INITIATING ARMYWORM IPM FOR TURFGRASS

Bill Sciarappa and Rich Obal, Monmouth County Agricultural Agents

Several branches of Rutgers Cooperative Extension have joined forces in investigating a potentially “new” economic pest – the True Armyworm. Some of the first steps in an Integrated Pest Management (IPM) Plan include proper identification of the larval in-stars and adults as well as their approximate population densities. IPM-oriented lawn care professionals will first visually monitor the number of larvae found in several square foot samples to determine if a potential threat exists before a decision to spray is made. At our recent Rutgers Turf Field Days, much of this basic biology was provided to hundreds of attendees. Many reported they did indeed do this reconnaissance first, while others sprayed without regard to population densities or economic thresholds. At a general custom application cost of 1.5 – 2 cents a square foot, this charge comes to a hefty $650 - 900 per acre. For economics and environmental stewardship, it is important that this pest is present in potentially damaging numbers before spraying; even if the client insists on insurance spray protection. A suggestion – offer a weekly armyworm scouting program to your customers.

Depending on the size of the property, monitor 4-10 square yard sections for armyworm activity. The most likely locations are alongside fences, in or near mulched areas, edges of browned turf and under leaf litter and thatch. Look for little larvae or frass/droppings or evidence of feeding damage. Here in New Jersey, we have no cosmetic damage threshold information for True Armyworm in turf. Our best guess at this time is that an average of 2 - 4 third in-star larvae (1/2 inch) per square yard can cause cosmetic damage and treatment may be necessary. Tell your customers that your IPM service can save them $100 - 200 or more in unnecessary sprays. If spraying is warranted, rebate half your scouting charge from the application cost. That way, you’re all winners – your service company, your client, the naturally occurring bio-control agents, and our environment in general. You’ve probably gained a long-term, repeat customer. Then, let us know what you’re observing and recording in your scouting program. This survey information will help us build an economic threshold for True Armyworm. Please e-mail reports/observations to sciarappa@aesop.rutgers.edu.

SEE ARMYWORM IPM ON PAGE 2
In order to get a better picture of this armyworm invasion, our extension offices have turned to the IPM Blacklight System to detect these nocturnal adult moths flying in various areas statewide. The RCE-IPM field scouting teams of Kris Holmstrom in North Jersey, Frank Spiecker in Central Jersey, and Sally Walker in South Jersey provided the blacklight trap specimens for assessing adult moth populations. The combined data from these 25 sites was mapped using Global Positioning System (GPS) and Geographic Information System (GIS) technology and graphically presented by Marilyn Hughes of the Center for Remote Sensing. As seen in this graphic, we can use this new technology to locate, analyze and visualize the spatial distribution of the pest on a weekly basis. Hopefully these trap catches will eventually serve as an additional tool for predicting the probability of pest damage later this season, and in future years throughout various parts of our state. At this time, we have no historical baseline of information to compare current trap catches against because this pest has never been reported in such massive numbers for at least 30 years. This adult survey is a “work in progress”; an initial “recon” expedition against a new “enemy” for the turfgrass industry.

From the graphics of the last 2 weeks in July, we see the initial central Jersey surge for the July 16 - 23 time frame which may reflect the “Next Generation” of adults, with some average nightly trap counts of almost 40 moths per trap, especially northeastern Monmouth and northwestern Mercer Counties. The following week reveals a shift northward of higher armyworm adult populations; perhaps related to slightly cooler weather conditions. Assuming most mating occurs at these trap peaks leads to a tentative population prediction of egg laying this first week in August followed by early instar larvae in the second and third weeks. Look carefully for them now. This pest often occurs in very erratic numbers on a site to site basis. Your specific site reconnaissance is our first line of defense in forecasting future armyworm outbreaks. For specific armyworm control see control on page 3.
**Plant Diagnostic Laboratory Highlights**

*Richard Buckley, Plant Diagnostic Laboratory Coordinator*

**Turfgrass**

The calm before the storm! If I wrote this last week, I would simply have commented on how dry things were, but now I can mention the heat and humidity! Generally, heat spells precede a major die-off of turf on golf greens. We assume that most of you are busy syringing and spraying to ward off disaster. Good Luck and we'll see you in two weeks!

