

PLANT & PEST ADVISORY

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Ramorum Blight (also known as Sudden Oak Death) Update

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

Sometimes “no news is good news.” This phrase is particularly appropriate for **Ramorum blight**, a disease still known to some as **sudden oak death**. Read to the end of this article to find out why.

Ramorum blight is caused by the oomycete fungus *Phytophthora ramorum*. The disease received much attention in the late 1990s because unprecedented mortality was occurring in coastal stands of tanoak, coast live oak, and California black oak near the San Francisco Bay. Symptoms on some trees appeared to develop so quickly that the popular press called the disease “sudden oak death.”

The story got more interesting in 2001 when *Phytophthora ramorum* was detected in rhododendron nursery stock in Santa Cruz, California. Within two years, viburnum, pieris, camellia, and rhododendron plants affected by Ramorum blight appeared in California, Washington, Oregon, and British Columbia nurseries. By 2004 the pathogen had spread on different species of nursery stock to 22 states, including New Jersey. The transport of infected nursery stock across the U.S. has made Ramorum blight a critical issue for the nursery industry, such that surveys were conducted in 2004 and 2005 to assess the incidence of this disease in nurseries and forested areas nation-wide.

Symptoms

The pathogen that causes Ramorum blight is a species of *Phytophthora* not too different from *Phytophthora* species with which many nursery growers in New Jersey are familiar. For example, *P. cinnamomi* is primarily restricted to the roots but may also cause cankers to form at the crown and lower stem. *P. ramorum*, on the other hand, is an “aerial” pathogen; it is not associated with root tissues and instead attacks leaves, petioles, twigs, and stems.

The type and severity of symptoms associated with infection by *P. ramorum* differ with the host species affected. In its most severe form, the fungus causes a lethal bark canker that affects oaks in the red oak group (Section *Lobatae*). These red-brown to black cankers appear most often on stems 3 to 6 feet from the ground and “bleed” a dark red or amber sap. Trees may be infected for a considerable period (up to 2 years) before stem girdling due to canker development causes the entire crown to brown and die.

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Phytophthora ramorum also causes a less severe twig or foliar blight on many of the other hosts in its range. On hosts such as madrone, witch-hazel, and species of *Rhododendron*, leaf lesions, twig blight, and stem dieback are most evident. Occasionally, stem dieback may continue to the ground, killing the host. On ever-green huckleberry, symptoms of the disease appear as small cankers on the stem, followed by dieback of the canes. Symptoms on these hosts can be easily confused with those caused by other pathogens such as *Phomopsis* or *Botryosphaeria*.

In contrast, foliar necrosis is not readily apparent in species of *Viburnum* infected by *P. ramorum*. Leaves on affected plants first wilt, followed by the collapse of affected twigs or the entire plant. Other agents that cause similar symptoms on *Viburnum* include water stress and *Verticillium* wilt. In hosts such as andromeda, camellia, and mountain laurel, infection by *P. ramorum* is chiefly limited to lesions on the leaves, although stem necrosis on andromeda and premature leaf drop on camellia may also occur.

Host range

The host range of *P. ramorum* is broad and encompasses many plant families. Although the list is incomplete, 85 known host species are susceptible to the pathogen. Bark canker hosts include species native to the Northwest such as tanoak and *Quercus* species in the red oak group: coast live oak, California black oak, and Shreve's oak. Of these hosts, tanoak is the most susceptible; affected trees of any age may die within a year of infection. In other oak species, most infection in nature almost always occurs on mature trees. Infection of pin oak and northern red oak has not been seen in nature, but these species can become diseased if inoculated in the laboratory. Several other tree hosts are worth mentioning here: branch cankers have been detected on Douglas-fir, white fir, and redwood. The impact of the disease on natural stands of these hosts, however, is not clear.

Plants that exhibit leaf lesions, twig blights, and/or stem cankers include certain members of the Ericaceae (andromeda, madrone, manzanita, mountain laurel, and species of *Rhododendron* and *Vaccinium*), as well as California bay laurel, lilac, and species of *Camellia* and *Viburnum*. Many of these hosts occur not only in natural stands but also are grown as nursery stock, thus the potential exists for widespread distribution of the pathogen in the nursery industry.

