RUTGERS COOPERATIVE EXTENSION AT THE NEW JERSEY AGRICULTURAL EXPERIMENT STATION

PLANT & PEST ADVISORY

LANDSCAPE, NURSERY & TURF EDITION $1.50 NOVEMBER 8, 2007

INSIDE

Diseases of Landscape Ornamentals: End of Season Notes

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

The 2007 growing season has come to a close, and it appears that temperatures are seasonal at last. Looking back through past issues of this newsletter, it became clear that winter injury and extreme patterns in soil moisture affected landscape plant material all over the state. This set the stage for many of the problems we saw during the growing season.

Rapid temperature changes and storm events in January and February resulted in significant damage to broadleaf evergreens as well as conifers. Subsequent injury included **winter desiccation** (evident by marginal leaf and needle scorch), **sun scald**, **frost crack**, **premature defoliation**, and **dieback**. Injury due to unseasonably cold temperatures in spring resulted in frost damage.

As always, environmental stress has a direct impact on diseases caused by living organisms. Winter injury and moisture extremes predispose trees to **canker diseases** caused by *Cytospora*, *Botryosphaeria*, and *Nectria*. **Armillaria root rot**, another pathogen that takes advantaged of trees stressed by drought, was also evident. This disease is readily diagnosed by the growth of black, string-like "rhizomorphs" on the surface of the buttress roots of affected trees, and honey-colored mushrooms that appear at the base of trees in the fall.

During the early growing season, some evidence of **Rhabdocline needle cast** as well as a report or two of **Swiss needle cast** were seen on Douglas fir by Christmas tree growers. **Volutella blight** of pachysandra (also known as pachysandra leaf and stem blight) was prevalent in many pachysandra beds; the disease was easy to spot with its fabulously large, "bulls-eye" leaf spots and elongate cankers on petioles and stems. Boxwoods were affected by the normally opportunistic fungi *Volutella* and *Macrophoma*; shrubs injured by winter desiccation were most commonly affected.

Later in June we finally got to see some of the foliar diseases that make disease watching in the landscape fun. **Apple scab**, **rusts**, **shade tree anthracnose**, **juniper tip blight**, **oak leaf blister**, **horse chestnut leaf blotch**, **black spot of elm**, and **Phyllosticta leaf spot** were common on a variety of trees. These diseases are, for the most part, cosmetic and do little real damage to trees and shrubs. The vascular disease **Verticillium wilt** was evident on many maples this year; not only were

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Plant Diagnostic Laboratory Highlights

Richard J. Buckley, Laboratory Coordinator

Turf

Not much to speak of in the turfgrass arena during the fall period. Unseasonable warmth and relatively dry weather provided excellent conditions for turfgrass growth and recovery from the summer stress periods. As a result, samples of dead and dying turfgrass were few and far between. We did see a couple obligatory samples of **dollar spot**, a pair of **take all** samples, and a bit of **rust** in the ryegrass and bluegrass, but that was all. Overall, it was a very good year for turfgrass and a rather slow one for the turfgrass doctors.

Landscape

Red oak and pin oak with **bacterial leaf scorch** (BLS) continue to be submitted to the laboratory. Most of the samples were from Middlesex and Mercer Counties. Samples of trees and shrubs with scale were common submissions in the laboratory this month. **Juniper scale** was identified on juniper and cryptomeria. **Maskell scale** was identified on a second cryptomeria sample. **Euonymus scale** was found on euonymus and pachysandra that were sent from Mercer County. **Obscure scale** was identified on apple. **Pine needle scale** was on a pine sample and **cryptomeria scale** was found on a concolor fir. ❑

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our maples affected by the usual environmental stress factors, but many of them were under attack by this fungal disease as well.

