CORNELL UNIVERSITY TURFGRASS TIMES

CUTT

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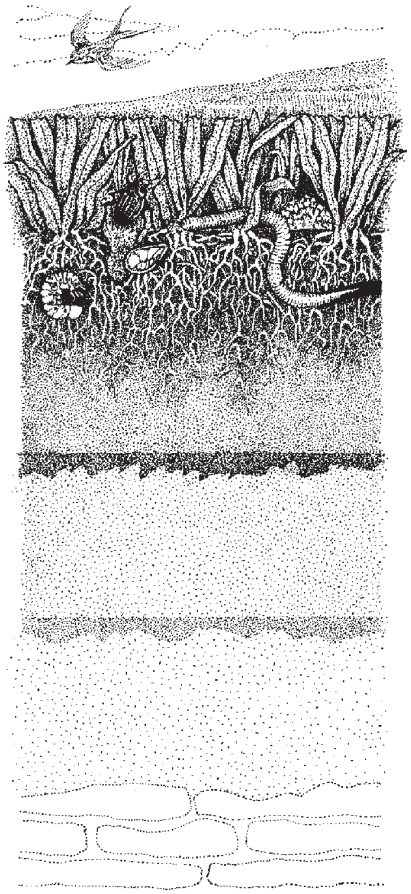

When A Sand is Not Just Sand

Imagine spending $300,000 to construct a new sports field or 18 golf greens out of sand, and then find that they don't drain or are extremely hard. Is this possible? You bet it is! Unfortunately, it happens far too often.

Sports and golf turf areas are increasingly being built with sands, or soils modified with large amounts of sand. Sands with uniform particle size will resist compaction, provide excellent surface drainage and soil aeration. Selecting the proper sand, however, is most important to achieve these characteristics. I often remind people that sand is also used in concrete, mortar, and bricks ■

What Sands Are Best?

Sand is a loose granular material that formed through the weathering of rock. A technical definition of sand is a soil particle between 2 and 0.05 mm in diameter. Sands found in New York State can be either quartz calcareous. Quartz or sand is generally preferred as a growth medium because it is chemically inert. The chemical and physical makeup of turf areas constructed with quartz sands should change very little through time. Natural deposits of quartz sands can be found near Rome, NY, much of the Adirondacks, the Catskills, and Long Island. Quartz sands are also available from several out of state sources (Table 2).

More common in New York are the calcareous sands. Formed from limestone rock, calcareous sands may contain as much as 15% free calcium carbonate (lime). These sands will therefore have a high pH, and are well buffered from any attempts to change pH. Calcareous sands are very chemically active, and very prone to further weathering. Despite these drawbacks, many successful installations have been made with calcareous sands.

The particle size and uniformity of a sand are of greater immediate importance than the chemical makeup. Many terms are used to describe sands, including masonry, block, plaster, construction, trap, and others. These terms are descriptive of the intended use of the sand, but say nothing of its particle size or uniformity. To

continued on page 4

This Times

Short Cutts

NYS Turfgrass Association and Cornell present 1990 Turf and Grounds Exposition Conference and trade Show Nov. 13 - 16, 1990 Rochester Riverside Conference Center, Rochester, NY

Please turn to page 7 for CUTT *subscription information.*

Faculty, Student, and Staff Update

There have been a few face and title changes in the Turfgrass Science Program at Cornell in recent months. Norm Hummel has been recently promoted to Associate Professor with tenure.

Bob Vavrek, a Ph.D. candidate with Marty Petrovic, has been working as a North Central agronomist for the USGA since April. Bob expects to complete his degree this fall.

Allen Maloney is working in Eric Nelson's program as a post-doctoral assistant. Eric was recently awarded a USDA competitive grant for $100,000 over two years to support Allen's project. The title of the project is "Role of Bacterial Adherents to Fungal Cell Surfaces in the Biological Control Properties of the Bacterium *Enterobacter cloacae*".

John Gowan has joined the program as a technician in Norm Hummel's program. John brings into the program 22 years of experience as a technician in both the Ecology and Entomology departments. John's position is partially funded by the New York State Turfgrass Association through the matching funds program.

