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Sampling New Jersey Turfgrasses for Nematodes

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All turfgrasses have plant-parasitic nematodes feeding upon them, but most of the time root growth exceeds root destruction. When the reverse is true, economic damage occurs and light green patches, poor growth, and wilting become noticeable. Although an experienced observer can often find familiar root damage, nematodes must be extracted from soil samples, identified, and counted to determine if they are present in sufficient numbers to justify expensive soil treatment.

Soil sampling tubes of about 3/4'' diameter are used to sample soil and feeder roots. Soil found below the root zone is of no value. The top portion of plant material plus dead thatch layer is discarded and the 3-5'' soil core is saved. Note how deeply the roots penetrate into soil because only this zone where roots are found should be sampled for nematodes. Soil samples may be taken from turf whenever the soil temperature is above 40°F. Soil should not be excessively wet, nor too dry, when soil cores are taken. A composite sample of 15-20 cores, consisting of a quart or more volume, is more or less randomly obtained from a

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Natural Growth Instead of a Good Lawn?

Could you sell your house with this ''natural'' growth replacing your lawn? Omission of mowing that started a few short years ago is responsible for this scene. This area will become more unsightly as it collects paper and plastic refuse. A fire-prone growth is the next step with its concomitant of weeds, trees, honeysuckle, and poison ivy. Good forest cover might be grown in 50 or 100 years, but it will still have appreciable fire hazard and you and your house might object to the lack of open space.

Why Turf is Needed

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Do those of us who grow and work with turf appreciate its importance or have we told others about the value of turf? How good are the reasons we would give someone who asks us, ''Why bother with turf?'' Most of us have heard someone say turf is a luxury and is unnecessary. These are times when we need clear answers and convictions. This article will discuss the values of turf and why it is grown, or the importance of turf.

- **The Aesthetic Value of Turf** — While it is impossible to assess the aesthetic value of turf in dollars, this attribute of turf is most important. When people are asked what surrounding makes them feel best, the most common answer is green grass and trees. This type of therapy awaits many people at work, home, or play. Psychologists report green is the most soothing color for human beings. Thus, mankind will seek and enjoy the greenness of nature until some distant time whe his or her basic constitution is changed. The aesthetic benefits of an attractive green turf are truly a big value that is often unappreciated.

- **Agricultural Science Values of Turf** — Vegetables have been planted in many home lawns in recent years. The number of lawns undergoing this change will increase with higher

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Nematodes

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fairway, green, lawn, or turf farm. The soil sample should include some cores from the edges of damaged areas. Soil from dead spots contain a few nematodes. Five acres is the maximum size turf area for a single sample. Samples should be taken from areas of similar appearance that are representative of specific soil types, slopes, or drainages. Sample problem areas first for detection of nematodes. If a nematode problem is found to exist, the other areas can then be examined later.

Separately mix each soil sample and place about a pint of soil in a heavy plastic bag. Close the bag tightly to prevent the sample from drying out. Excess soil is discarded. Protect soil samples from high and freezing temperatures. Soil heats rapidly in closed bags when exposed to direct sunlight whether on a green or in the back seat of a closed car. Do not leave soil samples in the car's luggage compartment since temperatures often exceed those lethal to nematodes.

Place the collected soil samples in the kits previously obtained from the Extension Service or the Nematode Detection Service. Record the date the sample was taken, type of grass or grasses present, site or locality, and name and address of the person receiving the final report, and any other information requested on the form found in the kit. Send samples to the Nematode Detection Laboratory, Department of Plant Pathology, Cook College, P.O. Box 231, New Brunswick, New Jersey 08903. A reply with recommendations will usually be sent within 14 days after returning the soil kit. There is a charge for purchasing the kits, which partially covers the costs for this service.

The common nematodes found in turf are reported in the following table. Percent incidence of occurrence in soils shows that most soil samples contain more than one type of nematode. Maximum numbers per pint of New Jersey soil are also listed. Nematode numbers may exceed levels where treatment becomes necessary by 10X. Treat levels are given under the last columns. Irrigation of turf lowers water stress and greater numbers of nematodes are tolerated. Relative numbers of the different types of nematodes vary throughout the year. Population peaks or valleys can occur during spring, summer, or fall depending upon time of reproduction, stages that overwinter, reproduction rate, and temperature effects on various life processes. These numbers are used, therefore, only as a guide in determining if treatment is required in conjunction with knowledge of pathogenic abilities, time of year, and life cycles of the nematode complex found in a particular soil.

