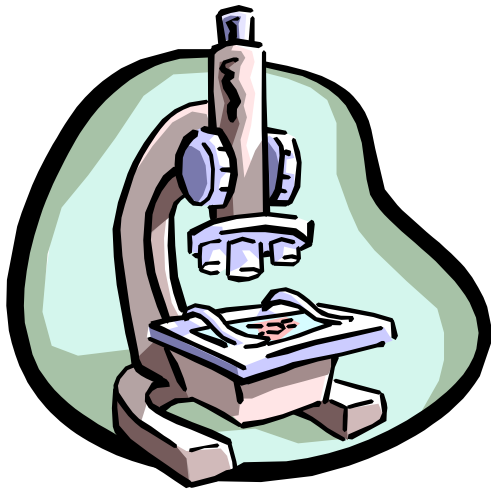


PLANT & PEST ADVISORY

LANDSCAPE, NURSERY & TURF EDITION \$1.50

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NJDA Lab Performs Key Role in Control of Hemlock Woolly Adelgid

Daniel Palmer, Research Scientist II, Laboratory Manager, and Mark Mayer, Supervision Entomologist, Field Coordinator, NJDA, Division of Plant Industry, Phillip Alampi Beneficial Insect Laboratory

The Division of Plant Industry's Phillip Alampi Beneficial Insect Laboratory is the primary producer and distributor of a predator that is the key insect supporting research and applied programs to control **hemlock woolly adelgid (HWA)**, a pest severely damaging hemlock stands throughout the region. Without effective control, hemlock adelgid threatens to permanently remove a tree species of significant environmental, economic, and aesthetic importance from forests throughout the Northeast and Mid-Atlantic states and has the potential of creating devastation on the scale of **Dutch elm disease**.

As part of a cooperative agreement with USDA/Forest Service, the laboratory has shipped the predator, *Pseudoscygnus tsugae*, for several weeks to release sites in New Jersey and to forest health professionals in Massachusetts, West Virginia, Pennsylvania, Virginia, North Carolina, and New York in a regional attempt to develop a control program for HWA. A total of eight states and two Federal recreation areas and a number of researchers are requesting the predator from the laboratory under the Forest Service agreement. *P. tsugae* has been provided to scientists at North Carolina State University; USDA Forest Health Research Laboratory, Hamden, Connecticut; University of Rhode Island, and Rutgers University for laboratory study.

The first New Jersey releases for 2001 of the HWA predator by Phillip Alampi Beneficial Insect Laboratory staff began in May. A total of 21,500 beetles were released among sites in Wawayanda State Park, Stokes State Forest, Walpack WMA, and Van Campen's Brook at the Delaware Water Gap NRA and at the Jacobsburg Environmental Education Center in Northampton Co., PA. Since the pesticides labeled for use against HWA are effective, and treatment of nursery and landscape trees is possible, while HWA populations using traditional control measures are unmanageable in natural hemlock forests due to the inaccessibility of most stands, poor coverage for aerial spraying,

SEE HWA ON PAGE 2

Diseases of Turfgrass

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

Anthracnose

This disease, caused by the fungus *Colletotrichum graminicola*, is apparent on bentgrass, annual bluegrass, fine fescue, perennial ryegrass, and Kentucky bluegrass at this time. The fungus typically attacks turf growing under stress (i.e., low soil fertility and/or heat and drought stress). Low cutting height can also enhance symptom development. To identify **anthracnose** in the field, look for small black fruiting bodies with protruding black spines. For best results, increase turf vigor with light applications of nitrogen, maintain adequate irrigation, reduce thatch, avoid wounding (e.g. switch to smooth rollers on mowers), and raise the cutting height (whenever possible). Apply Banner, Bayleton, Chlorostar, Cleary 3336, Compass, ConSyst, Daconil, Eagle, Fungo, Heritage, Manicure, Rubigan, Spectro or Thalonil on a preventive basis per manufacturer's recommendations. Once the disease develops, good results may be obtained with a tank mix combination of Bayleton 50W (1 oz/1000 ft²) + Daconil Ultrex 82.5 WDG (2.8 to 5.5 oz/1000 ft²) or Cleary 3336 50W (4 to 6 oz) + Daconil Ultrex 82.5 WDG (2.8 to 5.5 oz/1000 ft²).