Speaking of grants, the New York State Turfgrass Association recently awarded Cornell $30,000 in support of research through the matching funds program. This represents a very important contribution to our program. Besides John Gowan's position, matching funds donations partially support technicians in the programs of Joe Neal, Eric Nelson, and Mike Villani. The funds are also used for maintenance of the research facilities as well as pesticide analysis costs in Marty Petrovic's leaching studies.

NYSTA Turf and Grounds Exposition

The New York State Turfgrass Association in cooperation with Cornell University proudly announces plans for the 1990 conference and trade show. The Turf and Grounds Exposition will be held November 13 - 16 at the Rochester Riverside Convention Center, Rochester, NY.

The conference begins with three special seminars on November 13. The seminar options include Human Resources Management, Right to Know and Hazardous Materials Communication, and Back to Basics (Turfgrass Management).

Featured speakers this year include Ken Kaiser, American League Umpire; Steve Whitemen, San Diego Stadium, and several others. Featured topics include pest management, greens construction, and alternative landscapes.

A trade show with over 300 exhibits will display the latest in turfgrass and landscape maintenance equipment and supplies. Conference brochures and additional information can be obtained from NYSTA by calling 800-873-TURF.

The Use of Cornell's Name

It has been brought to my attention several times in the past few months that companies selling products or services have been using Cornell's name to promote their product. Products have included everything from topdressing to seed mixtures, to maintenance programs. A couple of companies who have products included in Cornell tests are taking the liberty of saying that Cornell "is using our product" sometimes "with great results".

Maybe we should be flattered, but we are not. Cornell University, because of our position as a land grant institution, cannot endorse any product. We would appreciate it if you brought these claims or products to our attention. Also, we would be happy to comment on any product we have experience using. **-Editor**

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Biological Control Of Snow Mold

Gray snow mold caused by *Typhula ishikariensis* or *Typhula incarnata* is a major winter disease in New York. Canadian researchers have reported that gray snow mold was reduced where they applied a strain of *Typhula phacorrhiza.* This biological control showed great promise over a three year period. Increasing the rate of *T. phacorrhiza* resulted in: 1) a reduction in intensity of snow mold injury, 2) a reduction in time required for the turf to recover from injury, 3) increased the number of scerotia of *T. phacorrhiza*, and 4) decreased the number of scerotia of *T. ishikariensis* and *T. incarnata.*

(From: M. B. Lawton and L. L. Burpee. 1990. Effect of Rate and Frequency of Application of *Typhula phacorrhiza* on Biological Control of Typhula Blight of Creeping Bentgrass. *Phytopathology* 80:70-73.)

Endophytic Grasses for Billbug Control

The discovery of endophyte enhanced turfgrasses has opened the door to some very exciting prospects for natural insect resistance. Studies conducted at Rutgers University looked at the effects of endophytes on four species of billbugs feeding on tall fescue and perennial ryegrass. Billbug adults feeding on tall fescue infected with *Acremonium* endophyte had greater mortality than those feeding on non-infected tall fescue. When given a choice to feed on endophytic or non-endophytic tall fescue, the billbugs showed no preference; but again, the mortality was higher when billbugs fed on endophytic grasses. To conclude, the presence of *Acremonium* endophytes in tall fescue and perennial ryegrass appears to affect the adult survival of billbugs, thus supporting their usefulness for natural pest resistance.

(From: J. M. Johnson-Cicalese and R. H. White. 1990. Effect of *Acremonium* Endophytes on Four Species of Billbug Found on New Jersey Turfgrasses. *J. Amer. Soc. Hort. Sci.* 115(4):602-604.)

Nitrogen Form for Sodded Bentgrass

When establishing new areas with sod, most turf managers give little thought to the form of nitrogen used. Researchers at the University of Georgia recently confirmed the results reported previously by other scientists that the ratio of ammonium nitrogen to nitrate nitrogen may influence rooting. A comparison of N ratios showed that a 1:3 (ammonium:nitrate) ratio produced the greatest root mass, about three times more than the 1:0 on transplanted bentgrass sod. The similarity of the results with those reported by other scientists suggests that this effect will occur over a wide range of conditions. More work is needed to look at the use of nitrate fertilizers on transplanted sod.

