

PLANT & PEST ADVISORY

LANDSCAPE, NURSERY & TURF EDITION \$1.50

MAY 21, 1998



INSIDE

Basics of Fungicides	1
Plant Diagnostic Lab	
Highlights	2
Diseases of Turfgrass	3
Harvesting & Timber Stand	
Improvement Program	3
Field Nursery Weed	
Control	4
Rain, High Temps &	
Fertilizer Management for	
Nursery Crops	5
IPM Pest Clinics	5
Ornamentals Pest Notes	6
Herbicide Options for	
Nursery Weed Control	7

The Basics of Fungicides: Mode of Action and Fungicide Resistance

Ann B. Gould, Ph.D., Ornamentals Plant Pathology

When combined with proper cultural practices, fungicides are effective tools used by growers to combat disease. To use these materials properly, it is important to understand how they work.

Terminology

Although all fungicides have long chemical names, they are most frequently referred to by their common and/or trade names. For example, the chemical name of a fungicide used regularly by growers to control needlecast on Douglas fir is tetrachloroisophthalonitrile. Fortunately, we use the common name, chlorothalonil, when referring to this chemical. Chlorothalonil is marketed under a number of trade names, such as Daconil 2787 or Bravo, which are the proprietary names of the manufacturer. Since the same fungicide can be manufactured by more than one company in a variety of formulations, we usually refer to fungicides by their common or generic name to avoid confusion.

Mode of Action

Fungicides are classified based on their mode of action. Contact fungicides are active on the plant surface, whereas penetrant fungicides are active within the plant. Contact fungicides do not penetrate plant tissue, thus they are active only at the site of placement and can be washed away by precipitation. Contact fungicides must be reapplied at periodic intervals to protect new growth as it emerges. In contrast, penetrant fungicides are active both within the plant and at the site of placement. Once adsorbed into the leaf, they do not wash away. Compared to contact fungicides, penetrants have longer residual activity. Penetrant fungicides are classified as localized (restricted to the area of application), acropetal (translocated to growing points), or systemic (translocated throughout the plant). Acropetal and systemic penetrants can protect new growth from within the plant. The major groups of fungicides are listed in Table 1.

Fungicide Resistance

Fungicides attack fungi in many different ways. Some fungicides interfere with cell division while others inhibit the activity of certain cellular enzymes or alter the function of cell membranes. Contact fungicides such as chlorothalonil and mancozeb disrupt fungal activity at multiple locations in the fungal cell. Penetrant fungicides, on the

SEE FUNGICIDES ON PAGE 2

Plant Diagnostic Lab Highlights

Richard Buckley, Coordinator,
Plant Diagnostic Laboratory

Turfgrass

Pink snow mold samples continued to be submitted to the laboratory at a relatively rapid pace into mid-May. Golf course turf from Bergen, Passaic, Ocean, and Gloucester Counties were diagnosed with the disease. Golf courses from Pennsylvania and New York were also represented in the sample load. **Pink snow mold** should cease to be a problem now that the weather is becoming more summer-like. Another cool season disease of golf turf, **yellow patch**, was active on samples from Ocean County.

Landscape

Samples of **ash anthracnose**, caused by the fungus *Gnomonia*, are beginning to show up in the laboratory at this time. The disease was diagnosed on ash from Gloucester and Passaic Counties. Samples diagnosed with **cytospora canker and twig blight** continue to be submitted to the laboratory. Cherry and Japanese maple are the most common hosts. Another canker disease, caused by the fungus *Botryosphaeria dothidea*, is also active in the landscape. The disease has been diagnosed on samples of holly and cherry from Sussex and Somerset Counties. Finally, **nectria canker** was identified on a birch sample from Morris County. Most likely, these trees were injured by temperature and moisture extremes and the fungus is simply invading the stressed plant material. □

FUNGICIDES FROM PAGE 1

other hand, tend to have very few avenues of attack. Some fungi become resistant to fungicides through genetic mutation. These fungi are no longer affected by the toxic action of the chemical. In other cases, a segment of the fungal population is naturally tolerant or resistant to the product. With repeated applications of the same fungicide or related chemistries, these strains may predominate and the disease will no longer be controlled. Resistance is more likely to occur with fungicides that attack fungi at only a few metabolic sites. For example, reports of fungi such as *Botrytis* resistant to the benzimidazole fungicides (benomyl and thiophanate-methyl), which act on only one metabolic site, are common.