With the samples that we are getting, Anthracnose is still the main problem. Summer patch is also common in recent submissions. Finally, we are seeing very high nematode populations on certain golf greens.

Brown patch is still an issue on residential turf at this time. Samples of brown patch were submitted from landscape turf all over the state. We have also seen several samples of summer patch on Kentucky bluegrass and fine fescue lawns.

The gray leaf spot scare continues. To date, we have only one confirmed diagnosis, but many suspects. I have been hearing about the disease in the field, but consider most of the reports to be misdiagnosis. The samples with suspect gray leaf spot that come to our laboratory at this time turn out to be dry spots, brown patch, or other leaf spot diseases – like brown blight or fading out. Historically, we see most gray leaf spot samples in mid-September. At any rate, it is important to be vigilant in your monitoring program and to get an accurate diagnosis before expensive fungicide treatments are made. All of us on this side of the business agree that it is tough to get an accurate diagnosis without skilled microscope use, so proceed carefully (and give us a call) with your decision making process. Better safe than sorry!

**Greenhouse**

A Morris County grower submitted a sample of torenia with abnormal growth that was diagnosed with broad mites.

**Landscape**

This week was canker and scale week in the laboratory. Fusicoccum canker was identified on Russian olive from an Ocean County landscape. Bolryosphaeria canker was found on holly from Atlantic County and Crabapple from Mercer. Atropellis canker was diagnosed on a pine from Morris County. We also had our fair share of scale. Oak lecanium scale was found on an oak from Somerset County. White prunicola scale was diagnosed on lilac and cherry from Morris and Camden Counties, respectively. What an awesome site, thousands of white prunicola scale crawlers all over the bark! Pine oystershell scale was identified on pine from Monmouth County. We must also report on the roving party of spider mites. This week the mites were found on linden from Bergen County and euonymus from Burlington County. Has anybody else noticed all of the bagworm this season? They are tearing up on the spruce in the Central Jersey area.

**CONTROL FROM PAGE 2**

recommendations, please refer to the June 28 and July 26 issues of the Plant and Pest Advisory by Albrecht Koppenhofer.

A final note - Since Monmouth County was one of the first extension offices inundated with client calls concerning this emergency, a special pheromone-based system at 22 sites was also implemented to selectively monitor male adult moth emergence. Surprisingly few adult moths were captured in the pheromone trap compared to the light trap numbers. Further investigation reveals approximately a 50 to 1 sex ratio in favor of the females (who comprise 98% of the current adult population that are light-trapped – a lot of egg layers and a lot of work for the males if this initial finding from sexing almost 2000 adults holds up in future assessments). Check the RCE website for further information – www.rce.rutgers.edu.
White Grubs in Turfgrass: Early Detection, Sampling and Monitoring Damage Thresholds

Albrecht M. Koppenhöfer, Ph.D., Turfgrass Entomology

White grubs damage turf by chewing off roots close to the soil surface. In hot, dry weather, this can lead to quick loss of turf. All cool-season and many warm-season grasses are susceptible to white grubs. Being alert to the signs and symptoms of white grub infestations will help avoid unexpected loss. Early signs of a white grub infestation include gradual thinning, yellowing, wilting in spite of adequate soil moisture, and the appearance of scattered, irregular dead patches. The patches grow and may join together until large turf areas are affected. Due to the grubs’ tunneling activity, infested turf feels spongy underfoot and can be pulled up easily, exposing the C-shaped white grubs. Secondary often more severe damage can be caused by vertebrate predators (e.g., birds, skunks, raccoons), that tear up the turf to feed on the grubs.

Mid- to late August, when the grubs are primarily 2nd instars, is the time to monitor for potentially damaging white grub populations. In New Jersey, the adult white grub stage (e.g., Japanese beetle, oriental beetle, masked chafer, Asiatic garden beetle) lays eggs between late June and mid-August. Egg stage, 1st instar, and 2nd instar each last about 3 weeks. By late September populations will primarily consist of 3rd instars. It is the late 2nd instars and especially the large 3rd instars that cause turf damage in late summer and fall and that attract predators.

