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STMA – 1-800-323-3875 – www.sportsturfmanager.com

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Our membership is growing fast. Currently we have 219 members. If you haven't renewed your membership please call (908) 236-9118 in order to continue receiving this newsletter.

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DROUGHT UPDATE

DEP Commissioner Bradley Campbell has been holding "meet the Public" meetings to discuss the drought emergency. The state has been divided into six multi-county regions for drought management and each region has been having one of these meetings with the commissioner and Drought Coordinator Dennis Hart. Campbell said it is highly unlikely there will be any changes in the current restrictions before the end of the summer, regardless of rainfall improvement. The DEP re-visits the administrative order at the end of June. For updates, consult the DEP **website at www.njdrought.org** or call their hotline at 1-800-448-7379.

(This Week in Farm bureau, June 8, 02, www.njfb.org)

"RUTGERS CORNER"

"Turfgrass Species and Soil Conditions Affect Irrigation Requirements"

by Dr. James A. Murphy, Specialist in Turfgrass Management

Many factors influence the water requirements to grow turfgrass. A healthy, high-quality turf may need up to 1¾ inches of water per week to keep it growing vigorously under hot, dry, windy summer conditions. This total water requirement includes both rainfall and irrigation. Turfgrass will require much less water when the weather is cool or cloudy. Turfs that produce a deep root system will require less frequent irrigation than a shallower rooted turf. In many cases, rooting is limited by poor soil conditions and subsequently such turfs require more frequent irrigation to produce healthy vigorous growth and an acceptable playing surface.

Turf-type tall fescue will require less frequent irrigation than Kentucky bluegrass, if it can grow a deep root system. In many cases, however, tall fescue rooting is limited by poor soil conditions and, subsequently, such turfs require as much watering as Kentucky bluegrass to look good and maintain healthy vigorous growth. Perennial ryegrass will typically have poorer drought tolerance than tall fescue and Kentucky bluegrass.

Turf, or any plant, should be irrigated in a manner that applies enough water to moisten as much of the root zone as possible. A soil probe can be used to determine what the average rooting depth is in a turfed area lawn. If the roots grow down to 6 inches deep, irrigate to moisten the soil to that depth.

In addition to rooting (soil) depth, the quantity of water to apply is also a function of the soil's texture, organic matter content, structure, and bulk density. Examples of the effect of soil texture on soil water availability are provided in Table 1. From Table 1, it is evident that the amount of irrigation water applied in a single event is predicated on the soil's ability to hold water. Sands typically can only be irrigated with a ¼ to ½ inch of water at a time, whereas a silt loam can have 1½ or more of water applied in a single irrigation event (provided that the water is not applied too intensely resulting in runoff).

Continued on next page.

Continued from page 2 **"Rutgers Corner"**

Table 1. Available soil water for various soils.

Soil Texture	***Available Soil Water***
	inches per foot of depth
Sands	0.5
Loamy Sands	1.0
Sandy Loams	1.5
Loams	2.0
Silt and Clay Loams	2.5
Clays	2.0

Adding organic matter (e.g., peat, compost) to soil will increase the water holding capacity of a soil. Unfortunately, the structure of a soil is often destroyed during earthmoving operations and typically creates a very high soil bulk density. High bulk density soils will not only suffer from poor water infiltration but also low soil water availability. Thus, turf grown on soil damaged by compaction will be extremely prone to drought stress because it dries out very quickly. To improve your ability to conserve water, devote considerable effort to loosening (cultivating) any soil that is compacted during earthmoving operations. Cultivation with an agricultural subsoiler, chisel plow and discing equipment prior to establishing a turf will greatly improve the capacity of the soil to avoid drought problems (high frequency of irrigation) after establishment. ▲

CALENDAR OF EVENTS

RUTGERS

July 31 - Rutgers Landscape Turf Field Day, Adelphia Plant Science Research Station, Adelphia, NJ. *(Learn about the research on turf grasses to improve your turf).*

August 1 – Golf & Fine Turf Research Hort. Farm II – Ryder's Lane, North Brunswick, NJ

For information call: Bea Devine (732) 821-7134 or Dick Caton (856) 853-5973 or (732) 932-9711 ext. 135.

Pesticide Recertification Credits Offered On Both Days

SFMANJ

August 8 – Field Day at Bernards Twp's Harry Dunham Park, a day loaded with equipment demos, five ways to attack your goal mouths, writing specs, maintenance programs and more. 8:00am to 3pm. Fliers were mailed in June. Call Eleanor at 908-236-9118 for info.