Remember, sample analysis and interpretation are only accurate if the soil and roots were properly collected and arrive at the Nematode Detection Laboratory in good condition.

Comments and Opinions

Weeds and Energy

You don't have to be very bright to realize that the fossil fuel we're using — the oil, coal, and natural gas — is nonrenewable. When it's gone, it's gone.

Vivid in my mind is the section of a museum in Hawaii with the story of the great whaling industry of our forefathers. The industry was destined to die because it could not adequately supply the needs of a modern society. A little whale oil may be okay for lamps, but there certainly wasn't enough for those new-fangled contraptions on four wheels.

Where should we locate the museum for the oil industry — Pennsylvania, Texas, Arabia, Iran? Surely future generations should know about this fascinating era and how successful we were in using up "our" fossil fuel in record time. The energy that Mother Nature took millions of years to store, we could burn in a century or so.

You learned long ago that the oil and coal were formed from plants and stored. Use some of it we must, but our generation should be responsible for growing our own plants and converting as much solar energy each year as possible into a form we can use.

Ellery L. Knake

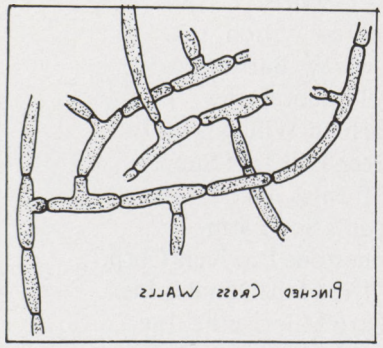
Nematodes Found under New Jersey Turf

Common Name	Percentage Incidence in Soils	Maximum Numbers Per Pint of Soil	Treat Level Per Pint of Soil	
			NonIrrigation	Irrigation
Stunt	63	2100	400	500
Lance	52	1600	200	400
Spirals	52	8000	800*	---
Ring	48	9600	400	800
Lesion	28	600	500*	---
Stubby Root	20	50	---	---
Pin	11	6000	800*	---
Cyst-Root Knot	7	110	---	---
Dagger-Needle	4	160	200*	---

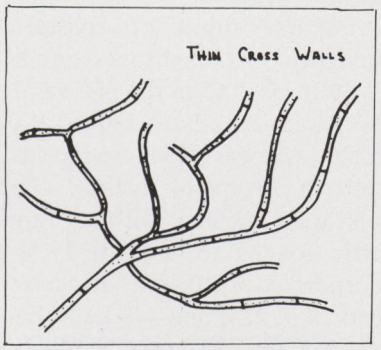
*Tentative treat level per pint of soil.

Turfgrass Fungi through the Microscope for the Turfgrass Professional

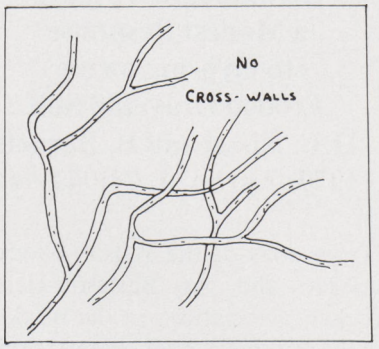
Turf Pathogens Identified Only by Mycelium