(From: D. S. Glinski, H. A. Mills, K. J. Karnok, and R. N. Carrow. 1990. Nitrogen Form Influences Root Growth of Sodded Creeping Bentgrass. *HortSci*. 25(8):932-933.)

Drought Influences on Summer Patch

Summer patch is one of the most devastating summer diseases of turf. It has long been thought that the development of summer patch symptoms was enhanced by drought conditions. Three papers recently published by University of Maryland scientists in the journal *Phytopathology* have proven that this is not the case. In fact, they reported that the growth of *Magnaporthe poae*, the causal organism for summer patch, was restricted by drought at high temperatures. It appears that high temperatures will enhance the development of summer patch more than drought stress. Field studies confirmed that the disease was most severe where the turf was not stressed by drought. In short, summer patch is most likely to be severe at temperatures greater than 80 degrees with adequate soil moisture. These reports have provided great insight on environmental factors influencing this disease, and will no doubt foster research on water management in relation to disease severity.

(From: Kackley et al. 1990. Three papers in *Phytopathology* 80(7).)

Scanning the Journals

A review of current journal articles

Sand

continued from cover

better describe sands for turfgrass use, we separate them into five classes based on particle diameter. Table 1 lists the five separates that can be easily determined by sieving. Only by fractionating sands through sieves can we learn if a sand is suitable for construction.

Sands should be uniform in particle size, that is, most of the sand should fall within two adjacent size classes (eg. medium-coarse). Sands with particles split across several size classes would tend to "fit" together, plugging much of the pore space between grains.

Sands with particles split across several size classes would tend to "fit" together, plugging much of the pore space between grains.

Sands with a large percentage of particles between 2 and .25 mm in diameter will cause the greatest change in the physical properties of soil.

Table 1. Size Distribution of Sands

Tyler Screen Scale	Size (mm)	Designation (sand retained)
9 mesh	2.0 mm	Gravel
16 mesh	1.0 mm	Very Coarse Sand
32 mesh	0.5 mm	Coarse Sand
60 mesh	0.25 mm	Medium Sand
150 mesh	0.1 mm	Fine Sand
270 mesh	0.05 mm	Very Fine Sand

Sands with a large percentage of particles between 2 and .25 mm in diameter will cause the greatest change in the physical properties of soil. These coarser sands should be selected when attempting to modify an existing soil. Finer, uniform sands may be used, but much larger amounts will be required to produce the desired effect.

The United States Golf Association Green Section has developed their own set of specifications for greens construction that are widely accepted. The specifications state that a uniform sand between 1.0 and 0.25 mm should be used for greens mixtures, with 75% of the sand falling between 0.5 and 0.25 mm. No more than 10% of the particles should pass through a 60 mesh sieve (<0.25 mm).

Table 2 shows that many sands found in New York are very uniform, but fine in particle size. While these sands may have limitations as amendments to improve soil, they may be excellent for pure sand greens or athletic fields. We have found through our own experience maintaining pure sand greens at Cornell that it's much easier to maintain turf on the finer sands (Marcellus products) than a coarser sand (Blue Ridge).

Modern greens and athletic fields are constructed from sand.

Testing Sands

Sands should be tested prior to using them for modification to assure they will improve soil physical properties. Aside from testing the suitability of the sand, tests can also determine the quality of organic matter sources, and the optimum ratio of sand to soil or peat to use. The Physical Analysis Laboratory at Cornell routinely conducts these tests, as do other labs around the country. Considering the tremendous investment in time and money involved in constructing greens or sports fields, soil testing is a small but crucial first step in assuring success.