The only way to accurately determine the presence of white grubs is through examining the upper 3-4” of soil under the turf. Most conveniently, turf/soil plugs are sampled with a standard golf course hole cutter (4.25” diam ~ 0.1 ft²). More tedious is the use of an oversized hole cutter (6” diam ~ 0.2 ft²; “turf mender”) or cutting a square-foot sample with a flat-blade spade. The plugs can be broken up and examined on the spot (preferably on a tray). To improve sample survival, split the soil end of the sample first into halves and then quarters and smaller pieces to reveal the grubs that typically will occur near the thatch-soil interface. Record the number, species (check raster pattern with a hand lens), and life stages on a data sheet or map. Place the soil back in the hole and replace the sod cap. Irrigate to promote turf recovery, especially when dry. Because white grub populations have a patchy distribution, several samples should be taken in a grid pattern. Rarely does an entire turf area require treatment.

To save time and effort, sampling can be concentrated on suspected infestation areas, high risk or low tolerance areas, or areas with a history of grub infestations. If historical information is not available and/or a more accurate idea of grub distributions is necessary, mapping and surveying is the thing to do. Using graph paper, prepare a general map of the turf area including landmarks. Mark sampling spots at 6-10 feet (lawns) or 10-20 feet (sports fields) apart in a grid pattern. At each spot take a sample and record number, species, and stage of grubs found (also record 0s!). Golf course fairways can be sampled by taking samples in a zigzag pattern every 10-15 feet starting from about 5 feet in from the rough throughout the length of the fairway. Alternatively, samples can be taken 10-20 feet apart along 3 to 4 parallel transects throughout the length of the fairway. Experienced samplers can process about 20 samples per hour.

Mid- to late August, when the grubs are primarily 2nd instars, is the time to monitor for potentially damaging white grub populations.

To determine whether treatment is required, transform the grub numbers into ‘per ft²’-values and compared to damage thresholds. Most published damage thresholds lie in the range of 6-10 (Japanese beetle, oriental beetle, European chafer) and 15-20 (Asiatic garden beetle) grubs per ft². However, damage thresholds vary considerably with grass species, management type, and climatic conditions. In well-maintained tall fescue plots I have repeatedly observed grub densities in the range of 30 to 60 grubs per ft² without any signs of turf damage. With experience, turf managers should develop their own range of thresholds for the various turf areas they are responsible for.
White Grubs in Turfgrass: Curative Treatments
Albrecht M. Koppenhöfer, Ph.D., Turfgrass Entomology

If soil sampling has revealed white grub populations, areas with densities above treatment thresholds or ongoing damage may need to be treated. This curative control approach works best if applied while the grubs are still smaller (i.e., mid August to early September). Monitoring and sampling (see article in this issue) will help you optimize application timing and allow you to restrict treatments to areas that actually have high grub populations. Once the grubs have reached the 3rd instar, they are much harder to control.

Curative treatments applied in spring (late April through May) are generally the least effective and rarely justified because the grass can outgrow most grub populations. Only extremely high grub populations, unduly stressed turf, or digging grub predators can cause damage at this time. Any necessary treatments need to be applied before the grubs pupate. Due to the annual life cycle of the grubs, areas that had no damaging infestation or were successfully treated in the previous late summer/fall, will not need treatment in the following spring.

Successful treatments typically kill 75-90% of the grubs, but product performance varies with soil type, thatch thickness, and grub species. Therefore, evaluate treatments and keep record of product performance.

While speed of kills varies with insecticides, soil insecticide applications never work overnight. Affected grubs usually turn yellow or brown within a week of treatment. Wait at least 1-2 weeks before evaluating. But don’t wait longer than 3 weeks to allow for a follow-up treatment if the 1st treatment was ineffective. In the latter case, don’t apply the same product again at a rate exceeding the label rate. Rather, try a different compound.

While development of grub resistance to insecticides is unlikely with the presently used short-residual insecticides, some grub control failures can be caused by enhanced microbial degradation of the insecticide, especially after repeated insecticide use. Avoid unnecessary applications and alternate insecticides.