Rhizoctonia

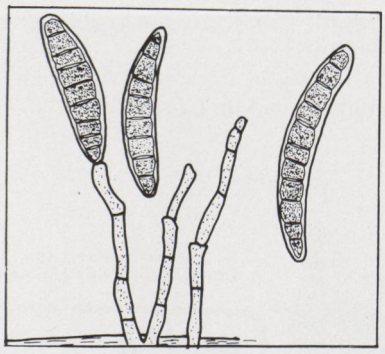


Sclerotinia

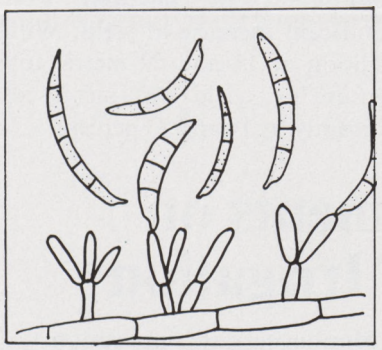


Pythium

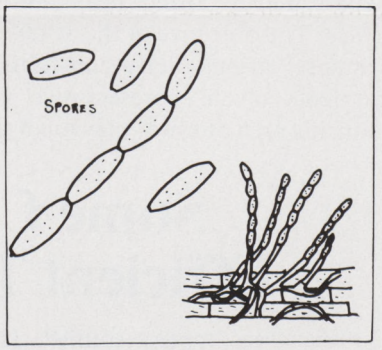
Turf Pathogens Identified by Spores and Fruiting Structures



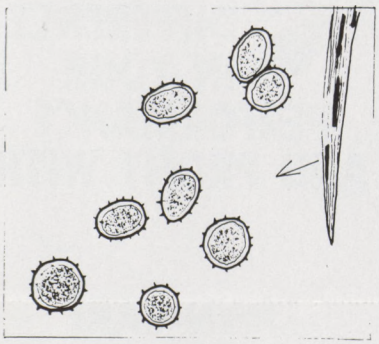
Helminthosporium



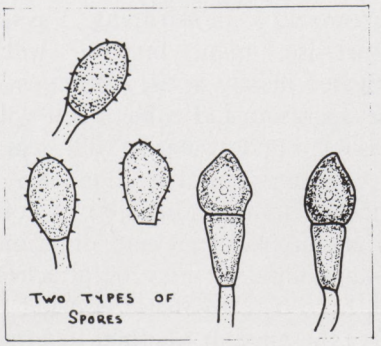
Fusarium



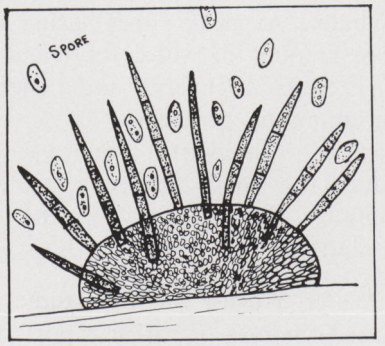
Erysiphe



Ustilago

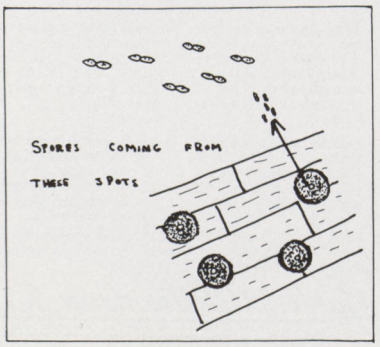


Uromyces

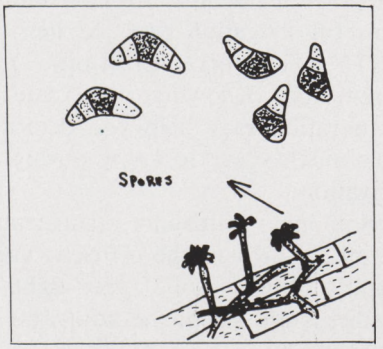


Colletotrichum

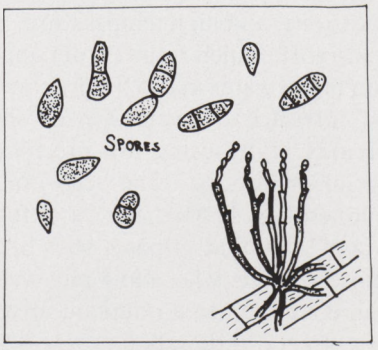
Nonpathogenic Fungi Often Found on Dead Turfgrass



Ascochyta



Curvularia



Cladosporium

When Grass Diseases Stump You

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Most of us in this business of turf management are pretty good at identifying the common turf diseases just by looking at them over the toe of a nine-iron. But once in a while some of the spots don't look just as they should for the disease we suspect.

Next we get down on all fours and look a little closer or perhaps even pull out the little 10-power hand lens we all carry (or should carry). Taking a closer look at the spotting on the leaves or the color of the little band that separates the green tissue from the brown tissue may give us another clue for identification.