To prevent the development of fungicide resistance, it is good practice to (1) avoid repeated use of the same fungicide or materials with closely related modes of action; (2) alternate or tank mix fungicides with different modes of action; (3) carefully apply fungicides to ensure uniform coverage; and (4) avoid application of fungicides above or below recommended rates.

Table 1. Classes of fungicides and their mode of action.

<p>1. Aromatic Hydrocarbons (substituted Benzenes) – contact fungicides.</p> <ul style="list-style-type: none"> ● quintozone (PCNB) – soil fungicide and seed treatment for <i>Rhizoctonia</i> and <i>Sclerotinia</i>; is not effective against <i>Pythium</i>. ● etridiazole (ethazole) – a triazole soil fungicide for root and stem rots; is effective for <i>Pythium</i> and <i>Phytophthora</i>.
<p>2. Benzimidazoles - first known acropetal penetrants; inhibit DNA synthesis and interfere with cell division.</p> <ul style="list-style-type: none"> ● benomyl – a systemic fungicide; is not effective against water mold fungi. ● thiophanate-methyl – systemic preventive fungicide used as a soil drench; also not effective against water mold fungi.
<p>3. Carbamates - very common contact materials; contain metals; all work differently (inhibit enzyme activity, membrane function, or fatty acid metabolism).</p> <ul style="list-style-type: none"> ● maneb – foliar protectant fungicide and seed treatment; controls a wider range of diseases than any other single fungicide. ● mancozeb – foliar protectant fungicide. ● propamocarb hydrochloride – localized penetrant, foliar fungicide used in transplant water or as a soil drench, seed treatment, soil surface spray, or foliar treatment. ● ziram – foliar fungicide.
<p>4. Carboximides – block enzymes in respiration.</p> <ul style="list-style-type: none"> ● captan – protectant; used as seed treatment, foliage spray, dip, or preplant soil treatment.
<p>5. Demethylation Inhibitors (DMIs), also known as Sterol Inhibitors – protectants and acropetal penetrants that inhibit ergosterol synthesis.</p> <ul style="list-style-type: none"> ● fenarimol – foliar. ● propiconazole – protective foliar. ● triadimefon – systemic with residual. ● myclobutanil – systemic protectant and curative. ● triforine – piperazine derivative.
<p>6. Dicarboximides – localized penetrants that have protective activity against <i>Botrytis</i>, <i>Sclerotinia</i>, <i>Monilinia</i>, <i>Alternaria</i>, <i>Phoma</i>, and <i>Rhizoctonia</i>; inhibit spore germination, mycelial growth, DNA synthesis, and interfere with respiratory enzymes.</p> <ul style="list-style-type: none"> ● vinclozolin – contact and protective, specific against <i>Botrytis</i> and <i>Sclerotinia</i>, prevents spore germination. ● iprodione – foliage-contact, broad spectrum.
<p>7. Nitriles - contact foliar fungicides that inhibit sulfur-dependent enzymes and interfere with regulation of cell metabolism.</p> <ul style="list-style-type: none"> ● chlorothalonil – preventive foliar fungicide.
<p>8. Phenylamides – protectants and acropetal penetrants with activity against Oomycetes (<i>Pythium</i> and <i>Phytophthora</i>); interfere with ribosomal RNA.</p> <ul style="list-style-type: none"> ● metalaxyl – acylalanine compound with long lasting control of Oomycetes.
<p>9. Phosphonates – systemic penetrants.</p> <ul style="list-style-type: none"> ● fosetyl Al – full systemic, organic phosphate compound; has no preventive action as it is only active if the pathogen is present; used as foliar spray or soil drench.

Diseases of Turfgrass

Bruce B. Clarke, Ph.D., Turf Plant Pathology

General

Ascochyta leaf blight, **stripe smut**, and **leafspot and melting-out** are quite evident on Kentucky bluegrass throughout the State. Many lawns have experienced severe thinning and are now prone to weed invasion. **Fusarium patch (= pink snow mold)**, **red thread**, and **take-all patch** are also prevalent on turf at this time. Preventive **dollar spot** and **summer patch** sprays should be in place. Refer to recent issues of this newsletter for complete disease control information.