Finally, some comments on insecticides presently available for curative grub treatments. Organophosphates include chlorpyrifos (Dursban), Diazinon (Diazinon), ethoprop (Mocap), isofenphos (Oftanol), and trichlorfon (Dylox). Carbamates include Bendiocarb (Turcam) and carbaryl (Sevin). Among these, chlorpyrifos and bendiocarb are restricted use insecticides. Chlorpyrifos use is also being increasingly restricted, especially with concern of potential exposure to children. Diazinon and isofenphos cannot be used on golf course and sod farm turfs. Chlorpyrifos binds strongly to organic matter in the soil and is a poor choice for thatchy lawns; rather use trichlorfon or bendiocarb. Trichlorfon is also the fastest acting insecticide. Nematode products for grub control contain the species Heterorhabditis bacteriophora, Heterorhabditis megidis, or Steinernema glaseri. These nematodes can be very effective against Japanese beetle and masked chafer grubs, but are not effective against grub species of oriental beetle, Asiatic garden beetle, or European chafer.

Use of the growth regulator halofenozide (Mach2) and the neonicotinoid imidacloprid (Merit) is generally not recommended for curative control. While they may still provide good overall curative control depending on grub species (see my article in 6/28 issue), their speed of kill is too slow to prevent impending turf damage. 

For best results with any insecticide, mow the turf and rake out dead grass and thatch before treatment. This will reduce the amount of insecticide bound up by surface debris. Irrigate with 0.5-1” water immediately after treatment (or timely rainfall) to leach the insecticide into the root zone where the grubs are feeding. Irrigation also increases insecticide contact by drawing the grub closer to the surface. If the soil is very dry, pre-treatment irrigation will also increase efficacy by bringing grubs closer to surface and reducing thatch binding and evaporation of liquid treatments. However, do not apply soil insecticides to saturated soil. Also, granular formulations need to be applied to dry grass to allow the granules to sift down into the thatch. Liquid and granular applications are usually equally effective, however, granular formulations may be more forgiving if post-treatment irrigation is delayed.
Diseases of Turfgrass

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

**Basal Stem Rot 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 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, and raise the cutting height (when possible). Apply Banner, Bayleton, Chlorthal, 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 have been obtained with a tank mix combination of Bayleton 50W (1 oz/1000 ft²) + Daconil Ultrex 82.5WDG (2.8 to 5.5 oz/1000 ft²) or Cleary 3336 50W (4 to 6 oz) + Daconil Ultrex 82.5WDG (2.8 to 5.5 oz/1000 ft²). Avoid the use of Prostar on turf infested with anthracnose since this product has been shown to enhance this disease when conditions are conducive for its development.

**Marasimus**

There have been numerous reports recently about the appearance of small mushrooms protruding from brown leaf blades. These structures, belonging to the fungus *Marasimus*, are approximately 1/2 to 3/4 inch in length and consist of a dark brown stem and a small tan to orange colored cap. *Marasimus* often appears in areas that have been thinned by brown patch. Although this fungus may appear to be pathogenic, it is actually invading dead and dying tissue and thus is not a threat to the surrounding turf.

**Pythium Blight**

*Pythium blight* has been quite active on golf and landscape turf during the past week. Since pythium thrives in low or poorly drained areas, especially when the night temperatures are above 70°F, we should see a lot more of this disease as the “hot muggy” weather continues this summer. For best results, improve drainage, water in the morning hours, avoid over fertilization, and apply Aliette, Banol, Heritage, Koban, Prodigy, Quell, Subdue MAXX, or Terrazole, according to the manufacturer's recommendations.

**Yellow Ring**

This disease, caused by the fungus *Trechispora alnicola*, is evident on Kentucky bluegrass lawns and sod fields at this time. Patches are usually 1 to 2 feet in diameter. Affected areas consist of green grass surrounded by 2 to 3 inch diameter yellow rings. Upon close inspection of the thatch, a dense mat of white mycelium is often apparent. Infected turf rarely dies and rings do not always reappear the following year. Symptoms are most apparent during cloudy weather between May and October. The fungus is primarily a saprophyte which colonizes organic matter in the thatch. Since the damage caused by this fungus is purely cosmetic and the turf recovers during cool weather in the fall and spring, control is rarely warranted. In areas where symptom expression cannot be tolerated, turf managers should dethatch affected areas. PCNB has proven effective in some university tests but is not currently labeled for use against this disease. Due to phytoxicity, this fungicide should not be used on cool-season grasses during hot weather. Fungicides that suppress fairy ring (i.e., Heritage and ProStar) may aid in symptom remission.