NEW JERSEY RECREATION & PARKS ASSOC.

September 25 – Skatepark Risk Management Workshop - 9:00 am to 1:00 pm

Red Hill Activity Center, Middletown, NJ

Contact: NJRPA at (732) 568-1270

Registration: $80.00 NJRPA member, $100.00 non member

NEW JERSEY TURFGRASS ASSOCIATION

December 10-12 - New Jersey Turf and Landscape Expo 2002 , Taj Mahal, Atlantic City, NJ. *(Athletic Field Educational Sessions begin Wed., Dec.11 from 4pm to 6pm. & Thurs. Dec. 12 from 10am to 3:30pm with annual SFMANJ meeting at 1pm, Thursday).*

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Did you know? If you store your string trimming line in a bucket of water it will remain softer, less brittle and will last longer.

"GIVE IT WHAT IT NEEDS"

"Selection of Topdressing Materials" by Jim Hermann

The following information is based on practical experience (some good, some bad) and a great deal of research. It is one person's opinion offered as food for thought and does not promote the use of any specific products or materials. It should be pointed out that there are exceptions to the principles and situations discussed that go beyond the scope and complexity of this article. This article is directed to the Public Works departments, Parks departments and all those whose job it is to maintain native soil fields, many of which are heavy textured, problem fields. The intent is to bring attention to some of the considerations necessary when selecting a topdressing material. It should be mentioned that there are very few absolutes in this or any other area of athletic field management.

In order to have a successful topdressing program, it is necessary to have an understanding of a few very basic physical properties of soil.

Soil is made up of sand, silt and clay (physical analysis). The proportion of each is what determines the coarseness or fineness (texture) of a soil.

New Jersey soils can vary from very fine, heavy textured clayey soils to very coarse, light textured sandy soils, depending on the location. Therefore if the same topdressing material is used on different locations it may have different results. Maybe good, maybe not so good.

Soil is divided into 12 different classifications based on texture. The lower the corresponding number, the heavier and finer the texture.

These classifications are:

1. Clay
2. Silty Clay
3. Sandy Clay
4. Clay Loam
5. Silty Clay Loam
6. Sandy Clay Loam
7. Loam
8. Silt Loam
9. Sandy Loam
10. Silt
11. Loamy Sand
12. Sand

Note: The number assigned to each classification is used solely for the purpose of understanding and clarification and is not a universally accepted means of classification.

It is important to know the texture of the soil in your root zone. A physical analysis of your soil will give you this information. Most soil testing laboratories provide this service.

Water movement

It is a generally accepted fact that water will permeate sand faster than it will permeate clay. You will notice clay and sand are at opposite ends of the soil texture list. Sand is coarse or light textured and clay is fine or heavy textured. Keeping this in mind, you can assume water will infiltrate sandy loam (#9) faster than silty clay loam, under most conditions (#5). Likewise silt (#10) usually has a higher percolation rate (hydraulic conductivity) than loam (#7). Hydraulic conductivity is a term used to describe the ability of a soil to transmit water. (Natural Turf for Sports and Amenity, Adams and Gibbs 1994).

It should be mentioned that in addition to the proportions of sand, silt and clay in a soil, the coarseness or fineness of the sand portion, (it's particle size distribution or sieve analysis) also has an effect on the physical properties and water conductivity) of a specific classification of soil.

Example: A medium size sand with a relatively consistent particle size (lower gradation index) usually has a higher rate of hydraulic conductivity than a material containing a more diverse blend of coarse, medium and fine particles, (higher gradation index) such as quarry screenings. As you are probably well aware, quarry screenings can pack like concrete. This is due to the higher gradation index or broad range of particle size distribution.

A principle to remember; water will move from a coarser textured soil to a finer textured soil more readily than the other way around, providing there is adequate pore space between the particles. For this reason, always try to topdress with a material that has the same or coarser texture than the existing root zone of your field (coarser is better, within limits). Always seek the advice of an agronomist or turf consultant when selecting a topdressing material.

When using any material to modify an existing root zone, adequate cultivation is necessary to insure proper incorporation of the material. The more a topdressing material varies from the existing root zone in relation to its texture classification and physical properties, the more cultivation is typically needed.