Brown Patch

This disease, caused by the fungus *Rhizoctonia solani*, developed recently on golf and landscape turf due to the hot, humid weather and late night thunderstorms. To reduce the incidence and severity of **brown patch**, avoid nitrogen applications during hot weather, irrigate between midnight and 8 a.m. to minimize the leaf wetness period, and spray turf with Banner (preventive only), Chipco 26GT, Chlorostar, Cleary 3336, Compass, ConSyst, Curalan, Daconil, Eagle, Endorse, Fungo, Heritage, mancozeb, Manicure, Prostar, Spectro, Thalonil, or Touche per manufacturer's recommendations.

Powdery Mildew

This disease is present on landscape turf at this time. In most cases, **powdery mildew** occurs in shaded areas and on lawns with poor air circulation. Although chemical control is usually not required, present infections may be checked with Banner, Bayleton, Eagle, Manhandle, or Rubigan if desired.

Summer Patch

Now is the best time to apply a second preventive fungicide application for the control of **summer patch** in areas prone to this disease. For optimum results, apply Banner, Bayleton, Cleary 3336, Compass, Eagle, Fungo, Heritage or Rubigan in 4 to 5 gal of water/1000 ft². Repeat every three to four weeks (every two weeks if using Fungo or Cleary 3336). If fungicides cannot be applied with this much water, irrigate them into the thatch

immediately with 1/16 to 1/8 inch of water. Aerification and improved drainage will also aid in disease suppression. Soil pH should be maintained at or slightly below 6.0 for optimum disease suppression.

Turf Field Day

Mark your calendars now for this year's Rutgers Turfgrass Research Field Days. The *Rutgers Landscape Turf Research Field Day* has been set for August 1, 2001 at the Plant Science Research Farm in Adelphia, NJ. Registration will begin at 8:00 AM. Guided tours will commence at 9:00 AM and conclude at 3:30 PM, "rain or shine". The *Rutgers Golf Turf Research Field Day* will be held on August 2, 2001 at the Turf Research Farm (Ryders Lane) in North Brunswick, NJ. This event starts at 9:30 AM (registration); field tours will run from 10 AM to 3:00 PM, "rain or shine". The cost of registration will be \$20 (\$30 with lunch) for the August 1, 2001 field day and \$25 (no formal lunch, but a food vendor will be on site) for the August 2 event. Recertification credits will be available at the conclusion of each program. Call Marlene @ (732) 932-9400 Ext. 339 for further information or directions. □

Update for Fax Subscribers

We regret the delay in the repair of the fax broadcast system. In order to better service our readers we invested in a new system which will improve our faxing capabilities. Unfortunately, technology does not always perform as expected. Our vendor has identified the cause of the system failure, and is awaiting the arrival of the software upgrade. Fax subscribers will temporarily receive the newsletter by mail.

To receive the newsletter on issue day, you can call our fax back system at 732-932-4535 and request fax document 8002. The next newsletter will be placed on the system around 5:00 pm on June 28.

If you are a fax subscriber and have not been receiving previous weeks' issues, please contact Cindy Rovins at 732-932-4539 or by fax at 732-932-9838, or e-mail rovins@aesop.rutgers.edu. We can send you back issues of the newsletter.

We apologize for the inconvenience and hope to reinstate the fax broadcasts very shortly. Thank you for your continued patience. □

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pesticide restrictions near bodies of water and/or excessive cost, all beetle releases made by the NJDA will be in natural hemlock forests. Releases will continue until HWA goes into summer aestivation. The intent is to establish the beetles at the release sites and have the beetle populations disperse throughout infested hemlock populations including those found on nursery and landscape trees. □