Mid-summer is the time for **powdery mildew**, which was evident on many landscape trees and shrubs. This extremely common disease is caused by fungi that grow on the surface of leaves. This growth is evident as "powdery" spots or mats on tissue surfaces. Hosts commonly affected by powdery mildew include ash, azalea and rhododendron, flowering dogwood, elm, lilac, oak, and rose. In most landscape trees and shrubs, powdery mildews do little harm to the host, and we can expect to see them back again next year.

Symptoms of **bacterial leaf scorch of oak** appeared early this year and were very striking, especially on Northern red oak. Symptoms of this disease are usually evident in late-summer to early fall, and in New Jersey, the disease affects trees in the red oak group.

Remember: environmental stress impacts not only the immediate growth and development of plants, it also predisposes them to other diseases (especially cankers and Armillaria root rot) and insect pests (such as borers). Keep this in mind during the next few years when monitoring landscape trees and shrubs for plant health. ❑

A Primer on Dormant Oil Applications

Steven K. Rettke, Ornamental IPM Program Associate

Dormant Oil Guidelines

Dormant oils at 2-4% rates in the late fall season can aid in the control of overwintering insects and insect eggs. Consider treating for such pests as **aphids** (eggs), **southern red mites**/eggs, **spruce spider mites**/eggs, **oak spider mites** (eggs), **eriophyid mites**/eggs, **spruce gall adelgids**, **lace bugs** (deciduous plants), **cankerworms** (eggs), **leaftiers**, **psyllids**, **plant bugs**, etc.

Some landscapers have been successful applying both late fall and early spring dormant oil treatments to the same plants on the same properties. This is a reasonable approach since a single dormant oil treatment will not provide 100% control and it gives the field technician another opportunity to monitor the landscape for problems.

Before applying dormant oils, monitor the plant to be sure of the susceptible life stage and location of the pest. Properly direct the spray to where the pest is located on the plant (underside of foliage, bark, leaf buds, etc.). For best results apply your dormant oil sprays to targeted areas that have been scouted for pests. Avoid the common tendency of applying blanket dormant oil treatments to large block areas that may only possibly contain susceptible pests. Blind, blanket sprays of dormant oils will unlikely achieve adequate coverage to provide satisfactory controls. Such practices are irresponsible, especially in areas were there is no target pest. Remember, when applying pesticides (including dormant oils), "A prescription without diagnosis is malpractice."

Nevertheless, dormant oil controls have some limitations. It is important to note that early spring dormant oils may often provide superior results and possibly with better plant safety. Generally, dormant oil applicators need to remember that their treatments rarely give 100% control, and in some situations may actually provide poor results against many targeted pests.

Phytotoxicity Concerns

Dormant oils are typically applied when temperatures will remain above 40°F. for 24 hours. However, several University studies determined that no phytotoxicity occurred at lower temperature applications. If sprays are applied just prior to temperatures dropping below freezing, the emulsion breaks down, causing the oil to adhere to the bark/leaves instead of insects.

However, certain plants exhibit some detrimental effects regardless of temperature. Plants that have a blue glaucous bloom on foliage, such as the blue spruces and junipers, will have the bloom removed. However, the

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untreated new spring growth will develop the blue color and the bloom should eventually return on the older, treated needles within a season. However, the glaucous bloom does apparently provide some protection against winter injuries. In general, plants having hairy leaves are more sensitive since they retain the oil for a longer period of time. Hence, these plants should be treated with a lower concentration.

When mixing, add water to the tank first, and then add the oil. The mixture should look like skim milk. Constant agitation is necessary during application (do not apply if the solution has been sitting 10 minutes or more without agitation). Finally, if the target pest is located on a plant that has experienced a good deal of environmental stress, then wait until the early spring for treatment reassessment.

Dormant Oils and Spider Mite Controls

During the months of autumn, many landscape managers begin applying horticultural oils (2-3%) to suppress spider mites. Spruce spider mites and southern red mites are the two primary species that are active on landscape plantings during the fall season. The spruce spider mite feeds primarily on conifers, while the southern red mite feeds primarily on broadleaf evergreens. Both species have been building their populations for the past several weeks and typically reach peak levels during the month of November. These cool season mites typically have 4 or 5 generations during the fall period. Usually by December they have laid many of their over-wintering eggs.

