees south. Extremes were 92 degrees at Pomona on the 29th, and 54 degrees at several locations on the 3rd and 4th. Weekly rainfall averaged 3.43 inches north, 3.42 inches central, and 4.11 inches south. The heaviest 24 hour total reported was 3.11 inches at Freehold on the 2nd to 3rd. Estimated soil moisture, in percent of field capacity, this past week averaged 99 percent north, 97 percent central and 94 percent south. Four inch soil temperatures averaged 68 degrees north, 70 degrees central and 74 degrees south.

Weather Summary for the Week Ending 8 am Monday 9/ 4/ 6										
WEATHER STATIONS	RAINFALL			TEMPERATURE				GDD BASE50		MON %FC
	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	
CANOE BROOK	3.95	26.20	.06	78	54	66.	-1	2838	563	98
CHARLOTTEBURG	missing									
FLEMINGTON	2.91	31.01	5.88	76	54	65.	-2	2702	367	98
NEWTON	missing									
FREEHOLD	5.33	27.80	3.29	78	55	67.	-2	2789	304	97
LONG BRANCH	4.39	26.83	1.97	78	59	68.	-1	2717	309	94
NEW BRUNSWICK	3.53	25.15	.37	77	56	67.	-4	2900	301	98
TOMS RIVER	1.29	19.80	-5.58	84	57	69.	-1	2819	423	100
TRENTON	2.54	25.21	1.72	81	58	68.	-2	2954	258	95
CAPE MAY COURT HOUSE	3.26	16.65	-5.30	87	58	71.	0	2888	497	95
DOWNSTOWN	4.53	22.46	-.73	83	60	69.	-1	2729	27	95
GLASSBORO	3.74	23.36	-.84	83	54	68.	-2	3149	469	95
HAMMONTON	5.07	22.85	-1.34	85	60	70.	0	3070	387	94
POMONA	3.97	24.28	2.00	92	60	70.	1	2954	452	95
SEABROOK	missing									
SOUTH HARRISON	4.36	27.50	4.89	84	59	69	NA	3117	NA	NA
WES KLINE — GDD BASE 40 PINEY HOLLOW										
LAST WEEK	241 (Ending 8/28/06)									
THIS WEEK	208 (Ending 9/4/06)									
*SOME CUMULATIVE VALUES ESTIMATED DUE TO EARLIER MISSING DATA										

Compost on the Links

Larraine Roulston

Reprinted with permission from BioCycle, Journal of Composting & Organics Recycling, July 2006, Vol. 47, No. 7, p. 38. <http://www.jgpress.com/biocycle.htm>

When Dean Piller, a well-seasoned golfer, groundskeeper and lover of nature, accepted the position as Superintendent of the Cordova Bay Golf Course in Victoria, British Columbia, he was tasked with helping to create a golf course in combination with a bird and wildlife sanctuary. The course overlooks the Pacific Ocean, San Juan Islands and Washington State's Mount Baker.

"In order to create a healthy setting, we were continually mindful of water usage and other environmental practices that led us away from traditional pesticide use," explains Piller. "Our goal became to enhance what Mother Nature already bestowed. One way to become environmentally proactive was to introduce compost into all the surrounding flower beds and shrubs."

Piller used seven existing large cement bins to collect various quantities of organic materials and to cure compost and mulch. With a wish list of a shredder and screener, his present compost method includes blending 25 percent brush, 25 percent aeration cores that contain sand, 25 percent Douglas Fir bark, and one percent vegetable/fruit peelings, coffee grounds, eggshells, etc. from the golf course's kitchen. Flowers, broken sod, grass clippings and leaves make up the balance. The only purchase necessary is the Douglas Fir bark, which makes the cost of his compost approximately \$4/cubic yard. Piller produces over 3,000 yards annually, which is incorporated into all flower beds and a miniature golf area on the property. As well, compost is spread for landscaping by owners and developers who have built apartments overlooking the spectacular view.

