RUTGERS COOPERATIVE EXTENSION AT THE NEW JERSEY AGRICULTURAL EXPERIMENT STATION

PLANT & PEST ADVISORY

LANDSCAPE, NURSERY & TURF EDITION $1.50 APRIL 19, 2007

INSIDE

Excessive Moisture in the Landscape

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

Recent rainfall and flooding remind us that of all the environmental factors affecting plant health, extremes in soil moisture can have the greatest impact. New Jersey landscapes were recently inundated with water, so now is a good time to discuss how excessive moisture affects plants in the landscape.

What happens below ground…

Even when soils contain sufficient water for plant growth, the volume of soil in which the roots grow is still 25% air, and the oxygen in this air is essential for plant health. When the root zone is flooded, the air spaces fill up with water, and any remaining oxygen is quickly used up by roots and soil microorganisms.

What happens when the oxygen is gone? After a few days, the normal life processes of healthy roots stop and the roots begin to die of anoxia (or oxygen deficiency); normal uptake of water and nutrients is diminished. In addition, the energy producing mechanism in the root cells (called respiration) switches from a process that uses oxygen (aerobic respiration) to a process that does not (anaerobic respiration). Anaerobic respiration is not efficient and causes toxins such as ethanol to accumulate in the root zone. Other elements and compounds that accumulate to toxic levels in flooded soils include iron, manganese, sulfides, and phenols.

We see damage due to excessive soil moisture not only in sites that are obviously wet, but also in places where soil drainage is impeded by planting conditions (such as planting holes for street-side shade trees) or high soil clay content.

What happens above ground…

Since roots no longer deliver water to the branches and leaves, drought symptoms develop in the upper portions of the plant. Internal water shortages in plants cause the stomates to close. In addition, photosynthesis stops, and if the plant remains alive, chlorosis due to nitrogen deficiency appears. Plants may wilt, and twig dieback and plant death often occurs. Even after the soil drains, a plant that survived flooding may die due to drought stress because the injured root system can't supply the top growth with enough water.

SEE EXCESSIVE MOISTURE ON PAGE 2

Aboveground symptoms associated with excess soil moisture

- chlorosis and leaf discoloration
- edema (cork-like blisters on the lower leaf surface)
- epinasty (downward bending of the leaf petiole)
- leaf drop
- marginal leaf scorch
- reduced fruiting
- stem swelling (especially in small plants)
- twig dieback
- wilt
- root death
- plant death

EXCESSIVE MOISTURE FROM PAGE 1

Susceptibility to disease

Plants affected by excessive soil moisture become susceptible to certain root diseases. For example, species of *Phytophthora*, a common water mold, attack roots in waterlogged soils. Not only are roots more susceptible to disease in such an environment, but the excessive moisture is ideal for dispersal of the pathogen. Where water molds organisms are abundant, managing soil moisture is the primary method of disease control.

Relative tolerance to excessive soil moisture

Some trees, such as sycamore, elm, sweet gum, and red maple, can tolerate flooding for a few days with no adverse effects. Most trees and shrubs, however, cannot grow for long in water-logged soil. In general, most deciduous plants tolerate flooding better than most evergreens. Also, dormant plants can tolerate flooding better than actively growing plants, in part because roots in cold soil need less oxygen.

**Source: Sinclair, W. A. 1987. Diseases of Trees and Shrubs. Cornell University Press.*

A partial list of plants tolerant or susceptible to excessive soil moisture

Tolerant

- ash (black, green)
- bald cypress
- eastern larch
- red maple
- red-osier dogwood
- tulepo gum

Intermediate

- ash (white)
- Atlantic white cedar
- box elder
- callery pear
- cornelian cherry
- eastern arborvitae
- elm (American)
- fir (balsam)
- hackberry
- honey locust
- Japanese barberry
- maple (silver)
- Pfitzer juniper
- oak (pin, water, willow)
- osage orange
- pussy willow
- river birch
- sweet gum
- sycamore