Plant Diagnostic Laboratory Highlights

Richard Buckley, Plant Diagnostic Laboratory
Coordinator

Turfgrass

Patches, patches, and more patches. The last of the spring disease problems are pouring into the laboratory at this time. Most golf turf managers are complaining of patch problems. The two diseases that cause patches and rings of dying turf in spring are **Take-all**, which is caused by the fungus *Gaeumannomyces graminis*, and **yellow patch**, which is caused by *Rhizoctonia cerealis*. **Take-all** was confirmed in bentgrass samples from Burlington, Ocean, and Monmouth Counties in New Jersey, and in a sample from Pennsylvania. **Yellow patch** was found in samples from Hunterdon, Gloucester, Morris, and Warren Counties and in turf from New York. **Anthraxnose** also continues to be a problem for golf turf managers. Samples with confirmed **anthracnose** were sent to the laboratory from North Carolina and Massachusetts as well as from Monmouth and Camden Counties. It is surprising to note that all of the samples diagnosed with **anthracnose**, but one, were bentgrasses. Another problem that is typical for annual bluegrass, the **annual bluegrass weevil**, is also active at this time. We found several adult beetles in a cup-cutter plug of dead bentgrass. There was considerable injury to the turf, so we might conclude that the weevils had killed all of the Poa; however, we also might suspect that they were feeding on the bentgrass. Dr. Pat Vittum, at the Turf Expo a few years ago, suggested that the **annual bluegrass weevil** will eat perennial ryegrass in the laboratory and may have caused damage to "Providence" creeping bentgrass in the field. It is not clear if the weevil will injure bentgrass, but the possibility exists. At any rate, be vigilant in your monitoring, because we just might be seeing a change in diet for this critter.

Landscape

Not much is going on by way of woody ornamentals this period. We are seeing quite a few stress related growth problems. It appears that some leaf development was stunted during the dry period this spring. A few minor leaf problems were identified on landscape plants from Somerset County. **Pestalotiopsis tip blight** was diagnosed on arborvitae, and **Macrophoma leaf blight** was diagnosed on boxwood. These diseases are normally found on stressed, dead, or dying plant tissue. **Winter injury** is often the predisposing stress factor. Selective pruning often takes care of the problem. □

Vascular Wilt Diseases of Shade Trees, Part I: Dutch Elm Disease

Ann Brooks Gould, Ph.D., Plant Pathology

Vascular wilt diseases are caused by pathogens that reside in the water-conducting tissue (or xylem) of plants, thus disrupting the uptake of water and minerals. The primary characteristic of such diseases is wilting due to water stress. This stress occurs when xylem vessels are blocked by the pathogen (disease agent) or by the host itself as it attempts to halt the movement of the pathogen through the transpiration stream.

Many plants associated with New Jersey agriculture are affected by vascular wilts. In shade trees, the most common of these diseases include **Dutch elm disease**, **Verticillium wilt**, **Mimosa wilt**, and **bacterial leaf scorch** of shade trees. In Part I of this four-part series, **Dutch elm disease**, the most troublesome disease of American elm, will be discussed.

Introduction

The American elm was once a very important shade tree in cities and parks throughout North America. Because of its graceful, overhanging canopy and fast growing characteristics, American elm was densely planted along roadsides and was also used in wind-breaks and hedgerows. In the 1920s, a new vascular wilt pathogen, *Ophiostoma ulmi*, was introduced from Europe in elm logs used for making furniture. The Dutch scientist Christine Johanna Buisman subsequently identified Dutch elm disease of American elm in Ohio in 1930. Since then, the disease has spread up and down the Eastern seaboard and west to California, destroying an estimated 40 million trees. A highly destructive related species of the fungus, *Ophiostoma novo-ulmi*, is responsible for the more recent outbreaks of this disease.

Symptoms

In New Jersey, Dutch elm disease is most apparent on affected American elms during June to August. The first symptom of the disease is wilting (called flagging) of leaves on individual branches throughout the canopy. These leaves rapidly turn yellow, then brown, and then curl and drop from the tree. Affected branches die shortly after. Rapid mortality (within one season) occurs in trees that become infected with the pathogen in early spring. Trees infected later in the summer may often take several years to die.