Symptoms from mite feedings during the fall often do not become evident until the following spring or summer. The application of horticultural oil in the fall can be important to prevent unacceptable damage. Dormant oil sprays will suppress mite adults, immatures, and eggs. Remember that oils have a physical mode of action and cause a disruption of cell membranes (indirectly promotes suffocation). Therefore, to be effective, thorough oil coverage is required.

As a further reminder, do not make the mistake of applying oil sprays to kill *"overwintering eggs"* of two-spotted spider mites (e.g., burning bush). This warm season mite species does *not* overwinter as eggs, but rather as adults. The adults are hidden in protected areas under the plants (e.g., soil/mulch) where oils cannot effectively contact them. Oil applications this time of year will be a waste of time and material. Controls will have to wait until next year when they emerge during the late spring months.

Dormant Oils and Armored Scale Controls

Euonymus, Elongate Hemlock, Pine Needle, Juniper, White Prunicola, Pine Oystershell, Obscure, and Oystershell are all examples of armored scales that should be monitored during the fall and winter. Look for the elongate or circular shapes and the typically white or grayish colored scale covers of overwintering adult females on twigs, branches or trunks. Dormant oil sprays are more effective against soft scales than against armored scales. Some suppression may occur, but satisfactory results are not always achieved. Numerous studies indicate the level of armored scale suppression with dormant oils may not be significant. When infestations are very high, the scale populations may be lightly brushed off of the trunk and branches, or simply pruned out.

Live vs. Dead Scale Characteristics

Probably all too often, oil treatments are applied to scale populations that are not viable. Just a little bit of extra time is required to determine if the observed scales are dead or alive.

Compare a live, viable scale insect to a water filled balloon. If the cover is somewhat flexible and soft to the touch it may still be alive. Furthermore, with the use of a sharp pinpoint (e.g., insect mounting pin), determine if insect body fluids are released. When the waxy cover of a live armored scale is removed from the plant surface, it will often appear as a red/yellow "blob of jelly."

As an example, by early spring pine needle scale females have already laid most of their red colored eggs and are probably dead (i.e., the female scale has become darkened, dry and shrunken in appearance). Pine needle scale eggs will hatch and red colored crawlers will emerge some time in May. ❑

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 Armada, Banner, Chipco 26GT, chlorothalonil, Compass, ConSyst, Eagle, Headway, Heritage, Insignia, Instrata, Medallion, PCNB, Spectro, Tartan, thiophanate-methyl, Trinity, or vinclozolin. For best results, apply any of these fungicides now and then repeat in late-January if the snow cover recedes. However, do not reapply PCNB after January 15 due to the possibility of phytotoxicity during warm weather next spring.

Turf Expo

This year's Turf Expo will be held at the Trump Taj Mahal Casino/Resort on December 5-7, 2007. This is an excellent opportunity to receive the latest turf management information from nationally renowned speakers. For additional information, please contact Cece Peabody (973) 812-6467 or e-mail execdirector@njturfgrass.org or Marlene Karasik (732) 932-9400 ext. 339 or e-mail mkarasik@aesop.rutgers.edu. ❑

Nursery Crop Association with Mycorrhiza - The Helpers Down Under

Gladis Zinati, Ph.D., Nursery Management Specialist and John Dighton, Ph.D., Director, Pinelands Field Station

Mycorrhiza- is a Greek word meaning "fungus root." It is the symbiosis between plant roots and beneficial fungi, where the fungus and the host plant depend on each other for survival in natural ecosystems. Most land plants form some type of mycorrhiza with specialized soil fungus. The fungus form a fine network of fungus threads called **hyphae** that help the plant extract nutrients and water from the soil or the medium far beyond the bounds of the roots' capabilities and the plant provides the fungi the carbon (sugars) produced by photosynthesis.