Without adequate cultivation there remains a very real potential for layering in the soil. Anytime there is a layer created in the soil, the interface between the layers will have the potential to negatively effect hydraulic conductivity, root penetration and even air and gas exchange characteristics of the soil.

Purpose

Before you can determine the proper topdressing material to use, you must first determine why you are topdressing. What are you attempting to accomplish? A few reasons for topdressing are:

- Modification of existing root zone
    - Increase water conductivity
    - Increase organic matter content
    - Increase tilth
    - Increase (Cat ion Exchange Capacity)
- Increase success rate of renovation thru improved soil seed contact
- Smooth a rough uneven surface

Continued on next page.

Root zone Modification

There are as many reasons to modify a root zone as there are soil classifications and growing conditions. Two common materials used to modify a root zone are organic matter (in the form of compost) and sand. Caution must be practiced with either material.

In certain situations, sand can be used to ensure that the playing surface is smooth and firm under wet conditions. It does not improve drainage unless cultivation and topdressing reach a soil depth below the surface that has improved water percolation. If improved drainage is the prime focus of your topdressing program, be sure there is somewhere for the water to go. Be sure there is an outlet. Another approach to improve drainage is to combine sand-based topdressing with vertical/slit drains.

The use of sand as a topdressing material should not be justified merely because it is an inexpensive material. A heavy textured soil requires a tremendous amount of sand, applied over a period of years to have a positive effect on hydraulic conductivity and that's if there is an outlet.

It is important to understand the physical characteristics (sieve analysis & gradation index) of the sand you are using. A steady supply of a uniform material, which conforms to very specific guidelines, should be consistently available. Variations in material uniformity can void the success of the most well planned program. An agronomist can best prescribe these specifications.

Leaf compost is being used more and more to topdress athletic fields. Production by private and public recycling plants alike has made it a widely available material. It is sometimes blended with fine sand and sold as organic topsoil. The benefit to incorporating compost into the root zone is realized through the addition of organic matter.

The addition of organic matter can provide a number of benefits. In a light sandy soil, organic matter can be of benefit by increasing the ability of the soil to retain moisture. This would be classified as an increase in "field capacity". Field capacity is the upper limit of water storage in a field layer after excess water has drained through due to gravity. This increase can maximize irrigation efficiency.

The incorporation of organic matter into a soil adds essential plant nutrients. Depending on the source of the organic matter, this "fertilizer effect" can be substantial and could replace one or more applications in a fertilization program. Organic matter can also increase the ability of a soil to retain nutrients. This increase is known as an increase in CEC (cation exchange capacity) This increase is not usually necessary with heavy textured clay soils but may be of benefit in sandy soils. Note that it takes a tremendous amount of organic matter to increase soil CEC. Thus, in most situations, the benefit of incorporating organic matter is more a result of increased water retention and nutrient addition, than increase in CEC.

The addition of organic matter can decrease the compactive tendencies of a soil and over time help to improve the soil structure (tilth) of a heavy textured soil. Tilth can be associated with the soft, fluffy texture of a well-maintained garden soil. A lack of tilth can be associated with the hard clumpy soil of a goalmouth. The benefits of organic matter can be realized in all areas of an athletic field but more noticeably in high traffic areas where existing soil structure has been destroyed.

Once soil structure is destroyed the ability of the soil to drain and maintain turf cover is severely compromised. The result is a weed-infested area of high compaction. A major cause of this destruction is playing games in wet waterlogged conditions where the soil is actually smeared under the stress of heavy foot traffic.

Materials similar to leaf compost are sewage sludge and spent mushroom compost. These materials are much the same as leaf compost in that they have high organic content but many have the added benefit of higher nutrient availability and therefore the potential for a greater "fertilizer effect".

As with any topdressing material, care must be taken when acquiring and applying compost. A quality compost material should be composted for at least a year prior to purchase and be properly screened to eliminate all twigs and debris. It should show no resemblance to its original components and have a clean earthy odor.

The results of a compost analysis report should be requested prior to purchase. These results should supply a minimum of pH, % organic matter, soluble salt levels, heavy metal levels and the Carbon:Nitrogen (C:N) ratio. Also included with these test results, should be a reference made to the acceptable levels of soluble salts and heavy metals. If it is a blended material it should carry a physical (sand, silt, clay) analysis and have a texture classification such as loamy sand, sandy loam etc. A chemical analysis is also useful in determining the potential "fertilizer effect" of a topdressing material.