For the most current host range of *P. ramorum*, visit the following USDA-APHIS Web site:

<http://www.aphis.usda.gov/ppq/ispm/pramorum/>

Disease development

Phytophthora ramorum is an oomycete (water mold) fungus that prefers conditions that are moist and cool (optimum temperature for growth is 68°F). Thus, coastal regions that receive cool, moist air all year and periods of summer fog are ideal regions for infection in nature. (It might be expected that nursery conditions are similar during certain times of the year.) The fungus spreads short distances chiefly as spores (sporangia and zoospores) in rain splash or wind-driven rain. Although the pathogen has been recovered from pools of water around infected plants, distribution within moving streams of water is limited to 12 feet from the infected host. In addition, chlamydospores (resting spores) have been found in soil and litter, but there is no evidence that these spores are important in disease spread. Movement of infected plant material is most important for dispersal over longer distances.

In coastal oak stands, fungal spores develop to high populations on the foliage of understory hosts such as California bay laurel. In essence, these hosts serve as reservoirs of inoculum as spores are distributed on rainblown air to the bark of susceptible trees, and oak mortality is greatest when trees are grown in close proximity to these understory species.

Management?

Since *P. ramorum* has not been identified in New Jersey nurseries, a watchful eye and preventive measures already in place to protect plant material from other *Phytophthoras* as well as other diseases are excellent strategies. These strategies include:

- use pathogen-free stock
- use good sanitation practices
- manage the moisture to ensure good drainage and reduce splashing
- reduce nitrogen in the field and landscape
- prune diseased branches
- use disease-resistant plants when available
- preventive use of fungicides labeled for control of *Phytophthora* in nurseries

So, what's the good news?

The disease was not found in New Jersey this past growing season, which is the good news. National surveys of nurseries conducted by USDA-APHIS-PPQ in 2005 detected Ramorum blight in only seven states (California, Georgia, Louisiana, Oregon, Tennessee, South Carolina, and Washington). In addition, nationwide surveys of forested regions (coordinated by USDA-APHIS) have shown no evidence of the disease outside of the Pacific Northwest. Clearly, industry and regulatory efforts to limit disease incidence are off to a good start. □

Diseases of Turfgrass

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

Pink Snow Mold

This disease, caused by the fungus *Microdochium nivale* (*Fusarium nivale*), will develop soon on golf and landscape turf. To prevent pink snow mold this fall, avoid excessive nitrogen applications, continue mowing turf until dormancy, and apply Banner, Chipco 26GT, chlorothalonil, Compass, ConSyst, Eagle, Heritage, Insignia, Medallion, PCNB, Spectro, thiophanate-methyl, or vinclozolin. For best results, apply any of these fungicides now and then repeat in late-January if the snow cover recedes. Do not, however, reapply PCNB after January 15 due to the possibility of phytotoxicity during warm weather next spring.

Stripe Smut

This disease, caused by the fungus *Ustilago striiformis*, is apparent on sensitive Kentucky bluegrass varieties. Symptoms appear as long black streaks (striations) between the veins of infected blades. These areas eventually rupture releasing abundant black smut spores. One well-timed application of an appropriate fungicide now will provide excellent control and is, therefore, far superior to multiple applications in the spring (mid-May). For best results, apply Banner, Bayleton, Cleary 3336, Eagle, Fungo, or Rubigan now per manufacturer's recommendations.