Intolerant

- American beech
- American holly
- basswood
- black gum
- black locust
- black walnut
- crabapple
- eastern hemlock
- eastern red cedar
- elm (Siberian, winged)
- flowering dogwood
- forsythia
- hornbeam (American, hop)
- magnolia (saucer, southern)
- maple (Norway, sugar)
- oak (northern red, southern red, shumard, white)
- Oriental bittersweet
- pine (jack, red, Virginia, eastern white)
- privet (amur and common)
- redbud
- shagbark hickory
- spruce (Norway, Sitka, white)
- tartarian honeysuckle
- tulip tree
- yellowwood

Diseases of Ornamentals

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

It's that time to once again consider diseases that affect outdoor ornamental plantings. An abundance of moisture, normal for the spring season, is ideal for the foliar diseases in the landscape. The most common diseases on trees and shrubs affect the foliage as **spots**, **blotches**, and **blisters**. Although unsightly, most foliar diseases do not greatly impact the health of the plant, and chemical inputs are rarely necessary.

Leaf Spot and Blotch

Leaf diseases are caused by many different species of fungi, and most ornamental plants are susceptible to one type of leaf spot or another. Fungal spores, produced in fruiting structures in leaf litter on the ground, are splashed to developing tissue after budbreak. Typical leaf spotting occurs soon after the infection process begins.

Leaf spot diseases are caused by a wide variety of fungal and (some) bacterial pathogens. Leaf blotches, which encompass a larger portion of the leaf surface, are rarer but still prevalent. A very common leaf blotch in New Jersey landscapes is **horsechestnut leaf blotch** caused by the fungus *Guignardia aesculi.*

Apple Scab

Scab, caused by the fungus *Venturia inaequalis*, is one of the most common diseases of apple, crabapple, and other rosaceous ornamentals such as cotoneaster, hawthorn, mountain ash, and pyracantha. Symptoms of this disease include olive-colored spots (1/4 inch in diameter) with fuzzy borders on leaves and petals. Corky-looking lesions (hence the name "scab") may appear on twigs and fruit. Severely infected leaves, petals, and fruit may turn brown and drop prematurely.

Oak Leaf Blister

Look for symptoms of this disease, little "pockets" on the leaves of susceptible oaks, later this spring. The fungus that causes this disease, *Taphrina deformans*, overwinters in budscales and twigs. Leaves become infected as they develop in spring, and symptoms begin to appear within several weeks. As the blisters age, they become dry, brown leaf spots, and heavily affected trees may defoliate. As with most diseases that development in the spring, oak leaf blister is favored by wet weather. This disease does not seriously harm healthy trees and control with fungicides is not usually recommended.

Volutella Blight of Pachysandra

Volutella blight (also called **Pachysandra leaf and stem blight)** is easy to spot. Plants infected with the fungus *Volutella* exhibit fabulously large, "bullseye" leaf spots and elongate cankers on petioles and stems. Within several weeks, highly diagnostic, pink-colored fruiting bodies form on affected tissue. This disease can be very destructive in beds, causing circular patches of dying plants to form and enlarge rapidly.

Like many diseases in the landscape, Volutella blight cannot be sufficiently managed by only using fungicides. There are cultural factors that contribute to disease severity. First, water is essential in the disease infection process, so "managing the moisture" helps to manage the disease. Avoid practices that encourage excessive moisture (such as including heavy mulching and over watering). Periodically thin the beds to increase light and air circulation. Avoid watering during times of the day, such as late afternoon, when the beds are apt to remain wet for long periods. Consider that heavy shade may also contribute to longer periods of leaf wetness. Winter injury and wounding predispose pachysandra to this disease. Common things to watch out for include mechanical injury (foot traffic, pets, or children playing in beds), scale insects, and poor nutrition.