The C:N ratio is used as a barometer to measure the level of decomposition and should be less than 30:1. Higher C:N ratios can cause nitrogen supplies in the soil to become temporarily unavailable to the turf until the C:N ratio is reduced through further decomposition. This can have a negative effect on turf quality.

After acquiring a compost material, a test should be done by your soil-testing laboratory to insure conformity to the compost analysis. *Continued on next page...*

With compost materials, as with any other topdressing material, care must be taken to provide adequate cultivation in conjunction with the topdressing procedure. As was stated earlier, the more a topdressing material differs from the existing root zone, the more cultivation is necessary to blend the two materials. This is done to minimize the effects of layering. Applying highly organic compost to a mineral based soil such as is the predominant soil in NJ, brings with it the risk of layering. If adequate cultivation is not provided, this risk can become greater with each subsequent application. In this particular situation more is not necessarily better. An anaerobic organic layer (black layer) in the soil is a potentially devastating problem on athletic fields

Timing

Cultivation in conjunction with topdressing should be accomplished during times of the year when there is adequate moisture available, the turf is actively growing and is in a position to repair itself. With cool season turf such as Kentucky bluegrass, perennial rye and tall fescue, spring and fall typically represent the optimum conditions for topdressing and aerification. Topdressing materials with high organic matter content such as straight compost materials should not be applied when there are inadequate moisture levels or when there is the potential for drought stress. These materials have the ability to rob the turf of available moisture when moisture is in limited supply.

Core Aerification

Core aerification is generally the recommended means of cultivation with any topdressing application. Multiple passes done in different directions are typically recommended. Again, the intensity of the aerification procedure is governed by the extent of texture variation between the topdressing material and the root zone. When root zone modification or turf renovation is the intent of a topdressing application, multiple passes to provide a coring pattern of a maximum distance between core holes of 2" and at a depth of 2" to 3" is recommended. The application of topdressing should be accomplished prior to core aerification. The cores, along with the topdressing should be dragged into the core holes using a drag mat at the completion of the procedure. If a more rapid change in the surface conditions is desired, the soil cores can be removed after aerification; in this case it would be appropriate to topdress after soil cores are removed.

Where severe soil structure damage has occurred such as in goalmouths, it is sometimes necessary to till the area in an effort to blend the topdressing material with the damaged soil and create an adequate seedbed.

Be wary of over-cultivating with the rototiller style of equipment, especially if the soil is to dry. Rototiller style cultivators can actually destroy existing soil structure by pulverizing the soil into a fine grainy (dusty) material if over used. As with most soil cultivation procedures, the soil should be moist enough to hold its shape after being clenched in your fist but dry enough to crumble if rubbed between your thumb and forefinger.

Smoothing Roughness

It is not uncommon among sports field managers and contractors alike to incorporate topdressing into a renovation project. Topdressing can not only smooth and therefore improve the topography of a field, but also improve soil seed contact, which is critical to the success of an athletic field renovation.

Continued on next page...

When renovating an athletic field, it is recommended that a material very similar to the existing root zone be used for the purpose of filling holes and depressions. Once an acceptable contour is achieved, a material that provides the objectives of a desired root zone modification program can be used.

Example:

A soccer field was renovated that consisted of a heavy textured loam root zone. The center portion of the field was approximately 50% turf cover. The goalmouths and center circle were extremely depressed, along with the coaches and players. Years of abuse and inadequate maintenance had produced a very compacted soil with severely compromised soil structure.

It was August of "99", the year of the drought. The core aerator wouldn't penetrate the ground 1/2". For this reason the field was aeravated twice over using a solid tine vibrating aeravator. After which it was topdressed with 100 cu. Yds. of screened topsoil, taking care to add additional topsoil in the holes and depressions. The objective of this part of the renovation procedure was to smooth the field. The screened topsoil was very similar in texture to the original root zone.

Screened, mineral based native topsoil, available at many landscape supply companies, is one of the most difficult products to control consistency and quality. Every load has the potential to be different. It can come from many different locations before it reaches the retail supply company.

We found a supply company that had only one topsoil supplier. His product looked to be fairly consistent from month to month and the random tests we had done were acceptable to us.