Aschochyta leaf blight

Several reports of **leaf blight**, caused by the fungus *Ascochyta*, have been received recently from central New Jersey. Turf areas that have thick thatch layer (1 to 3") are most susceptible to attack. Upon close inspection, both healthy and diseased leaves are evident within blighted areas. Infected leaves typically appear "white" from the "tip down". Under certain conditions, lesions may extend all the way down to the leaf sheath. As lesions age, prominent black pycnidia (fruiting bodies) develop along the bleached portion of affected tissue. Unlike **anthracnose** fruiting bodies, these structures lack visible black spines. During moist conditions spores are released and infect healthy turf. Since *Ascochyta* enters grass through wounds, infection is most severe just after the grass is mowed. For best results, avoid frequent mowing, raise the height of cut, use a "sharp mower blade", water as deeply and infrequently as possible without causing moisture stress, water in the early morning hours, avoid excessive applications of nitrogen, and remove excess thatch. Although fungicides are not currently labeled for the control of this disease, mancozeb has shown promise in research tests. Chemical control, however, is rarely warranted since affected turf typically recovers with proper maintenance.

Dollar spot

Dollar spot will soon develop on golf and landscape turf. To prevent this disease from causing damage to susceptible turf again in 1998, maintain adequate nitrogen fertility, water the early morning hours, reduce thatch, avoid the sole use of any fungicide for prolonged periods of time (to reduce the possibility of disease resistance), and apply Banner, Baylton, Chipco 26019, Curalan, Daconil, Eagle, mancozeb, Manicure, Rubigan, Sentinel, Thalonil, Touche, or Vorlan. Repeat fungicides as needed through late-October.

Red Thread

This disease, caused by the fungus *Laetisaria fuciformis*, is very prevalent on sensitive turf throughout the State. Infections are characterized by the appearance of short red threads (1/16-1/14" long) emerging from tan-colored leaf blades. Affected patches are typically pink in color and range from 1 to 6 inches in diameter. Although perennial ryegrass and fine fescue are most susceptible, bluegrass, bermudagrass, and tall fescue may also be affected. **Red thread** is typically found on "hungry" (low fertility) turf during cool, wet weather. Well fertilized turf, however, may also be attacked. To obtain optimum disease control, maintain adequate fertility levels, avoid drought stress and excessive thatch, and apply Banner, Baylton, Chipco 26019, Curalan, Eagle, Heritage, Rubigan, Sentinel, Touche, or Vorlan per manufacturer's recommendations. □

Harvesting & Timber Stand Improvement Program

Jerome L. Frecon, Gloucester County Agricultural Agent

On **Thursday, May 28, 1998 at 6:30 p.m.**, Rutgers Cooperative Extension of Gloucester County will conduct a twilight forestry program entitled, "An In-the-Woods, Up-Close-and-Personal Look at Timber Harvesting and Timber Stand Improvement in a South Jersey Woodlot". The program will be presented on site at a woodlot in Monroe Township, off Fries Mill Road, Gloucester County.

The program will be conducted by Dr. Mark Vodak, Forestry Extension Specialist, Rutgers Cooperative Extension.

The woodland is primarily an oak/pine - upland oak forest type common on well-drained sites in South Jersey. These stands are frequently fully stocked with an oak component that is under 65 years old, averaging from 6 - 12 inches in diameter. The trees are firewood-size and the site is capable of growing trees to saw timber-size in a reasonable period of time.

Depending on the landowner's objectives, the managing forester favors two stand treatments in these stand types: coppice with reserves and improvement cutting. Coppice with reserves is a regeneration method where the majority of regeneration is from stump sprouts, and trees are retained to meet goals other than regeneration. Improvement cutting is done to improve stand composition and quality by removing less desirable trees. Both practices can provide products to earn income for farmland assessment and meet an array of landowner objectives.

The advantages and disadvantages of these management practices will be discussed during the program. Participants can see what these practices are, what the results look like, and have a chance to ask questions.

For directions to the property on Fries Mill Road and to register, call the Rutgers Cooperative Extension Office of Gloucester County, at 609-863-0110. □

Field Nursery Weed Control

Albert O. Ayeni, Ph.D., Weed Science

New Plantings

Transplanting of nursery crops is in progress throughout the state. Rainfall, temperature and sunlight have been satisfactory. This weather condition should get the crops to a good start, but also favors rapid weed infestation. In a matter of days after transplanting, the nursery will be taken over by weeds if the grower fails to adequately control them.