Foliar Disease Management

The development of these and many other foliar diseases is favored by abundant moisture and cooler temperatures. These conditions in the spring months can vary significantly, which is why we see more disease in some years than in others. Management of springtime foliar diseases benefits from a few basic strategies: reduce leaf wetness and humidity in plantings (e.g., improve air-flow through proper spacing and weed management, irrigate during early morning hours, and avoid overhead watering); remove leaf litter to reduce fungal inoculum; and improve plant vigor to help reduce disease severity. Remember, however, that the environment drives the foliar disease process, so expect to see more of these following wet springs.

Although spring-time diseases require chemical inputs only when troublesome, there are pesticides labeled for management of each of these diseases. Refer to the New Jersey Agricultural Experiment Station Bulletin E036, Pest Control Recommendations for Shade Trees and Commercial Nursery Crops, 2007. This publication can be found on the Web at: http://njaes.rutgers.edu/pubs/publication.asp?pid=E036.

Early Season Broadleaf Weed Headaches

Stephen E. Hart, Ph.D., Specialist in Weed Science and Patrick McCullough, Program Associate in Weed Science

With the onset of more seasonal spring like temperatures next week combined with copious amounts of soil moisture we would expect the resumption of the tremendous growth of winter annual weeds and early season perennials (especially wild garlic) that we observed early in April. Winter annuals and wild garlic are especially problematic this spring because these weeds continued vegetative growth well into January due to the above average seasonal temperatures. Wild garlic is especially pervasive this spring likely due to the development of an extensive underground root system during the fall and early winter months. Although these weeds will generally mow out by late May/early June, we have observed that in some instances weed infestations are so heavy that the application of broadleaf weed herbicides may be warranted to reduce competition with desired turfgrass. The weather forecast over the next 10 to 14 days calls for highs in the 60's and lows in the 40's which is acceptable to obtain good activity with broadleaf weed herbicides.

If a decision is made to apply a broadleaf weed herbicide keep the following in mind. Many winter annual weeds are tolerant to 2,4-D so be sure the herbicide mixture you choose contains herbicides other than 2,4-D such as dicamba, triclopyr, 2,4-DP, and MCPA/MCPP. For wild garlic control 2,4-D is a good choice but the ester formulation should be used in place of the amine formulation. Due to the orientation of the leaves of wild garlic, the addition of a surfactant, preferably a high quality non-ionic surfactant with 80 or 90% active ingredients may increase the retention of the spray solution on the leaves and improve control. ❑

Diseases of Turfgrass

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

Necrotic Ring Spot

This disease, caused by the fungus *Ophiosphaerella korrea* (formerly *Leptosphaeria korrea*), should develop soon on landscape turf. *Ophiosphaerella* attacks the roots and crowns of turf during cool, wet weather in the spring and fall. Grass growing under stress (i.e., low mowing height, pH extremes, or moisture extremes) is most susceptible to infection. Although most cool-season grasses are susceptible to necrotic ring spot, annual bluegrass, Kentucky bluegrass, and fine fescues are most frequently affected. Symptoms typically appear as circular to irregular patches of dead turf (3" to 12" in diameter) with green tufts of resistant grass or weeds in the center. To control, reduce plant stress, avoid soil pH extremes (i.e., keep soil pH between 6.0 - 6.5, if possible), and treat affected turf now with Banner, Chipco 26GT, Eagle, Headway, Heritage, Rubigan or thiophanate-methyl. Repeat 14-28 days later for best results.

Red thread

This disease, caused by the fungus *Laetisaria fuciformis*, is common on susceptible turf (particularly perennial ryegrass and fine fescues) throughout the State. Infections are characterized by the appearance of short red threads (1/8" to 1/4" long) emerging from tan-colored leaf blades. Affected patches are typically pink in color and range from 1 to 6 inches in diameter. Bentgrass, bluegrass, and tall fescue may also be affected. Red thread is typically found on "hungry" (low fertility) turf during cool, wet weather. Well-fertilized turf may also be attacked but to a lesser extent than nitrogen deficient turf. To obtain optimum disease control, maintain adequate fertility levels, keep turf properly irrigated, avoid excessive thatch, and apply Armada, Banner, Bayleton, Chipco 26GT, Compass, Curalan, Eagle, Headway, Heritage, Insignia, Prostar, Rubigan, Tartan or Touche per manufacturer's recommendations.