Norman W. Hummel Jr., Dept. of Floriculture and Ornamental Horticulture

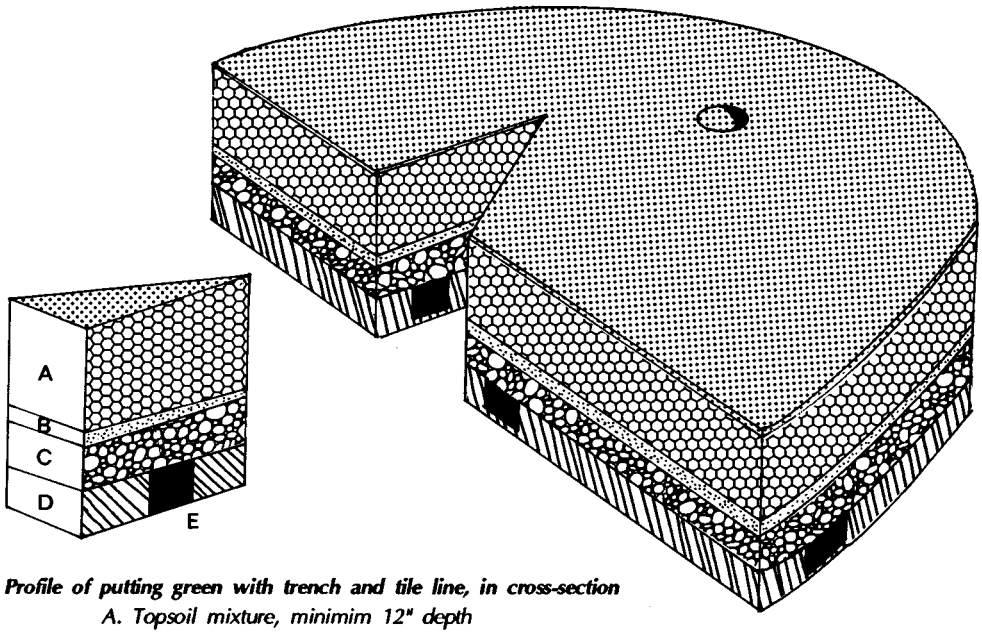
Table 2. Several sand sources available in New York State.

Sand Source	Particle Size (mm) 2-1 VC	1-0.5 C	0.5-0.25 M	0.25-0.1 F	0.1-0.05 VF	Type
Porter's Concrete, Waverly	9%	25%	52%	12%	2%	C
Porter's Mason, Waverly	0%	4%	39%	46%	11%	C
Marcellus Products, Syracuse	0%	2%	36%	56%	6%	C
Frey Bros. Mason, Batavia	5%	19%	49%	26%	1%	C
Bryant Sand, McConnellsville	0%	5%	32%	57%	6%	Q
Herba Trap Sand, Albany	6%	22%	41%	28%	3%	C
Carned Sand, Albany	1%	16%	71%	11%	1%	C
Saunders Sand, Syracuse	1%	10%	51%	37%	1%	C
Lynn Scott, Blossvale	0%	6%	48%	42%	4%	Q
Eastern Rock, Syracuse	2%	25%	47%	23%	3%	C
Fertl Soil CM, Pennsylvania	14%	54%	28%	3%	1%	Q
Egypt Farms, Maryland	4%	28%	55%	12%	1%	Q
Harford CM, New Jersey	5%	29%	55%	10%	1%	Q
Best Sand, Ohio	1%	75%	23%	1%	0%	Q
Partac Peat, New Jersey	5%	21%	55%	18%	1%	Q
Blue Ridge, Pennsylvania	1%	5%	74%	15%	5%	Q

Every attempt has been made to provide accurate information. Variation in particle size analysis can result from sampling techniques. Type of sand was not determined by mineral analysis, but rather from pH measurements and the presence or absence of calcium carbonate.

We have found through our own experience maintaining pure sand greens at Cornell that it's much easier to maintain turf on the finer sands (Marcellus products) than a coarser sand (Blue Ridge).

The USGA greens section has developed one concept in greens construction using sand.



Profile of putting green with trench and tile line, in cross-section

A. Topsoil mixture, minimim 12" depth
B. Very coarse sand, size 1 mm or greater , 1 1/2" to 2" depth
C. Gravel, preferably pea gravel 1/4" to 3/8" diameter, minimum 4" depth
D. Subgrade of native soil or fill material
E. 4" diameter tile

Sands should be tested prior to using them for modification to assure they will improve soil physical properties. Aside from testing the suitability of the sand, tests can also determine the quality of organic matter sources, and the optimum ratio of sand to soil or peat to use.