To improve the biology of the soils, Piller is experimenting with the application of compost teas that are sprayed on the fairways, tees, and driving range. His 300-gallon tank of compost tea, equipped with an air filter, brews a mix of kelp extract, humic acid, fish fertilizer, oatmeal and compost. The tea bubbles and steeps in the tank for 48 hours. The 300 gallons are sprayed on 15 acres of turf, with an effort to spray every two to three weeks through the growing season.

"We work with the compost teas mostly for the reduction of thatch and to encourage the natural cycling of nutrients in clippings," explains Piller. "We are also hopeful that a reduction in disease will become a benefit down the road. As for pest control on the greens, we spray with fungicides when necessary, which I consider to be a curative medicine for the plant when environmental conditions create disease pressure. From a turf management perspective, the greatest challenge occurs from November through March as the turf is stressed from

heavy play and frost damage. Disease pressures are usually quite predictable with Fusarium Patch and red thread being the two major pests at this time of year. Tees and fairways are not sprayed with fungicides due to low disease pressure; however, we apply the compost teas as well as deep tine aerate to improve oxygen levels in the root zone so beneficial microorganisms can flourish."

Cordova Bay Golf Course was the first course on Vancouver Island to be designated a "Certified Audubon Cooperative Sanctuary," an honor bestowed on only six courses in British Columbia. This environmental recognition is the culmination of a five-year effort to create a wildlife and habitat management program. Each year, Piller and his excellent staff who are committed to the Audubon program, strive to incorporate another step of environmental stewardship. Their track record includes creating nesting boxes for Purple Martins and bluebirds. Cordova Bay boasts that 71 species of birds make their home there, many of which show appreciation by keeping insect larvae on the greens at bay. Bat houses have been built for the winged residents to control insects. Safe dead trees are left standing and 37 gardens have been added for birds, wildlife and native pollinators. Maintenance staff uses pest resistant, stress tolerant, and native plant materials when possible. The grounds have been kept green using 20 percent less water than when the course was first played upon. Ponds have wide borders of natural grasses and wild irises that keep the water much clearer and their surfaces cleaner than when grass was initially mowed to the water's edge.

Piller realized that the golfing industry is going to be faced with tougher legislation on environmental issues. "Superintendents should play a leading role in educating the public on the positive impact golf courses have on the surrounding flora and fauna," he says. "This can be done by following the guidelines laid out by the Audubon Society and by promoting properties as sanctuaries that can be enjoyed by people and wildlife." Piller, who was president of the Canadian Golf Superintendents Association in 2002, has spoken at several national and international conferences about his golf course management strategies, and is one of the most respected members of the turfgrass industry. The Cordova Bay Golf Course has been named one of the "Five Great Golf Destinations" by Golf Canada Magazine, and given a 4-star rating on Golf Digest's "Places to Play List."

Topdressing Colorado Courses

A-1 Organics, based in Eaton, Colorado, composts a range of municipal, agricultural and industrial organics at four sites in Colorado. Annual production of compost and mulch is well over 200,000 cubic yards/year. Golf courses are among the markets A-1 services. "We are supplying around 25 courses," says Bob Yost, Vice President, New Business Development of A1-Organics. "We currently are projecting we will sell about 15,000

COMPOST ON PAGE 5

cubic yards for this year. The market is growing rapidly. The primary application is to topdress fairways, but some are using it in their sand mix for tees and driving range tee repair."

The company sells its one-quarter inch particle size Pro-Gro mix for this application. It is engineered from A-1's "Evergreen" compost, which is produced from poultry litter and bedding materials. "We do not guarantee analysis, but a typical NPK breakdown of Pro-Gro is 1.4 - 3.5 - 1.6," adds Yost. "It also includes significant trace minerals including high iron and sulfate." Pro-Gro is sold in bulk; other end users include municipal gardens, country clubs, and institutional grounds.

"The tough part is getting the superintendents to try the compost on a test area as that group doesn't usually like taking chances," says Scott Ramer of A-1 Organics, who is involved in compost marketing. "The fact that it usually takes longer for the application of the organics to become effective makes selling it to first-time users more difficult. But once the superintendents try it, they are hooked. They end up calling me back for another load because they'll see spots that they missed." Compost qualities that appeal to the golf course clientele include the product's consistency, nutrient value, and performance - as well as its ability to retain moisture, thus reducing water usage (a key benefit given Colorado's chronic drought conditions).