Weeds deprive the nursery crops of adequate moisture, nutrients and light; and the crops may not be able to fully benefit from the good weather and nutrient supplies. New transplants are highly susceptible to early and persistent weed interference and may not grow at the desired rate or develop the good features to attract buyers. A weedy nursery also harbors rodents, disease-causing organisms, harmful insects and nematodes.

A slow start or ugly appearance usually results in a prolonged stay of the crop in the field before attaining the marketable size or appearance. This ultimately increases the grower's production cost and may reduce the profit margin. It is therefore important to pay adequate attention to weed management from the onset.

Major Weeds of New Plantings

a) Summer Annuals: In spring time and early summer, the most serious weeds of newly prepared seedbed for nursery transplants are summer annuals which become established within a few days after transplanting. These annuals may be broadleaves or grasses. They grow fast and cover the entire seedbed within 2 to 3 weeks after transplanting. These weeds readily suppress small-size transplants and must be promptly controlled chemically or by cultivation. Some important summer annuals in field nursery throughout the state include the following (listed alphabetically):

Broadleaves	Grasses
Cocklebur	Barnyard grass
Galinsoga	Crabgrass (large, smooth)
Jimsonweed	Downy brome
Knotweed	Fall panicum
Lambsquarters	Foxtail (yellow, green, giant)
Marestail or Horseweed	Goosegrass
Morningglory (ivyleaf, pitted, tall)	Witchgrass
Pigweed (redroot, smooth)	
Ragweed	
Smartweed	
Spurge (prostrate, spotted)	
Velvetleaf	

It is important to identify these weeds especially if you rely on chemical weed control. Some of the weeds are readily controlled by conventional chemical weed control programs but some are not. Contact your County Agent or consult the book: **Weeds of the Northeast**, for more information on weed identification. Future editions

of *Plant and Pest Advisory* will give specific information on how to handle the difficult summer annual weeds of field nursery.

b) Perennial Weeds

Freshly prepared seedbed for nursery crops rarely suffer from perennial weeds, but fields previously infested by perennial weeds and subjected to poor preparation may present perennial weed problems shortly after transplanting. With good land preparation, annual weeds usually suppress the perennials until late in the cropping season when the annuals have completed their life cycle or selective weed control has subdued them, allowing perennials to dominate the system.

The perennial weeds which may prove difficult in new nursery plantings in the state include **bindweed (field or hedge), Canada thistle, creeping oxalis, white clover, Johnsongrass, nimblewill, tall fescue, orchardgrass, quackgrass, timothy, and yellow nutsedge**. Identify and control these weeds early before they become dominant in the nursery. Once firmly established they are difficult and expensive to control.

Weed Control in New Plantings

a) Land Preparation: Good land preparation delays weed establishment because it buries the weed seeds to a depth that reduces emergence rate as well as total emergence. Good land preparation also enhances the action of soil acting herbicides. Invest in high quality conventional tillage. It helps to reduce initial weed pressure. For information on land preparation for transplanted nursery crops, contact your Rutgers Cooperative Extension County Agent.

b) Cultivation: Many growers in the state rely on cultivation as the major weed control method in new and established nursery plantings. This method is effective if applied before the weeds get too big. Do not cultivate too close to the root system of new plantings, especially under dry conditions. Manually remove the weeds close to the base of the transplant which the cultivator cannot reach - they are more detrimental to the crop than the weeds further away. The first cultivation should be done within two weeks after transplanting and subsequent ones applied at 2 to 3 weekly intervals. As much as possible, avoid cultivation in dry weather, or if you must cultivate, follow with irrigation within 48 to 72 hrs.

c) Chemical weed control: Chemical weed control has a major advantage over cultivation. When properly applied the grower does not have to engage in supplementary handweeding to remove the weeds within the crop row. In most circumstances, the cost of removing the intra-row weeds manually is quite substantial. Note however, that newly transplanted nursery crops are generally more sensitive to soil-acting herbicides than established plantings. Make sure you select appropriate herbicides for your nursery crop(s) and weeds. The following is a list of herbicides classified on the basis of the group of weeds they control more effectively in the nursery:

SEE WEED ON PAGE 5

Rain, High Temperatures and Fertilizer Management for Nursery Crops

Raul I. Cabrera, Ph.D., Nursery Crops Management

Given the recent and unusual weather patterns, particularly the heavy rains and now the hot temperatures, nursery growers should be paying attention to their fertility programs.