The 10-power hand lens is strong enough to distinguish between the fungus growth of *Curvularia,* which is a secondary type of fungus on grass that is going-out because of poor root system and *Colletotrichum,* the cause of Anthracnose. (See page 3.) The *Curvularia* is pretty well scattered over the surface of the dead leaves and has a gray-green-brown color. The *Collectotrichum* develops little patches of black growth that look like tiny black pins in a pin cushion. The 10-power will pick this up quite easily.

We know brownpatch is easily identified (most of the time) by the "smoke ring" that encircles the 4- to 40-inch spots of dead and dying grass on the greens and around the collars. And we expect brownpatch in midsummer with high temperatures and high humidity. But during periods of high temperature and high humidity or rainfall, we can also anticipate the possibility of *Pythium.*

Now we all know that during the wet weather *Pythium* can "run" or streak as the fungus washes downhill from a diseased spot into healthy grass. And even if it is on a flat surface and does not "run," it usually does *not* form a "smoke ring." But sometimes it does form a smoke ring similar to the *Rhizoctonia* which causes brownpatch.

So how do we distinguish between the smoke rings and why is it important? It's important because what will control brownpatch will not affect *Pythium* and vice versa.

Now we have a choice between making a guess and applying one of the chemicals we think will take care of the problem (that's a 50-50 chance and even the inveterate gambler doesn't like that) or we can mix the brownpatch chemical with the *Pythium* material and apply both. The first option may not stop the disease and the second costs you dollars at today's chemical prices.

What do we do to get around these problems? Take a couple of samples and give them to your lowest-paid help and send him to Rutgers for a microscopic examination of the plugs. (This fellow would much rather drive to New Brunswick than rake traps on a hot day anyway.) Much of the time you will catch one of us here in the office and you will have your answer in a few minutes or we'll be back later in the day and you'll have your answer the next day.

You might also send the sample to New Brunswick with your Greens Chairman! Many such individuals are retired gentlemen who have the time and would like to see how a plant pathologist conducts his work. And your Greens Chairman may be so impressed with how valuable a microscope is for true identification of grass diseases that he'll come back all gung-ho to buy you one. The cost of the scope is about the same as a single application of the chemical that has only a 50-50 chance of controlling a disease if you are only guessing as to which fungus you are tackling.

And even though your Greens Chairman is not a turfgrass professional (which you are), he is a knowledgeable man about finances and you should end up with your microscope. Give it a try! But in any event, don't guess at your problem — come on over to Rutgers for an answer.

Turf's Value

(continued from page 1)

costs of food and an increased demand for food. Many of these lawn sites started with poor subsoil and they were made more productive with the growth of the grass cover. Grass is nature's efficient and excellent way of improving all soils. Thus, lawns might be valued for their ability to insure a more productive garden area for the future. Good soil management decrees the importance of preventing erosion of mud and dust. Without turf cover to control this ugly nuisance, soil erosion around homes, streets, and other buildings would become ghastly and would endanger many structures.

- **Turf for Recreation** — Turfgrass cover serves for neighborhood sports on lawns, parks, and playgrounds; athletic fields are used for soccer, football, lacrosse, and baseball; and specialized turf is grown for lawn bowling, tennis, and golf. Large sums of money have been spent on synthetic turf on sites that are being reestablished with natural grass. Cost of maintenance and replacement were overlooked with synthetic turf. Maintenance costs proved similar to the cost of maintaining natural

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grass turf. Essentially, no one associated with natural turf had time to worry about, fear, or resist encroachment of synthetic turf, which has been dubbed "fuzzy pavement". This type of outdoor covering will have a very restricted existence until far better and cheaper types become available.

- **Turf Reduces Unwanted Creatures and Plants around Homes** — Few homeowners want snakes, certain rodents, ticks, or skunks near the house. These creatures usually do not make the lawn their home. Brush, unmowed tall grass, and wooded areas are their chosen habitat. Also, mowed lawn areas have essentially no poisonous weeds such as poison ivy, pokeweed, or nightshade. Thistles and thorny weeds are uncommon on most lawn areas. For various reasons some home grounds experts say trees should not be grown closer to houses than 20 feet.