IPM Corner

IPM is a preventive approach that incorporates other inputs besides a spray schedule into your pest management program.

An IPM program cannot and will not sacrifice turfgrass quality or aesthetic value.

What is IPM?

In this issue I would like to define Integrated Pest Management (IPM) and briefly explain the most important fundamental components of an IPM program.

The challenge facing turfgrass pest managers in the next decade is to reduce the use of pesticides while still maintaining quality turfgrass. The forces driving the challenge include: 1) In the future, there will be many additional laws and regulations governing worker rights, pesticide use, and the fate of pesticides in the environment. The new laws and regulations will make pesticide applications difficult; 2) A growing awareness of pesticide impacts on the environment and public fears concerning pesticide use. This form of pesticide phobia is going to curtail the use of many chemicals; 3) Over 475 insects, mites, weeds and plant diseases are resistant to chemical control. Consequently pest managers are increasing the rate and frequency of applications to obtain moderate control. New pesticide registrations are rare.

Prudent pest managers are addressing the challenge by changing the way they practice pest control. Integrated Pest Management is an excellent method to combat this problem.

Integrated Pest Management is a concept with a primary goal of optimizing pest prevention and control in an economic and ecologically sound way. IPM is a simple, practical and, most important, a flexible way to manage insect, mite, plant disease, and weed pests.

IPM is a preventive approach that incorporates other inputs besides a spray schedule into your pest management program. The information generated in an IPM program enables a turfgrass manager to make sound pest management decisions. If pest control is warranted, IPM records can be valuable documentation to justify the control action. If needed, pesticides can be applied at the optimal time. Such action decreases the potential for hazards from misapplication and overuse of pesticides.

Preconceived Problems

One of the biggest misconceptions about IPM in turfgrass is that turf quality will suffer and the turf will attain pest damage prior to pest control action. This is incorrect. An IPM program cannot and will not sacrifice turfgrass quality or aesthetic value.

The second negative notion, associated with IPM has to do with risk. Many turfgrass managers think IPM is a risk. I find this hard to believe, considering many turfgrass managers rely on one set of tools (chemical pesticides) to protect their turf. That is a risk. Relying on one tool is dangerous. If you choose the wrong tool, it will not work. If you overuse or misuse the tool, eventually the tool will fail. Even the best tool wears out. Integrated pest managers incorporate other tools into their pest control tool box, therefore reducing the risk.

Fundamental IPM Techniques

IPM practitioners follow fundamental pest management principles to develop strategies that integrate chemical, biological, cultural and mechanical methods to prevent or control pests.

The fundamental principles of IPM include monitoring, pest identification, timing, and records keeping. These principles are applicable to all types of turfgrass settings such as golf courses and residential lawns. In this issue I will briefly describe the four components. In the next article we will get specific on each technique.

Monitoring

Successful pest management is based on early detection and correct pest identification. Monitoring (scouting) provides up-to-date accurate information on the status of the turfgrass and the pest(s). Regular turfgrass monitoring acts as an "early warning system" to potential turfgrass problems.

Scouting

A turfgrass scouting program generates data on insects, plant diseases, weeds, nutritional deficiencies, and other factors known to adversely affect turfgrass quality or value. Scouting is accomplished by making visual observations or sampling periodically to determine what, where and how many pest(s) are present or absent. Ultimately, the pest population levels or damage estimates derived from these observations are used as a basis for effective and economical pest management decisions. When pest management action is taken, regular turfgrass scouting is an excellent method to check the success or failure of the control.

There are pest monitoring and trapping devices commercially available for early detection of specific pest problems. In future articles I will explain the potential uses of these devices.

Identification

It is impossible to implement pest control action without accurately identifying the pest problem. Misdiagnosis of a pest usually results in three or four wasted pesticide applications of the wrong materials and a loss of valuable time. The correct action is often too late. The outcome is often dead or damaged turf and *unnecessary* environmental pollution. The ramifications of this type of pest control are increases in pesticide laws and regulations by the government.