Growers of field nursery stock that had already made applications of granular-soluble field fertilizers (like urea or urea-ammonium-nitrate) before the recent heavy and prolonged rainy period will need to assess whether a re-application is in order. This will be based on factors like the type of fertilizer used, frequency (is it split over the season? how many times?) and dose of application, plant species and their response, soil type, and local experience. The ultimate and ideal decision-making alternative are the results from a (quickly done) soil analysis report. Consult with your county agent or specialist for information on soil testing laboratories with rapid turn-around times. Growers that rely on field-grade slow-release fertilizers (typically based on UF-urea, IBDU-urea and SCU-urea) are likely to be less affected by the recent rainy weather. Incidentally, we are just starting a study comparing the effects of slow-release fertilizers on growth response of field nursery crops, as well as evaluating their efficacy, cost and labor savings with respect to regular granular-soluble fertilizer applications. We will keep you posted on the results as the project evolves.

Most container growers base their fertility programs on controlled-release fertilizers (CRF), whose nutrient release is not as affected by moisture (i.e. rainfall), but by high temperatures. Up until last week we have had moderate ambient temperatures throughout the state, rarely reaching 80°F. Based on results from a study we did a couple of seasons ago, most commercial CRF have moderate and very steady nutrient releases under such conditions. Once ambient temperatures reach the 80's and approach the 90's, however, they can suddenly trigger high nutrient releases, which if left unattended, will likely cause salinity problems. Under these conditions it is important to pay particular attention to salt-sensitive shrub and tree species such as azaleas, roses, camellias, dogwoods, maples, lindens.

A systematic monitoring of soluble salts remains the simplest way for the grower to keep track of nutrient release from CRF. This will indicate if nutrient release from CRF is adequate, excessive or limited, allowing you to adjust your fertilization management practices accordingly. The monitoring is accomplished by simply taking a reading from a solubridge or conductivity meter inserted

in an aqueous paste of growing medium or solution leached from the pots. Regardless of the method used to measure soluble salts, the two salt readings that should always be remembered are those of the irrigation water and the threshold value for salt damage in a salt-sensitive or indicator plant. As the CRF becomes exhausted, salinity of the medium approaches that of the irrigation water, indicating the need for supplemental fertilization. On the other hand, salt readings approaching those harmful to the salt-sensitive or indicator species should signal the need to implement leaching practices. Leaching is the act of irrigating heavily with enough water to produce a good amount of drainage or runoff, which removes or displaces soluble salts from the medium. Research indicates that application of a volume of clean, low-salinity water (preferably with an electrical conductivity reading equal or less than 0.5 mmhos/cm) equivalent to the volume of growing medium in a container will leach out most of the soluble salts present. Once again, contact your county agent or specialist for information and help on how to take measurements of electrical conductivity from your containers. □

WEEDS FROM PAGE 4

Weed type		
Broadleaves	Grasses	Broadleaves and Grasses
Suitable Herbicides		
GALLERY	DEVRIKOL	OH 2
GOAL	FACTOR	REGAL O-O
RONSTAR	PENDULUM	REGALSTAR II
	PENNANT (also good on nutsedge)	ROUT
	SURFLAN	SNAPSHOT (DF & TG)
	TREFLAN	XL

For new nursery plantings, the use of postemergence herbicides (especially the translocated types) is not recommended. Wait until the nursery crop is well established which may take several months depending on the crop and the herbicide you wish to apply. Seek the advice of your RCE County Agent and follow herbicide label. □

1998 IPM Pest Clinics

Four Pest Clinics are scheduled for the growing season. Pest Clinics are outdoor classrooms; walking tours of landscapes to identify insects/diseases up close. Hear expert advice on how to monitor and manage these pests using an IPM approach.

June 9: Holmdel Park, Holmdel Twp., (Monmouth Co.); 9:30 a.m. - 11:30 a.m. (**Ornamentals**)

July 9: Medford Leas, Medford (Burlington/Camden Cos.); 9:00 a.m. - 12 noon (**Ornamentals**)

July/August: (dates to be advised) Adelpia Research Farm (Monmouth Co.) (**Turfgrass**)

Fee: \$5.00; **Registration:** Call Rutgers Cooperative Extension of Ocean County at (908) 349-1246; directions will be sent upon registering. **RAIN OR SHINE!** □

Ornamentals Pest Notes

Deborah Smith-Fiola, Ocean County Agricultural Agent, and Steven Rettke, Program Associate in IPM