- **Additional Pluses of Turf** — Often plants are praised for their use of carbon dioxide (CO_2) in photosynthesis and release of oxygen. Turf does this as well. Not many appreciate the cooling effect of natural grass. Synthetic turf made more people aware of this fact. Green cools the home and saves energy where air conditioning is used. While trees and shrubs are nature's primary sound deadeners, grass contributes its share also. Growing turfgrass has the unique advantage over bare surfaces and synthetic turf of hiding finer residue such as bits of paper, twigs, and airborne dust. Most of these items decompose on the surface of the turf or they become incorporated into the sod.

- **Lawns Rarely Sustain Fire** — The most unappreciated value of lawns is their fire-resistant nature compared with other vegetation cover such as trees, shrubs, vines, or unmowed grass. The litter, leaves, brush, and debris in unmowed areas will sustain fire when ignited except on the wettest occasions. In contrast, mowed green lawn turf rarely sustains fire. Can we ask for a more important reason for growing a green lawn area around homes?

In conclusion, man's much used open space must have a soil cover. The best and cheapest protection is turf. If it were not, something else would be used. Allowing people to enjoy the minimal grass cover required to protect the soil or the best turf that refreshes mind and soil is not a luxury by comparison with many other things that occupy mankind's time and money.

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ABSTRACT

Bermudagrass Makes a Modest Response to Gypsum on an Eroded Grayland Soil
D.E. Kissel and E. Burnett
(1979) Agron. J. 71:941-944.

Texas soils of the Wilson-Crockett-Burleson and the Burleson-Heiden-Crockett associations in the blackland and prairie have poor water relations and low fertility. The result is low crop production in many cases. The poor water relations are caused, in part, by a claypan that is often near the soil surface. The objective of this study was to impose various tillage and fertilizer treatments on a representative low-producing area of sandy clay loam soils to determine the feasibility of renovation to improve forage production by Coastal bermudagrass (*Cynodon dactylon* L.).

A sparse stand of coastal bermudagrass was tilled to a depth of 1.5 m (4'9''). At 1.67 m the pH was 7.4 to 7.8. Three years later 280 kg P_2O_5/ha (252 lbs./A) was tilled into the soil to a depth of 10 cm (4 inches). Gypsum plots were treated with 11 and 22 metric ton/ha (5 and 10 T/A) and incorporated to 10 cm. Nitrogen treatments of 0, 224, and 448 kg N/ha (202 and 404 lbs./A) were applied with single applications of ammonium nitrate. Deep tillage gave some yield increase during the second season while both rates of nitrogen gave a significant increase in yield. With the addition of 11 and 22 metric tons of gypsum/ha, yield was increased significantly by 14 and 15 percent.

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Some Comments on Efficient Turf Irrigation*

In the areas (cities) studied, landscape irrigation represented from 26 to 80 percent of the total water consumed annually. At peak times, using this large amount of water for irrigation can create delivery and energy-consumption problems in a municipality. Thoughtful water use will reduce this load, reduce costs, and minimize further government intervention.

Water Wasted — The study supported findings of earlier reports that turf receives the most frequent irrigation of all landscape plants. Conservatively, 40 to 50 percent of turf irrigation water is wasted — through runoff, excessive percolation from the root zone, and high temperature.

Runoff, which results from applying too much water in too brief a time, can be corrected by watering for shorter periods or by using low-precipitation sprinkler heads. The city of Albuquerque, N.M., has a "fugitive water" law that imposes stiff fines on those persons who allow any water to run directly onto a nonplant area such as a street or sidewalk.

Monitoring the Application — The best way to accomplish efficient landscape irrigation is with some type of automatic monitoring system. Otherwise, plant material will be irrigated merely at the convenience of the operator, and either water will be wasted or underwatering will occur.

A battery-powered timer may be attached to the hose bibb to control irrigation frequency and duration. A "water minder" may be attached to the hose bibb to stop the water flow after the amount of water determined by the user has passed through.

Monitoring the soil's water content with rain gauges and tensiometers helps to prevent overwatering. Perhaps the greatest potential for controlling a wasteful irrigation practice lies with "ET" (evapotranspiration) measurements. Knowing the rate of evaporation may help you determine how much water to apply during any irrigation.

Nonionic adjuvants (surfactants) definitely help in the efficient use of water. Where soils are tight or gradients are steep, the adjuvants are most effective.

*Taken from an article by R. C. Smith in the January 1980 issue of *Grounds Maintenance*.