Turf Field Day

Mark your calendars now for this year's Rutgers Turfgrass Research Field Days which will be held on Tuesday, July 31, 2007 (Golf and Fine Turf Research Field Day at Horticultural Farm II, New Brunswick, NJ) and Wednesday, August 1, 2007 (Landscape Turf Research Field Day at Adelphia Research Farm, Freehold, NJ). Additional information and directions to each location will appear in future issues of this newsletter. ❑

Plant or Soil Enhancing Products: Proceed with Caution

Michelle Casella, Agricultural Agent, Rutgers Cooperative Extension of Gloucester County

There are many products out there and new ones emerging all the time that make claims to "bolster plant health", "control diseases" (like Phytophthora and Pythium), and cure many woes of plant and crop production. With the difficulty in controlling devastating diseases like Phytophthora and the high prices of alternative control methods it is tempting to try new products.

Unfortunately, many of the new products available have not been tested by university researchers and do not have the non-bias, replicated, scientific studies to back up the claims being presented to growers to entice purchasing these products. The reason for lack of university research is often due to the fact that companies producing these products do not have the funds to support the type of research needed to verify the product's success. Generally, they are small, up-starting companies who may or may not have a good product. They may have done their own studies or have done studies with farmers who have had success, but often what works on one farm, may not universally work for others.

There are so many factors, like soil type, water quality, environment, pH, crop variety, etc., that influence the success or failure of a product. Additionally, some of the products sold have inconsistent attributes, like fertility level, pH, contaminants, etc. They may have interactions with other products. Take for instance a transplant mix enhancer/amendment that is made from a compost product. Composts are often inconsistent. Composts are mostly made from products like plant materials, wood by-products, manures, and other organic materials. When you mix an enhancing product with a transplant mix there is more chance of seeing an affect than if used in the field. Why? In the greenhouse using trays with small cells or even in pots, there is less growing media to interact with the plant. So the affect will be seen more dramatically then when plants are in the field with a greater amount of soil for growth and development. Some enhancing or amendment products have shown little or no affect on plant growth. Others have induced nutrient deficiencies, especially in young seedlings and transplants. On occasion some growers have reported success with other new products.

Your best bet is to proceed with caution when trying a new product that has claims to improve plant health or control diseases. Try it if you think it may help. However, try it on a small scale. Don't make a drastic change based on a good sales pitch. Always ask for a nutrient analysis (if it has fertility claims) and an ingredients list and label for the product. You can consult your county agricultural agent, but chances are many of these products do not have scientific data to back up claims. When looking into these products ask the manufacturer or sales person to show you university data from research by cooperative extension. If they have none, see if they are willing to fund a project for university studies to prove the product is reliable and meets the claims being presented. This article is not meant to promote or discourage the use of new plant or soil enhancing products, it is just mean to bring awareness to producers about how to proceed in investigating new products. ❑

IPM Scouting Field Guides Available

The Michigan State University IPM Program has three new IPM scouting field guides produced through NC IPM funding and Michigan State Project GREEEN:

1) A Pocket Guide for IPM Scouting in Herbaceous Perennials by Jan Byrne (MSU) and Raymond A. Cloyd (KSU).
2) An IPM Pocket Guide for Weed Identification in Nurseries and Landscapes by Steven A. Gower (MSU) and Robert J. Richardson (NCSU).
3) An IPM Pocket Guide for Weed Identification in Christmas trees by Steven A. Gower (MSU) and Robert J. Richardson (NCSU).

Ordering information is available on the web at:
http://www.ipm.msu.edu/publication.htm
or call 517-353-6740.