ARMORED SCALES: (Oystershell [363- 707 GDD], Elongate Hemlock [*Fiorinia*] [400 GDD], *Euonymus* [400 GDD], White Prunicola, Pine Needle [298-448 GDD]) Adults are oval, oystershell shaped, or round. From the side they look flattened, gray to white or brown in color, and have shed skins visible as a part of the cover when lifted off a branch (soft scales do not have a separate cover). Most armored scales produce crawlers (immatures) in May or June, and they usually have two or more generations in a season. Crawlers are the only mobile stage; often brightly colored (red, yellow, etc.); and easy to kill. Look for the crawlers using a hand lens or monitor using double-sided masking tape. Following peak crawler emergence, spray with a contact insecticide like 1% oil or soap for excellent results. A systemic (such as Orthene) will control scales found on foliage. Other products, such as diazinon, malathion, and/or chlorpyrifos (Dursban) are also labeled.

BIRCH LEAFMINER (530-700 GDD) (2nd generation adults): The 1st generation larvae have about completed their feeding and have dropped out of the leaves to pupate in the soil. Keep in mind that larvae typically feed only 10-14 days before dropping to the ground. (Make it a practice to check for larval activity, since spraying leaves with nothing inside is of no value! Monitor for active larvae feeding within, by holding the leaf up to light.) The second generation adults will probably be laying eggs by late May this year (depending on the location in the state). Set out yellow sticky traps to monitor for the small black adults (sawflies).

The control of this 2nd generation may not be necessary, especially if the 1st generation was suppressed. If sprays are required, treat with acephate (Orthene) or dimethoate (Cygon) when the larval activity is found. It's probably too late to treat with Merit.

SPRUCE SPIDER MITES: These cool season mites are nearing peak population build-up. By late May and early June, this mite species has been feeding for two months from when they started hatching back in March. Following mild fall and winter seasons, spruce spider mites often continue activity on conifers well into December and even January before overwintering eggs are laid. Generally, spruce mites do *not* feed on the current year needles during the spring months, but restrict their feeding to the older growth of past seasons. However, with the extensive feeding done last fall and winter, by the time the new growth elongates in May, the older growth may have already been "worked over" thoroughly. Therefore, the growing population could be forced to expand their activity onto the new growth this

spring. This may result in major bronzing of all of the foliage by July, when the dry, hot periods unmask the symptoms.

BOXWOOD LEAFMINER (448-700 GDD): Adults are laying eggs on new growth of boxwood. Larval feeding inside the leaves causes a blister-like appearance (look at the undersides of the foliage). Leaves will turn yellow and may drop by summer. If intolerable, control with dimethoate (Cygon). Merit will provide control by midsummer if applied now.

LADY BEETLES: These beneficials are out and feeding now on soft-bodied insect pests (aphids, scale crawlers, mites). If aphids have built up populations, you probably can find either the larva or adult lady beetle somewhere on the plant. If there is a good-sized population of lady beetles, or if aphids are not significantly harming the plant, consider *not* spraying. Continue to monitor and knock down the aphid population with insecticidal soap only if aphids are out-producing the lady beetles. Leaves damaged now will be hidden by healthy leaves produced later in the season when aphid populations wane. (Ref.: *The P.E.S.T. Newsletter; the Ohio State University Extension; [April 20, 1998]*)

TAXUS MEALYBUG: This insect pest of yew is covered with white, cottony wax which repels many sprays. Females are laying eggs now, which will commonly hatch into tiny crawlers in late May/early June (probably earlier this year) and congregate in the crotches of branches, where they will settle down and feed. Control crawlers on the bark with 1-2% oil or insecticidal soap. (Note that soap will also help wash away the copious honeydew often secreted.) Neem oil and Merit are also labeled. Many beneficial insects feed on this pest, so only use insecticides (Malathion, Merit, Sevin, Tempo, etc.) if a large, damaging population is present.

GREEN JUNE BEETLE: The primary damage done by this pest is *not* by feeding, but from the tunneling activities by the larva. Look for damaged turf with small mounds of soil that look like ant hills. Larvae feed on animal manure and decaying organic matter at the soil surface, with feeding taking place at *night*. Green June Beetles overwinter as large white grubs (up to 2" long). Larval activity starts in early spring and continues into May. Adults emerge in June and feed on fruit before laying eggs. Control smaller larvae later in the summer if damaging.