Once the field was smooth we topdressed with an additional 50 yards (1/4") of 60/40 mushroom compost, sand based topsoil blend that was classified as a sandy loam. This material was a somewhat lighter (coarser) textured material than the screened topsoil used to smooth the field. This particular material was composted for three years, which gave it physical characteristics more typical of soil than compost. It was also vapamed; a treatment which, I understand, kills unwanted seeds.

If you are working with a limited amount of topdressing, once you have smoothed the major depressions and wear areas, always start topdressing in the middle of the field, up one side of the centerline and down the other side, working your way out to the sidelines. In this way, if you run out of material, it's typically in an area of lesser need. With heavier applications apply at half rate and work the same way, from the middle of the field to the sidelines and then back starting in the middle again. The more severely damaged areas down the middle will receive the most topdressing.

The field was seeded using the aeravator equipped with a seed box calibrated at half rate. We aeravated and seeded twice over which helped to incorporate the 60/40-compost blend with the base. The field was then dragged with an infield drag mat to further aid in soil seed contact and smooth the field.

Topdressing Thru Core Aerification

The most economical means of topdressing a field is through core aerification. By pulling cores and depositing them on the surface, you are topdressing your field with a material that is 100% compatible. If you core aerate to an average depth of 2.25" with ¾" tines and maintain a maximum distance of 2" between holes you will bring up the equivalent of ¼" cover of material over the entire area. On an average size soccer field this is approx. 58 cubic yards. If you figure the cost of a topdressing material, this is a very cost effective procedure.

In most situations topdressing should be viewed as a discretionary tool available to the athletic field manager. When used properly, it can provide beneficial results which, in certain situations, could not otherwise be achieved as effectively. The cost of these benefits must be justified when compared to all other available options. ▲