Weekly Weather Summary

Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged much below normal, averaging 40 degrees north, 44 degrees central and 44 degrees south. Extremes were 66 degrees at Long Branch on the 11th, and 23 degrees at Charlotteburg and Flemington on the 11th. Weekly rainfall averaged 6.45 inches north, 5.95 inches central, and 4.13 inches south. The heaviest 24 hour total reported was 6.43 inches at New Brunswick on the 15th to 16th. Estimated soil moisture, in percent of field capacity, this past week averaged 100 percent north, 99 percent central and 98 percent south. Four inch soil temperatures averaged 39 degrees north, 43 degrees central and 43 degrees south.

The following table contains meteorological information since the start of the growing season March first. The table is updated each Monday and the following is an explanation for each column.
WEEK=TOTAL RAINFALL FOR THE PREVIOUS 7 DAYS ENDING MONDAY MORNING
TOTAL=TOTAL RAINFALL SINCE MARCH 1ST DEP=DEPARTURE FROM NORMAL OF RAINFALL SINCE MARCH 1ST. A NEGATIVE SIGN INDICATES BELOW NORMAL AND NO SIGN INDICATES ABOVE NORMAL.
MX=HIGHEST TEMPERATURE FOR THAT 7 DAY PERIOD
MN=LOWEST TEMPERATURE FOR THAT 7 DAY PERIOD
AVG=AVERAGE TEMPERATURE FOR THAT 7 DAY PERIOD
DEP=DEPARTURE FROM NORMAL OF THE AVERAGE TEMPERATURE FOR THAT 7 DAY PERIOD
TOTAL=TOTAL NUMBER OF GROWING DEGREE UNITS SINCE MARCH 1ST
DEP=DEPARTURE FROM NORMAL OF GROWING DEGREE UNITS
%FC=PERCENT OF FIELD CAPACITY (SOIL MOISTURE)

Weather Summary for the Week Ending 8 am Monday 4/16/ 7

	RAINFALL			TEMPERATURE				GDD BASE50		MON
WEATHER STATIONS	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	%FC
CANOE BROOK	missing									
CHARLOTTEBURG	6.29	11.95	5.54	52	23	40.	-7	25	25	100
FLEMINGTON	7.75	14.33	8.00	58	23	41.	-9	31	31	100
NEWTON	5.31	8.70	3.05	53	25	39.	-9	20	20	100
FREEHOLD	5.61	11.14	4.73	61	34	46.	-5	62	60	100
LONG BRANCH	5.40	11.04	4.39	66	27	45.	-5	29	29	100
NEW BRUNSWICK	8.82	14.65	8.60	57	26	43.	-9	45	41	100
TOMS RIVER	3.98	9.59	3.20	57	25	42.	-8	62	62	100
TRENTON	5.93	11.37	5.56	56	27	43.	-10	57	45	100
CAPE MAY COURT HOUSE	2.16	6.01	.36	58	28	45.	-7	51	43	100
DOWNSTOWN	4.69	10.40	4.59	60	25	44.	-9	81	68	100
GLASSBORO	4.60	8.64	2.54	58	31	44.	-9	87	75	100
HAMMONTON	4.17	9.37	3.48	60	24	44.	-9	83	72	100
POMONA	3.56	8.25	2.51	59	24	44.	-7	72	69	100
SEABROOK	5.61	10.70	5.57	59	28	46.	-7	103	88	100
SOUTH HARRISON	5.43	10.72	5.11	57	29	44	NA	81	NA	NA

WES KLINE -- GDD BASE 40 PINEY HOLLOW
LAST WEEK 43 (Ending 4/9/07)
THIS WEEK 30 (Ending 4/16/07)

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Pesticide User Responsibility: Use pesticides safely and follow instructions on labels. The pesticide user is reponsible for proper use, storage and disposal, residues on crops, and damage caused by drift. For specific labels, special local-needs label 24(c) registration, or section 18 exemption, contact RCE in your County.
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