ELM LEAF BEETLE (363-912 GDD) (Adults & Larvae): Overwintering adults are out now and feeding on elm (especially Siberian elm) and zelkova. Adult beetles are 1/4" long and yellow, with 3 black stripes along the length of the body. Eggs are laid in May in rows on the undersides of leaves; they are yellow and barrel-shaped. The larvae eat the bottom leaf surfaces between the fine veins. (In high populations the leaves look translucent.) Adult damage appears as skeletonized. *Bacillus thuringiensis* var. San Diego ("M-Teak")

SEE PEST ON PAGE 7

Herbicide Options for Nursery Weed Control

Albert O. Ayeni, Ph.D., Weed Science

The tables that follow are to guide nursery growers in the selection of herbicides for weed control in nursery crops. The ultimate choice depends on the crop(s) under consideration, weed types and the grower's circumstances. For best results seek additional advice from your Rutgers Cooperative Extension County Agent and follow herbicide label.

Note: The trade names listed are for easy identification only. No endorsement is intended nor is discrimination against other trade names with the same active ingredient(s) implied.

a) Preemergence Herbicides

Herbicide		Established		Newly Transplanted	
Common Name	Trade Name(s)	Field Nursery	Cntner Nursery	Field Nursery	Cntner Nursery
Single Active Ingredient Products					
Dichlobenil	CASORON, DYCLOMEC, NOROSAC	Yes	No	No	No
EPTC	EPTAM	Yes	No	No	No
Isoxaben	GALLERY	Yes	Yes	Yes	Yes
Metolachlor	PENNANT	Yes	Yes	Yes	Yes
Napropamide	DEVRIKOL	Yes	Yes	Yes	Yes
Norflurazon	PREDICT	Yes	No	No	No
Oryzalin	SURFLAN	Yes	Yes	Yes	Yes
Oxadiazon	RONSTAR	Yes	Yes	Yes	Yes
Oxyfluorfen	GOAL	Yes	Yes	Yes	Yes
Pendimethalin	PENDULUM	Yes	Yes	Yes	Yes
Prodiamine	FACTOR	Yes	Yes	Yes	Yes
Pronamide	KERB	Yes	No	No	No
Simazine	PRINCEP	Yes	Yes	No	No
Trifluralin	TREFLAN	Yes	Yes	Yes	Yes
Commercial mixtures					
Isoxaben + oryzalin	SNAPSHOT DF	Yes	Yes	Yes	Yes
Isoxaben + trifluralin	SNAPSHOT TG	Yes	Yes	Yes	Yes
Oryzalin + benefin	XL	Yes	Yes	Yes	Yes
Oxadiazon + prodiamine	REGALSTAR II	Yes	Yes	Yes	Yes
Oxyfluorfen + pendimethalin	OH 2	Yes	Yes	Yes	Yes
Oxyfluorfen + oryzalin	ROUT	Yes	Yes	Yes	Yes
Oxyfluorfen + oxadiazon	REGAL O-O	Yes	Yes	Yes	Yes

b) Postemergence Herbicides

Herbicide		Established	
Common Name	Trade Name(s)	Field Nursery	Container Nursery
Clethodim	ENVOY, PRISM	Yes	Yes
Diquat*	REWARD	Directed	Directed
Fluazifop-p-butyl	FUSILADE II, ORNAMEC, TAKE AWAY	Yes	Yes
Glufosinate-ammonium*	FINALE	Directed	Directed
Glyphosate*	ROUNDUP PRO, ROUNDUP ULTRA	Directed	Directed
Pelargonic acid*	SCYTHE	Directed	Directed
Sethoxydim	VANTAGE	Yes	Yes

*This is a non-selective herbicide which must be directed at the weed.

Avoid contact with the desirable nursery crop.

PESTS FROM PAGE 6

will kill the larva, as will horticultural oil. The new bacterial toxin ("Conserve") and Merit are also effective against adults and larvae. In heavy infestations, the traditional synthetics carbaryl (Sevin), Turcam, fluvalinate (Mavrik) or Methoxychlor are all labeled for use. Larvae pupate in the soil, so they must travel down the trunk of the tree. This is an excellent time to catch them by applying a sticky band around the trunk. Monitor for the second generation in July. Recent research from Minn. showed excellent control of larvae and pupae with a soil drench of beneficial nematodes.