A professional pest manager must have knowledge of the major pests likely to appear, where to look, how to identify them and their damage symptoms. It is not only important to know which pest(s) are present, but knowing the biology and life stage will determine the proper time to apply the pesticide. Many materials are effective only at certain stages of the pest's life cycle. For example, spraying for grubs works best when the grubs are in the early instar stages.

Timing

When chemicals fail, it is usually not because of product failure. The pesticide manufacturers spend millions of dollars verifying the efficacy of pesticides. Often the problem is improper timing. When a material is applied at the wrong time, a turfgrass manager is wasting time and money.

Timing pest management action should include, but not be limited to: future use of the turf, weather forecast, turf condition, soil moisture, pest type (stage) and location. This type of information, together with label specifications, will provide optimal efficacy from the pest control action.

Records

Brief, concise and accurate information recorded on a data sheet is one of the best available tools to make a pest management decision. IPM programs rely on records to make recommendations. The time spent recording information on a ledger or data sheet is often hard to justify as productive. Pest managers trying to make a diagnosis of a problem without records are at a disadvantage and will overlook potential causes of the problem. When program evaluations and future plans are developed, records and data analysis are priceless. Field data sheets, maps of the turf, final reports, and spray records are a mandatory component of an IPM program.

Integrated Pest Management is an intelligent way to achieve safe long term pest management with as little effect on the surrounding environment as possible. Turfgrass managers employing IPM care about the quality of their turf and their environment.

Gerard W. Ferrentino, Ornamentals IPM Coordinator

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What is *CUTT* ?

CUTT is a quarterly newsletter from the Cornell University Turfgrass Faculty. The purpose of *CUTT* is to bring to you the latest research results from Cornell, as well as other universities, in a timely manner. Each issue, published to coincide with the change in seasons, will help you understand turfgrass better, enable you to manage your turf better, and maintain healthier turf with greater environmental protection ■

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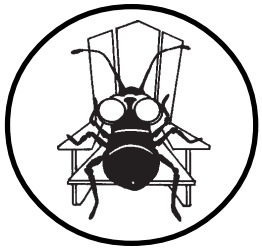

Pest Watch

Early autumn is the best time to control broadleaf weeds in turf.

Weed Control

Early autumn is the best time to control broadleaf weeds in turf. Adequate moisture, warm days, and cool nights ensure vigorous weed growth. Under these conditions, postemergent herbicides work the best. Apply a two-way or three-way, broadspectrum herbicide at the labeled rate in late September or early October. Some weeds will die quickly. Others will appear only to be stunted, but will die next spring.

Autumn is also the time to assess the effectiveness of your weed control program. Map "hot spots" where weed pressure is high or where herbicides failed to provide full season coverage. Try to determine why weeds are present in these areas. If possible, correct any cultural or physical problems which predispose these sites to weed encroachment. Also, reevaluate your current weed control program and adjust it to better manage the weeds in these problem areas.

If you have had difficulty applying preemergent crabgrass control materials at the correct time in the spring, our research has shown that late fall (November) applications control crabgrass almost as well as standard spring applications. Ronstar has recently been labeled for this use. This option should only be considered if labor shortages or work loads in the spring prevent you from applying preemergent herbicides before crabgrass germinates.

Disease Control

This year has been an especially bad year for Pythium root rots on a number of turfgrass species. Should conditions become favorable in autumn (temperatures 40-50° F and prolonged moisture), severe outbreaks are likely to occur from September to November. Early to mid-autumn is the time to apply preventive fungicide treatments to control the early spring phase of the disease. For sites with a history of severe Pythium root rot problems in the early spring, applications of either Banol, Aliette, or Subdue in mid-October to early November have proven effective in reducing the severity in the spring. Fungicides should be applied before turf dormancy and should be watered-in for the most effective control.

Dr. Eric Nelsonpoints out pink patch disease to students at the recent diagnostic course at Cornell

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