There are three common kinds of mycorrhiza that are important for ornamental nursery crops and urban landscapes. These include the endomycorrhizae the fungus that produce vesicles and arbuscules inside plant roots. **Vesicles** are formed in some endomycorrhizae and are simply storage organs containing carbohydrates and also serve as reproductive structures. **Arbuscules** are characteristic of arbuscular mycorrhizae (AM) and are very finely branched internal structures that aid in nutrient exchange. Plants that have AM association include ferns, redwood, native grasses, legumes, bulbs, sweetgum, maple and yellow-poplar. E**ctomycorrhiza** (EM) is another common kind of mycorrhiza forming a sheath of fungal hyphae on the exterior of the absorbing roots. Most forest trees that have EM association include: pines, firs, hemlock, spruces, oaks, beech, ash, birch and some other tropical tree species. Plants that have both AM and EM include eucalyptus, willows, alder and poplar. **Ericoids** are special types of mycorrhiza that associate with ericaceous plants such as azalea, rhododendron, camellia, pieris, heather and leucothoe roots. Mycorrhiza also has association with orchid plant roots.

Mycorrhizal fungi are involved with a wide variety of activities that **benefit plant** establishment and growth. These activities include:

- **Enhancing nutrient uptake** from soil or soilless medium, especially phosphorus
- **Enhancing plant water uptake**
- **Increasing plant resistance to water stress** (drought) in young seedlings
- **Detoxifying certain soils** from toxins
- **Withstanding high temperatures or extreme acidity** for young seedlings.
- **Favoring the growth of beneficial bacteria** in the root zone and help **protecting the plant from root disease**. Indirect but extremely important effects are the ones on root pathogens and soil structure. For example, ectomycorrhiza (EM) help exclude pathogens by surrounding the root and making it inaccessible. The EM and AM favor beneficial bacteria that are antagonistic to pathogens.
- **Improving soil structure**, the hyphae in the soil surrounding mycrorrhizal roots bind the soil together.

Figure 1. Leucothoe plant with and without mycorrhizal inoculation grown at low fertilizer and water rates.

Figure 2. Pieris plants with and without mycorrhizal inoculation grown at low fertilizer and water rates.

Colonization of mycorrhiza can be significantly affected by cultural factors such as pH, drainage and moisture, fertility, fumigation, pesticides, cover crops, shading and root pruning. Soil, substrate and water pH can limit the development of ectomycorrhizae in both bare-root and container nurseries. In addition, seedling lifting, storage, and planting practices in the landscape site have significant effects ectomycorrhizae retention on plant roots.

Inoculation of nursery plants with mycorrhiza produces plants that are "ready" to grow and sustain restored and landscape sites. These plants will have higher survival and fast growth than plants that are not

See **Mycorrhiza on page 5**

MYCORRHIZA FROM PAGE 4

inoculated. Although AM colonization is more effective than EM there is a strong negative influence of fertilizer addition on the subsequent colonization of roots. Additionally, mycorrhizal inoculation with fungi grown commercially in the laboratory to enhance growth of plants in the field has had mixed success. The fungi inoculated onto plants are 'weedy' species (especially for ectomycorrhizae) and quickly replaced by native species when mycorrhizal plants are planted in landscape and restoration sites.

One way to improve nursery plant mycorrhizal association in landscapes may be to inoculate nursery plant roots with naturally occurring-mycorrhiza collected from field soils. A **research project** was conducted in 2006 to test this idea by evaluating the use of naturally-occurring ericoid mycorrhizae in producing container-grown leucothoe and pieris under low and high fertilizer and water regimes. Research results showed that inoculated plants with naturally-occurring ericoid mycorrhiza had higher plant biomass when grown at low fertilizer and irrigation rates than non-inoculated plants (Figures 1 and 2). Contrary to what has been published, we found that while increasing fertilizer rate, mycorrhizal colonization was reduced in leucothoe, but increased in pieris. Such information is very critical in designing and developing strategies in nutrient management of container nursery crops and in understanding the factors that critically affect the mycorrhizal association. ❑