AZALEA LACEBUG (18-372 GDD-nymphs) (350-646 GDD-adults)= 1st generation:

The azalea lacebug is a serious pest of azaleas. It is found throughout the state, with 4 to 5 generations/yr. in South Jersey, and 3 to 4 generations/yr. in North Jersey. The first generation is now active. Watch for future peaks in June, late July and September. Adults are 1/8" to 1/4" in length, with lacy wings held flat on the back. They can fly well, but are often reluctant to take to the air. Immatures (nymphs) are oval in shape, wingless, black and spiny. Both adults and nymphs can be seen with the naked eye together on foliage, since generations overlap.

Look on the *underside* of foliage for black fecal spots, empty shed "skins" (from molted nymphs), eggs, or live lacebugs. Monitor plants in full sun more closely, as well as exposed plants in areas of reflected light or heat (such as next to buildings or sidewalks). Insecticidal soap and horticultural oil will control active lace-bugs on contact, but they must contact the lacebugs on the underside of foliage directly in order to be effective.

The earlier the lacebug infestation is detected and treated, the more likely control can be obtained with one application of an insecticide. Monitor first to make sure that the insect is indeed present before spraying. In general, **systemic** insecticides will give better control with less precise technique. Use acephate (Orthene) according to label instructions. Imidacloprid (Merit) is also labeled (watch lag time). We also had excellent (>90%) control of lacebugs last year by releasing beneficial lacewing larvae.

EASTERN & COOLEY SPRUCE GALL

ADELGIDS: If last year's infestations of either of these gall forming pests on spruce trees have not been treated by this time, *then it is too late to achieve any chemical controls this spring.* The next spray window will not occur until late summer/early fall. Prune out galls as they form. □

Rutgers Cooperative Extension - NJAES
U.S. DEPARTMENT OF AGRICULTURE
Rutgers - The State University of New Jersey
88 Lipman Drive
Cook College
New Brunswick, N.J. 08901-8525

PLANT & PEST ADVISORY LANDSCAPE NURSERY & TURF EDITION CONTRIBUTORS

RCE Specialists and Staff

Albert Ayeni, Ph.D., Weed Science
Raul I. Cabrera, Ph.D., Nursery Management
Bruce B. Clarke, Ph.D., Turf Pathology
Ann B. Gould, Ph.D., Ornamentals Plant Pathology
Joseph R. Heckman, Ph.D., Soil Fertility
James A. Murphy, Ph.D., Turf Management
George J. Wulster, Ph.D., Floriculture
Paula Shrewsbury, Ph.D., Ornamental & Turf Entomology
Richard J. Buckley, Coordinator, Plant Diagnostic Laboratory
RCE County Agricultural Agents and Program Associates
Atlantic, Charlene H. Costaris (609-625-0056)
Bergen, Joel Flagler (201-599-6162)
Burlington, Raymond J. Samulis (609-265-5050)
Camden, James Willmott (609-784-1001)
Cumberland, James R. Johnson (609-451-2800)
Essex, Jonathan H. Forsell (973-678-7988)
Gloucester, Jerome L. Frecon (609-863-0110)
Hunterdon, Winfred P. Cowgill, Jr. (908-788-1338)
Middlesex, William T. Hlubik (732-745-3443)
Monmouth, Richard G. Obal (732-431-7261)
Morris, Edmund Milewski (973-285-8300)
Ocean, Deborah Smith-Fiola (732-349-1246)
 Steven Rettke, Prog. Assoc. IPM
Passaic, Stanley Kamara (973-305-5742)
Somerset, Betsey Saul, Agricultural Assistant (908-526-6293)
Union, Madeline A. Flahive, Prog. Assoc. (908-654-9854)
Warren, William H. Tietjen (908-475-6505)

Newsletter Production

Jack Rabin, Assistant Director, NJAES
Cindy Rovins, Editor and Designer

Rutgers Cooperative Extension provides information and educational services to all people without regard to sex, race, color, national origin, disability, handicap or age. Rutgers Cooperative Extension is an Equal Opportunity Employer.

Pesticide User Responsibility: Use pesticides safely and follow instructions on labels. The user is responsible for the proper use of pesticides, residues on crops, storage and disposal, as well as damages caused by drift. For specific labels, special local-needs label 24(c) registration, or section 18 exemption, contact Rutgers Cooperative Extension in your County.

Use of Trade Names: Trade names are used in this publication with the understanding that no discrimination is intended and no endorsement is implied. In some instances a compound may be sold under different trade names, which may vary as to label clearances.