**Yellow Tuft**

This disease, caused by the fungus *Sclerophthora macrospora*, is present on greens and irrigated landscape turf at this time. *Yellow tuft* (=Downy Mildew) occurs on almost all cool-season turfgrasses, however, it is usually only a serious problem on turf maintained at a low cutting height. Poorly drained or heavily irrigated sites are often associated with disease development. Infected turf appears stunted, off color (yellow to light green), and may exhibit slightly broadened leaf blades and dense clusters of shoots. Patches range in size from 1/4 to 1 inch in diameter for bentgrass and red fescue turfs, and 1/2 to 3 inches for bluegrass and perennial ryegrass areas. Tufts are easily removed from the soil due to the absence of adventitious roots. To control, improve drainage, avoid overwatering, mow only when the grass is dry, apply iron sulfate to mask symptom expression, and spray turf with Aliette, Prodigy, or Subdue MAXX on a preventive basis (next spring) at 21 day intervals from late March to early June.
New Books on Diseases of Ornamentals

Two new books from APS Press are now available:

Shade Tree Wilt Diseases, edited by Cindy Ash. This publication discusses the identification, diagnosis, and management of wilt diseases of shade trees, including Dutch elm disease, bacterial leaf scorch, and Verticillium Wilt. $79.00.

Diseases of Woody Ornamentals and Trees in Nurseries, edited by Ronald K. Jones and Michael Benson. This volume updates an earlier version and covers the diagnosis and control of more than 65 ornamental crops (shrubs, ground covers, and shade trees) grown in nurseries throughout the United States. $89.00.

To order, call the APS Press Bookstore at 1-800-328-7560. To order these books on-line, visit the APS Press Bookstore Web site at: http://www.shopapspress.org. Click on the button “New from APS” for descriptions of these titles and ordering information.

While visiting the site, look for other outstanding titles to supplement your library, particularly the compendia on diseases of chrysanthemum, conifers, rose, azalea/rhododendron, turfgrass, flowering potted crops, and ornamental foliage plants.


---

Nursery Twilight Meeting
Thursday, August 23, 2001
Princeton Nurseries
Allentown, NJ

DATE: Thursday, August 23, 2001
TIME: 5:00 to 7:30 p.m.
LOCATION: Princeton Nurseries, Shipping Office, Allentown, NJ
COST $10.00 per person – Registration and Food (sandwiches, salads and beverages)

Agenda:
4:45-5:30 Registration and Dinner
5:30-6:30 Dr. Steve Hart – Field and Container Weed Control
6:30-7:00 Dr. Jim Lashomb – Oriental Beetle and Mite Control
7:00-7:30 Dr. John Grande - Pesticide Application Technology
Pesticide Credits and Q & A

This program is sponsored by Rutgers Cooperative Extension of Mercer and Monmouth Counties and the Central Chapter of the New Jersey Nursery and Landscape Association.

Pesticide License Recertification Credits: Core-1, PP2-3, 3A-3

**Pre-registration is required, deadline is August 21, please use registration form below. Call Rutgers Cooperative Extension of Mercer County at 609-989-6830 for further information.

---

THURSDAY, AUGUST 23, NURSERY TWILIGHT MEETING

NAMES OF THOSE ATTENDING:

__________________________
COMPANY:

__________________________
ADDRESS:

__________________________
PHONE:

Amount Enclosed at $10.00/person- $________
Make checks payable to “Mercer County Agriculture Education Fund”
Mail before August 21 to:
Rutgers Cooperative Extension of Mercer County
Annette F. Capp
Nursery Twilight Meeting
930 Spruce St., Trenton, NJ 08648-4584
Rutgers Cooperative Extension (RCE) provides information and educational services to all people without regard to sex, race, color, national origin, disability, or age. RCE is an Equal Opportunity Employer.

Pesticide User Responsibility: Use pesticides safely and follow instructions on labels. The pesticide user is responsible 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.

Use of Trade Names: No discrimination or endorsement is intended in the use of trade names in this publication. In some instances a compound may be sold under different trade names and may vary as to label clearances.

Reproduction of Articles: RCE invites reproduction of individual articles, source cited with complete article name, author name, followed by Rutgers Cooperative Extension, Plant & Pest Advisory Newsletter.

For back issues, visit our web site at: http://www.rce.rutgers.edu/pubs/plantandpestadvisory/index.html.