An Integrated Approach to Developing Nutrient Management Schemes for Container-Grown Nursery Crops

A three-year research and education project (2007-2010) was funded for $105,562 by the North East Sustainable Agriculture Research and Education (NE-SARE) to develop nutrient management schemes for container-grown nursery crops. In spring of 2007 a research study was initiated at the Rutgers Fruit Research and Extension Center (FREC), Cream Ridge, NJ to test the effects of three types of naturally-occurring mycorrhiza and controlled-release fertilizers on plant biomass, nutrient concentration in leachates, nutrient uptake by plants, and mycorrhizal colonization of container-grown azalea, oak and thuja plants in comparison to non-inoculated plants. The team on this project includes Rutgers NJAES faculty Gladis Zinati, John Dighton, Rich Obal, Jim Johnson and Jerry Frecon, and Carl Nordstrom (NJNLA), Ed Overdevest (Overdevest Nurseries) and Keith MacIndoe (Johnson Farms Inc.). More details on this project can be found at the website address: http://www.sare.org/reporting/report_viewer.asp?pn=LNE07-265.

This year, at the annual nursery growers meeting which was held at Rutgers FREC on August 17, 2007 we presented the use and management of naturally-occurring mycorrhiza in production of nursery crops and demonstrated these management schemes during the field tour. Over 80 nursery growers and managers attended this meeting. On Oct 9th, the nursery growers visited the research center and evaluated the nursery plants that were under study for their performance and provided their input on this project. During a field trip on October 2nd, 2007, our research work was also demonstrated to 30 undergraduate Rutgers students who attend the School of Environmental and Biological Sciences.

Illustrations on mycorrhizal association with nursery crops and preliminary results of this study will be presented at the upcoming annual nursery meeting that will be held at the RCE Cumberland County Office, NJ on November 13, 2007. ❑

Drs. Dighton (left) and Zinati (right) getting input from nursery grower.

Growers evaluating nursery plants.

South Jersey Landscape Conference and Trade Show

November 29, 2007
8:00 A.M. to 4:00 P.M.
Masso's Crystal Manor
Glassboro, NJ

Sponsored by Rutgers NJAES Cooperative Extension in Cooperation with the New Jersey Nursery and Landscape Association

8:00-9:00 a.m. - Registration & Continental Breakfast
Moderator: Carl R. Nordstrom, Executive Director, New Jersey Nursery and Landscape Association
9:00-9:05 a.m. - Welcome Remarks - Keith MacIndoe, President Elect-New Jersey Nursery and Landscape Association
9:05- 9:40 a.m. – Organic Lawn Care, Do You Know What it Means? by Dr. Jim Murphy, Specialist in Turf Management, Rutgers NJAES, Cooperative Extension
9:40 -10:15 a.m. - Developing a Business Plan and Securing Small Business Loans by Vince Nolan, Business Specialist, Cooperative Business Assistance Corporation.
10:15- 10:45 a.m. - Break on Trade Show Floor
10:45 - 11:20 a.m. - Rain Gardens: "A New Opportunity for your Business" by Dr. Chris Obropta, Water Resources Specialist, Rutgers NJAES, Cooperative Extension
11:20 – 12:00 p.m. "IPM Techniques for Landscapes" by Madeline Flahive DiNardo, Rutgers NJAES, Cooperative Extension of Union County
12:00 - 1:00 p.m. - Lunch
Moderator – Jerome L. Frecon, Agricultural Agent, Rutgers NJAES, Cooperative Extension of Gloucester County
1:00-2:00 p.m. - Protecting Yourself and Managing Pesticide Safety in the Landscape by Pat Hastings, Rutgers NJAES, Cooperative Extension
2:00-2:15 p.m. - Break on the Trade Show Floor
2:15- 3:00 p.m. - Important Legislative and Regulatory Issue for Those Working in the Landscape Industry
Panel - Carl Nordstrom-Moderator
2:15 p.m. - H2A & Immigration Reform Update by Ed Overdevest, Overdevest Nurseries, Bridgeton
2:25 p.m. - H2B-Worker Program and Homeland Security's Enforcement of Social Security Rule by Pete Haran, Lipinski Landscape and Irrigation, Marlton
2:35 p.m. - Home Improvement Contractor's Registration Act by Carl Nordstrom, NJNLA, Bordentown
2:45 p.m. - Sales Tax in the Landscape Industry – Current Problems and Update by Bob Bruch, NJDA, Trenton
3:00- 4:00 p.m. - Landscape Contractor-Panel Jerry Frecon – Moderator:
Pat Dougherty, Water Creations, Dougherty's Home and Garden Showplace, Franklinville; Evan Dickerson, Dickerson Landscape Contractors, Inc.; Dominic Mondi, Doerler Landscaping, Marcus VandeVliet.
4:00 p.m. - Adjourn