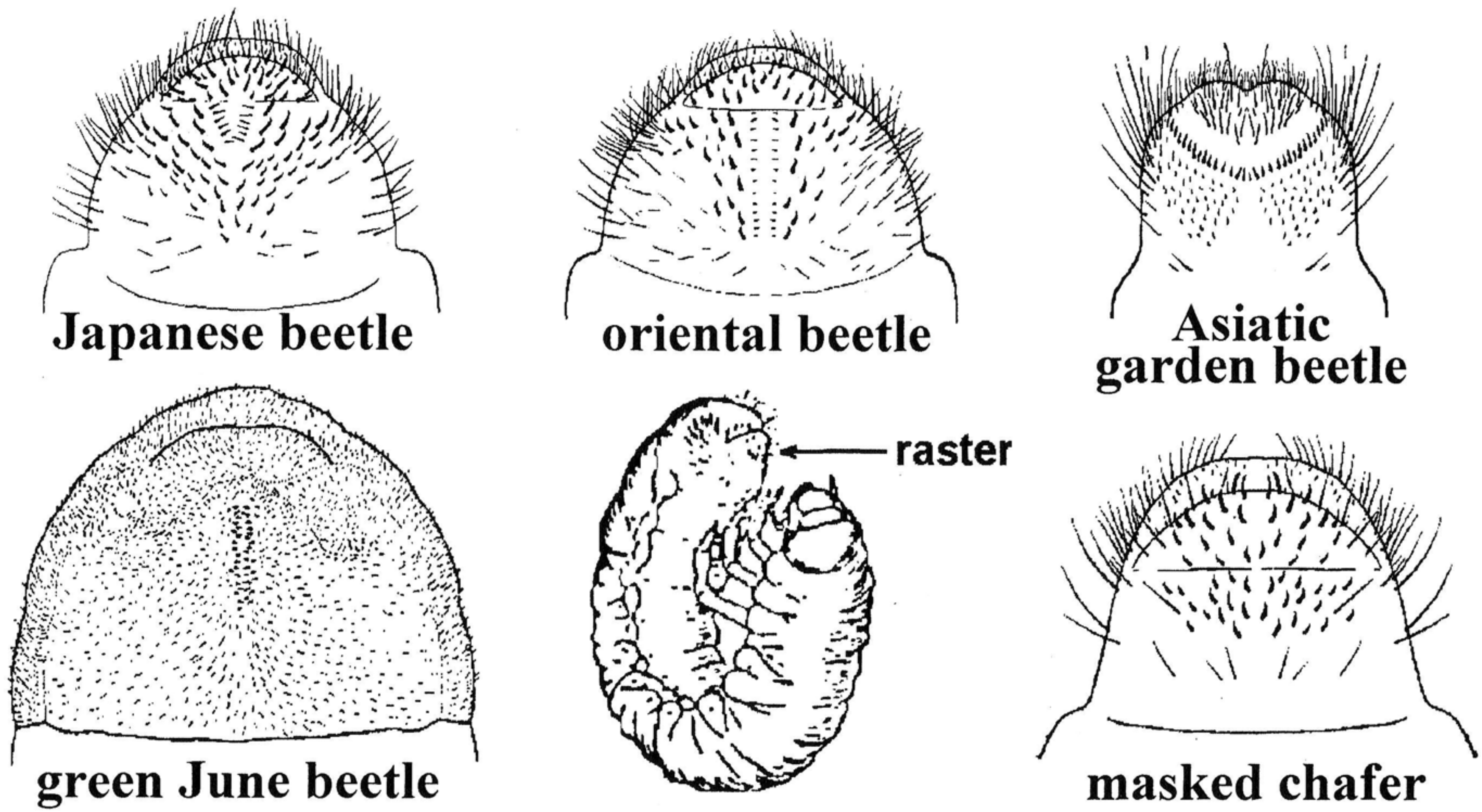

Fig. 1. Raster patterns of important white grub species in New Jersey (drawings courtesy of D. Shetlar).

READ ARTICLE "White Grub Management in Athletic Field Turf" on page 10

"WHITE GRUB MANAGEMENT IN ATHLETIC FIELD TURF"

Biology of the white grub complex by Dr. Albrecht M. Koppenhöfer[1]

In the northeastern USA, a complex of primarily introduced white grub species are the most widespread and destructive turfgrass insect pests. Until recently, the Japanese beetle (*Popillia japonica*) was regarded as the key species, but surveys have indicated that the oriental beetle, [*Exomala* (=*Anomala*) *orientalis*] has become the most important white grub species in New Jersey and some neighboring areas. Thus, the average white grub species composition in New Jersey home lawns in fall 2001 (5 counties, 61 sites, primarily central NJ) was 63% oriental beetle, 14% Asiatic garden beetle (*Maladera castanea*), 9% northern masked chafer (*Cyclocephala borealis*), 8% Japanese beetle, 4% May/June beetle (*Phyllophaga* spp.), and 2% green June beetle (*Cotinis nitida*) (Koppenhöfer et al. unpublished data). Another species, the European chafer (*Rhizotrogus majalis*) is the major low maintenance turfgrass pest north and west of New Jersey and may be more common in northwestern counties of New Jersey. However, it is important to keep in mind that species composition can vary considerably among sites.

Different white grub species can vary significantly in susceptibility to different control agents. Therefore proper species identification can be critical. The safest way to identify white grub species in the larval stage is to examine the raster pattern just in front of the anal slit on the grub's underside (Figure 1, see insert). Identification is the easiest when the grubs are 3rd instar larvae but at this point, the damage is often already done or impending. Therefore, identification should be done when grub populations are being monitored to determine whether curative treatments are necessary, i.e., in mid August.

Although the general life cycle of the important white grub species is very similar, the egg-laying period (major target for preventive treatments) and accordingly the occurrence of the voracious 3rd larval stage can vary by a few weeks among species; another reason for obtaining knowledge about the prevalent species in a turf site. Adult beetles emerge between June and August, mate, and the females return into the soil to lay eggs (total of about 20-60) in several batches over a period of 2-4 weeks. The egg stage, 1st larval stage, and 2nd larval stage each last about 3 weeks so that through September most of the grubs will molt to the 3rd and last larval stage. As the soil temperatures cool down in October, the grubs move to deeper soil layers to stay below the frost line to overwinter. During this time most species are more or less inactive. As the soil temperatures warm up in spring, the grubs come up to the root zone to feed for another 4-6 weeks in April and May before they pupate in the soil.

Signs of infestation

White grubs damage turf by chewing off roots close to the soil surface. The voracious feeding of the larger late 2nd stage and 3rd stage grubs, when combined with hot and dry conditions, can result in quick and extensive loss of turf from late August through mid-October. 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., crows, skunks, raccoons), that tear up the turf to feed on the grubs.

Early detection, sampling and monitoring, damage thresholds

Mid- to late August, when the grubs are primarily 2nd instars, is the time to monitor for potentially damaging white grub populations. 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 ft^2). More tedious is the use of an oversized hole cutter (6" diam ~ 0.2 ft^2; "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,

Continued on next page...