One satisfied customer is The Country Club at Castle Pines, in Castle Rock, Colorado. Castle Pines has been using Pro-Gro since 2002, says Sean McCue, Golf Course Superintendent. "It was around that time when we began making the switch away from synthetic fertilizers toward becoming 100 percent organic in our fertilization program," recalls McCue. "Pro-Gro was one of the most vital elements in allowing us to successfully make this conversion. It makes up 80 percent of the total fertility applied to my fairways via two applications - one in the spring and one in the fall. At the same time, we overseed our fairways with Bentgrass. The Pro-Gro serves as a cover, giving us excellent seed soil contact and also provides the essential nutrients for rapid seedling germination and establishment." Castle Pines purchases 500 to 600 cubic yards of compost a year at a cost of \$20/cy. In addition to topdressing, the compost is used in the club's flower beds.

In a testimonial posted on the A-1 Organics website, McCue explained how Castle Pines uses effluent water to irrigate the golf course and over time, the soils have been damaged due to the high levels of sodium and chlorides in the water. "The Pro-Gro is loaded with high levels of nutrients that help us address these soil issues, such as potassium and calcium," he wrote. Other benefits resulting from Pro-Gro use are a deeper, more developed turf root system and reduced water usage.

Castle Pines has cut out using any conventional fertilizers. McCue also has been able to substantially reduce pesticide use, although he does use a broad leaf herbi-

cide. "I also brew our own compost tea," he adds. "We have a 500-gallon tank with air filters for oxygen. We spray the tea in the spring and the fall."

Organic Golf Course Management

The website of the Blackburn Meadows Golf Club on Salt Spring Island, British Columbia notes it was the first organically maintained golf course in Canada. Blackburn Meadows is part of the Blackburn and Cusheon Lake watersheds, which provide drinking water to the island homes. "For the past 10 years or so, we have maintained the golf course as an organic facility in order to preserve and protect its delicate nature," says Eric Beamish, Golf Course Superintendent. "We have around 30 percent nesting areas and natural vegetation on the course that we try to sustain so that our delicate ecosystem thrives around us. Along with the vegetation is the thriving wildlife. Blackburn Meadows is home to more than 50 species of birds, endless deer, mischievous beaver and nutria. We also have natural and manmade streams and ponds for the spawning of Coho salmon and cutthroat trout." Beamish's total organic golf course maintenance includes the use of natural organic fertilizers, beneficial microorganisms, compost tea, parasitic nematodes and a natural organic surfactant. "The struggle with weeds is a constant battle but we find with hard work, keeping the grass healthy, and hand picking when needed, we can keep the population to a minimum," he says. "We do not use any chemical substances - no herbicides, chemical pesticides, fungicides, synthetic or synthetic-organic materials."

The greens are sand-based with creeping bent grass and receive treatments like aeration/topdressing and verticutting (power raking). They are amended with sand the majority of the time but Beamish experiments with water-conserving products that have a larger water holding capacity than that of sand. "These help us to use less water and keep the greens healthier through the summer months," he explains. "All of these amendments have to be of a natural organic origin in order for their use to be deemed safe by us. We also are starting to compost using effective-microorganisms (EM) modified into a compost amendment known as bokashi. This originated from oriental cultures and works as a fantastic composter. The end product is then turned into soil and used on the course in various locations. The compost teas are made from EM and include various types of grass clippings to create a fermented plant extract that can be returned to the plant as a food source.

"Clientele at Blackburn Meadows have 'peace of mind' that they are golfing on an environmentally friendly golf course. They recognize that being organic means that the course is not perfect. There are weeds in the grass and the cutting heights are slightly higher than usual. This is something they obviously come to terms with because the majority of the time they say, 'The course looks great!' upon their return. I believe that an organically maintained golf course is a way of the future and without these maintenance practices, the turf grass industry will fade as chemical regulations become difficult to accommodate." □

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