N.J. Pesticide Applicator Units: Core – 2 units, 3A – 1 unit, 3B Turf – 2 units
Certified Nursery and Landscape Professional Credits = 7

For registration information please call Rutgers Cooperative Extension of Gloucester County at 856-307-6450 Ext 1 or go to the web site at http://gloucester.rutgers.edu. ❑

Editor's Note: This is the last issue of the Landscape, Nursery & Turf edition of the Plant & Pest Advisory for the 2007 season. Thank you for subscribing.

Central Jersey Workshop on Rain Garden Construction

Rich Obal and Bill Sciarappa, Monmouth County Agriculture & Resource Management Agents

On November 20, 2007, a half-day workshop from 8:30 to 1:00 is designed to inform landscapers, extension agents and resource management advisors on how to plan and construct a rain garden. And what is a rain garden, you ask? A rain garden is a landscaped, shallow depression that allows rain and snowmelt to be collected and seep naturally into the ground. This helps recharge our groundwater supply and prevents a water quality problem called polluted runoff (nonpoint source pollution). Rain gardens make our cities and neighborhoods more attractive places to live, enhance ecological health and can contribute to the economic profitability of the landscape industry.

Throughout the state, Rutgers Cooperative Extension and other agencies are encouraging municipalities and households to install rain gardens. Water conservation, clean water and the desire to be "green" are strong current trends that can grow your operation.

Come to our training session to learn about construction, costs and plants for rain gardens. Speakers include Rutgers Water Resources Specialist Chris Obropta, Pinelands Nursery President Don Knezick and Extension Agent Madeline Flahive DiNardo. Then tour our demonstration site at our County Ag Building in Freehold and consider adding this service to your business.

For registrational details and agenda information, go to http://events.rutgers.edu/njaes/ and click on Nov. 20 to get brochure with registration form or call 732-431-7260 to get registration materials.

8:30 Registration/Continental Breakfast
9:00 Welcome & Introductions
Rich Obal, RCE Monmouth County Dept. Head, County Agent
9:15 Enviroscaping in the Watershed
Bill Sciarappa, Ph.D. , RCE Monmouth County, Agriculture & Resource Management Agent
9:45 What is a Rain Garden
Vivian Quinn, Agriculture & Resource Management Program Assistant/Master Gardener
10:15 Plant Selection Panel Discussion
Don Knezick, President, Pinelands Nursery & Supply; Rich Obal; Diane Zahorsky, RCEMonmouth County Home Horticulturist
10:50 BREAK
11:00 Engineering a Rain Garden
Chris Obropta, Ph.D., P.E, Rutgers Water Resources; Greg Rusciano, Program Associate, Rutgers Water Resources
11:45 Costing out a Rain Garden
Drew Madzin, Owner, Guardian Lawn & Turf
12:30 Rain Garden Tour

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