Disease spread

Dutch elm disease is transmitted (or vectored) from tree to tree by insects or through root grafts. Beetles that vector the disease include the **Native elm bark beetle** and the smaller **European bark beetle**. The insects are

SEE DUTCH ELM DISEASE ON PAGE 4

Publication on Diseases for Nurseries

The following publication is available from APS Press: *Diseases of Woody Ornamentals and Trees in Nurseries*, Ron K. Jones and D. Michael Benson, eds. APS Press, St. Paul, MN. \$89. To order, call toll-free 1-800-328-7560, or visit the APS Press Web site: www.shopapspress.org.

Submitted by Ann Brooks Gould, Ph.D., Plant Pathology. □

Rutgers Plant Diagnostic Laboratory

The Plant Diagnostic Laboratory and Nematode Detection Service is a diagnostic service available to the residents of the State of New Jersey. The mission of the Plant Diagnostic Laboratory is to cooperate with Rutgers Cooperative Extension personnel to provide accurate and timely diagnoses of plant problems. There is a fee for this service.

The laboratory was established in 1991 on the Cook College campus of Rutgers, The State University of New Jersey.

Diagnostic Services

- ❖ Disease and Insect Pest Diagnosis
- ❖ Plant and Weed Identification
- ❖ Insect Identification
- ❖ Nematode Assays
- ❖ Screening for Acremonium Endophytes
- ❖ Benzimidazole Fungicide Resistance Screening

Fees

All In-State Samples (except fine turf)	\$20
In-State Fine Turf	\$50
All Out-of-State Samples	\$75

For sample submission instructions and forms, visit our web site at: <http://www.rce.rutgers.edu/plantdiagnosticlab/submissions.html>.

Forms may also be obtained from your local county Rutgers Cooperative Extension office or via fax request (732/932-1270).

DUTCH ELM DISEASE FROM PAGE 3

attracted to dead or dying elm wood, where they lay eggs in tunnels (called galleries) just beneath the bark. As new beetles emerge, they may carry spores of the pathogen on their bodies, and will transmit these spores to healthy trees as the beetles feed on branch inner bark or in the crotches of twigs. Alternatively, when the pathogen spreads from an infected tree to a healthy tree through root grafts, it can move very quickly through the transpiration stream of the healthy tree. Thus, root graft transmission is very important in trees that are closely spaced.

Detection

To detect Dutch elm disease, look for vascular discoloration in the outer layers of wood on infected twigs and branches. Peel back the bark using a pocketknife; vascular discoloration usually appears as brown streaks in the sapwood of the current growing season. To detect infections that may have occurred the previous year, look for streaking as you cut deeper into the wood, or look at the branch in cross section.

Another vascular disease of elms, called **Verticillium wilt**, also causes vascular streaking in the wood. For a positive diagnosis, submit a sample to a diagnostic laboratory (such as the Rutgers Plant Diagnostic Laboratory) for analysis.

Management

The most effective means of saving elm trees includes a combination of cultural and chemical controls. Prompt removal of diseased limbs up to 10 feet behind yellowed foliage is essential. For best results, control **bark beetles** with dormant applications of methoxychlor, remove dead or dying elms as soon as they are noticed, and debark or burn dead wood prior to beetle emergence next spring. To prevent root graft transmission of this disease, dig a trench (3 feet deep) midway between diseased and healthy elms, or apply Vapam per manufacturer's recommendations. In addition, valuable trees may be injected on a preventive basis with Alamo, Arbotect, or Phyton 27 as per manufacturer's recommendations. When trees exhibit more than 5% crown symptoms, fungicide injection may be ineffective.

Native American elms vary in their susceptibility to Dutch elm disease. The most susceptible elm is the American elm (*Ulmus americana*), whereas other elms such as winged elm, slippery elm, rock elm, and cedar elm vary from susceptible to somewhat tolerant. Within species, individual trees or cultivars may vary in susceptibility. Siberian and Chinese elm are less susceptible to Dutch elm disease.

Frank Santamour and Susan Bentz in the *Journal of Arboriculture* (see reference list below) recently published a listing of elm cultivars with comments on their susceptibility to Dutch elm disease. American elms that have a history of tolerance or resistance include the Princeton Elm, American Liberty, Independence, Valley Forge, and New Harmony.

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