Take-all patch

This disease, caused by the root and crown infecting fungus, *Gaeumannomyces graminis* var. *avenae*, has been reported on bentgrass greens and fairways in the tri-state region. Although this disease is most prevalent from April through June, late-summer and fall outbreaks are not uncommon. Infection takes place during cool, wet weather and symptoms are most striking after stress. Infected grass first appears bronze to reddish-brown in color and then fades to a dull brown. Patches are usually circular or ring-shaped and range in size from several inches to two feet or more in diameter. The centers of affected turf are frequently colonized by bluegrass (*Poa* spp.), fescue (*Festuca* spp.), or weed species. Upon close examination, decaying roots and leaf sheaths appear black and dark strands of mycelium often develop parallel to the root axes. The disease is enhanced by poorly drained, light-textured, and high pH soils. Although take-all is difficult to control, best results have been achieved through the use of acidifying fertilizers during cool weather (e.g., ammonium sulfate) and preventive applications of Banner, Bayleton, Heritage, Insignia, or Rubigan in October and November. If the disease has been particularly severe, fungicides should be reapplied twice next spring at 21 to 28-day intervals

beginning in early April. Chemicals should be applied in 4 gal water/1000 sq ft or irrigated into the root zone (1/8 to 1/4" of water) for maximum effectiveness. Whenever practical, overseed infested areas with less susceptible grasses such as fine fescue, Kentucky bluegrass, or perennial ryegrass to mask symptom expression. Maintain soil pH at approximately 6.0 since the disease is enhanced in alkaline soils. The use of manganese (2 lb Mn/A applied as a foliar spray containing manganese sulfate or another water soluble source) has been shown to reduce symptom severity on sites deficient in this nutrient.

Turf Expo

This year's Turf Expo will be held at the Trump Taj Mahal Casino/Resort on December 6-8, 2005. This is an excellent opportunity to receive the latest turf management information from nationally renowned speakers. For additional information, see our Turf Center web site (www.turf.rutgers.edu) or contact Michelle Rickard (NJTA Director) at 215-757-6582. □

Farm Bill Listening Session

Andrew M.G. Law, State Director, USDA, Rural Development

You are invited to attend a 2007 Farm Bill listening session hosted by the United States Department of Agriculture (USDA) at Hilton East Brunswick on November 16, 2005 at 9:30 a.m. Under Secretary Thomas Dorr will lead this session of a nationwide listening tour aimed at gaining public input in preparing for the next Farm Bill.

This is an excellent opportunity for people affected by the Farm Bill to tell USDA what is working for them and what is not. We are fortunate to have Mr. Dorr coming to our community to hear first-hand about issues that concern New Jersey producers. New Jersey agriculture is unique, and its diversity of crops is unlike that of any state in the nation.

Please help us spread the word by encouraging producers and other appropriate constituents, in your area, to participate in this public listening session. Your help is very important to the success of the Forum and is greatly appreciated.

The listening session will run from 9:30 a.m. to 12:30 p.m. The session is open to the public and seating is on a first come basis. There is no pre-registration for those wishing to offer comments. At the listening session there will be a sign-in sheet and speakers will be called up in first come order from this list. Each person will have **three minutes** to make their oral comments. The time limit will be strictly enforced. It is advised that you prepare your comments ahead of time to ensure that you are able to concisely express your views in the short time allotted for each speaker. *Additional information about the New Jersey Listening Session can be found on the Rutgers Cooperative Research and Extension website at: rcrc.rutgers.edu.*

Written comments may be submitted to USDA at the listening session or via the website at www.usda.gov/farmbill. Select "Comment on the 2007 Farm Bill", which is the last item located in the middle section, to send your message. Additional information about the Farm Bill and the programs that are funded through it can also be found on this website.

When participating in the forums, the public is invited to respond to one or more of the following six questions. The format of the forum will allow an open comment period for general farm bill comments.

1. How should farm policy address any unintended consequences and ensure that such consequences do not discourage new farmers and the next generation of farmers from entering production agriculture?

2. How should farm policy be designed to maximize U.S. competitiveness and our country's ability to effectively compete in global markets?

3. How should farm policy be designed to effectively and fairly distribute assistance to producers?

4. How can farm policy best achieve conservation and environmental goals?

5. How can Federal rural and farm programs provide effective assistance in rural areas?

6. How should agricultural product development, marketing and research-related issues be addressed in the next farm bill?

The Farm Bill Forums provide an opportunity for USDA to hear directly from America's producers and other stakeholders who have tremendous insight to offer. The feedback USDA receives from New Jersey will be useful and help to set the course for a new farm bill that takes into account the unique needs and issues that northeastern farmers face.

Thank you, in advance, for your efforts in helping USDA in this effort, and we look forward to seeing you at the listening session. If you have any questions or are in need of special accommodations (handicap accessibility, etc.) for the meeting, please contact Kathleen Holden, 856-787-7771 or e-mail Kathleen.Holden@nj.usda.gov. □

Extension Resources

Now available from your county Rutgers Cooperative Research & Extension office or on the web at www.rcrc.rutgers.edu is the following new fact sheet:

FS022 - "The 'Nuts and Bolts' of Your IPM Toolbox: Knowing Your Options," authored by Joseph M. Gyurian, Somerset County Horticultural Consultant and Nicholas Polanin, Somerset County Agricultural Agent. This is a three page fact sheet.

"Prevention and Control of Wildlife Damage" is a University of Nebraska Cooperative Extension wildlife damage management publication that is available online at the following link:

<http://icwdm.org/handbook/index.asp>

It was originally published in 1994, but the information is still relevant. A new version will be available in about a year. □

Editor's Note: This is the last issue of the Landscape, Nursery & Turf edition of the Plant & Pest Advisory for the 2005 season. Thank you for subscribing.

Weekly Weather Summary

Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged much below normal, averaging 43 degrees north, 46 degrees central and 47 degrees south. Extremes were 70 degrees at New Brunswick and Long Branch on the 31st, and 30 degrees at Flemington and Charlotteburg on the 27th and 28th. Weekly rainfall averaged 1.53 inches north, 1.74 inches central, and 1.45 inches south. The heaviest 24 hour total reported was 1.46 inches at Freehold on the 24th to 25th. Estimated soil moisture, in percent of field capacity, this past week averaged 100 percent north, 98 percent central and 98 percent south. Four inch soil temperatures averaged 48 degrees north, 51 degrees central and 52 degrees south.

Weather Summary for the Week Ending 8 am Monday 10/31/ 5

WEATHER STATIONS	RAINFALL			TEMPERATURE				GDD BASE50		MON
	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	%FC
CANOE BROOK	1.65	36.68	3.02	69	33	45.	-3	3545	822	99
CHARLOTTEBURG	1.56	40.93	6.57	66	30	42.	-4	3026	902	99
FLEMINGTON	1.35	39.13	7.14	66	30	43.	-5	3462	670	99
NEWTON	1.56	36.66	5.48	66	32	42.	-3	2978	602	99
FREEHOLD	1.89	37.75	6.56	68	33	46.	-4	3518	482	96
LONG BRANCH*	2.09	37.17	5.56	70	33	47.	-4	3535	551	94
NEW BRUNSWICK	1.61	38.03	6.51	70	31	45.	-5	3674	503	99
TOMS RIVER	2.09	38.53	5.96	68	31	45.	-6	3472	493	95
TRENTON	1.01	37.10	7.48	67	32	47.	-4	3742	428	94
CAPE MAY COURT HOUSE	1.49	32.66	4.64	64	36	48.	-6	3374	229	94
DOWNSTOWN	1.41	29.63	.43	65	32	45.	-6	3572	219	95
GLASSBORO**	1.13	23.11	-7.76	66	37	46.	-5	2773	-519	95
HAMMONTON	1.29	30.05	-.65	66	34	47.	-4	3706	414	94
POMONA	1.93	30.09	2.36	67	34	47.	-3	3617	565	95
SEABROOK	1.44	32.64	4.22	58	33	47.	-5	3990	612	95
SOUTH HARRISON	1.19	35.10	4.92	65	35	46	NA	3692	NA	NA

*SOME CUMULATIVE VALUES ESTIMATED DUE TO MISSING PAST DATA

** cumulative values missing considerable past data

WES KLINE — GDD BASE 40 PINEY HOLLOW

Last Week 93 (Ending 10/24/05)

This Week 40 Ending 10/31/05)

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