CORNELL UNIVERSITY TURFGRASS TIMES

CUTT

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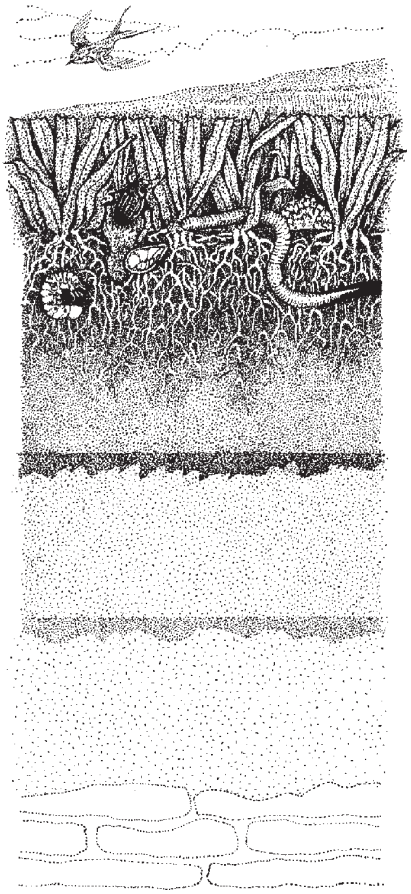

The Role of Turfgrass Management in Water Quality

Much concern has been raised over the impact of turfgrass management practices on the environment. Of special concern is the impact of turfgrass practices on the quality of both surface and groundwater. If we look at the importance of clean water to everyone, then the concerns are truly important. Almost all of our drinking water in the United States comes from surface or groundwater supplies that are tapped by individuals or municipalities. ■

On the average about half of our drinking water comes from surface water sources (streams, ponds, lakes). The other half comes from wells that tap into groundwater. In rural areas groundwater accounts for about 95% of the drinking water supply. When a water supply is contaminated, the options available to correct the problem are often extremely expensive. Thus, it is imperative that turfgrass management programs be developed that do not contaminate water supplies.

The turf maintenance chemicals that threaten groundwater are fertilizer elements like nitrogen (N) and phosphorus (P), and pesticides. The potential health risks associated with N involves nitrates - the form of N that leaches into groundwater. Nitrate has been shown to cause the disease known as blue baby syndrome or methemoglobinemia in infants less than 3 months old. Nitrate and P are also linked with algal population explosions in surface waters that can limit recreational uses, and indirectly affect the health of many other aquatic organisms. The extent of health problems associated with pesticides in water is of great concern and not fully understood.

The knowledge surrounding the fate of fertilizers and pesticides applied to turfgrass is growing. At Cornell University, we have been focusing on the fate of nitrogen fertilizers applied to turfgrass for the past five years. More recently, we have also studied the leaching potential of several pesticides.

Nitrate Leaching

Results from early studies on Long Island showed that a heavy application of a highly water soluble N source, like urea, in the late fall can result in a substantial amount of nitrate leaching by early spring. If slow release N sources were used, however, there was very little nitrate leaching. Current fertilizer recommendations were modified from these results. Turf areas grown on sandy soils should no longer receive

continued on page 4

This Times

Short Cutts

Pest Management Recommends now available from your county extension offices. Watch for new Turfgrass Management Handbook, available next spring.

Please turn to the back page for *CUTT* subscription information.

Where are the Recommends?

Many people have called us and extension offices around the state asking about the Cornell Cultural Recommends. The reason you haven't seen the 1990 Cultural Recommends is because they are currently undergoing major revision and expansion. Cornell adopted a policy late last year to publish the pest control and cultural recommends separately in all commodities. The Pest Management Recommends have already been revised and are available from your county extension offices. They will be revised and printed annually. The Cultural Recommends will be replaced by a Turfgrass Management Handbook that will be a greatly expanded version of the Cultural Recommends of the past. The handbook will be revised every three to five years. The first edition is expected to be available by next spring. So for now, use the 1989 Recommends for your cultural information.

Help is Available

Did you ever wonder where to go to get help on turf and ornamentals? You need look no further than your county Cooperative Extension office. Several counties in New York have commercial horticulture programs with agents trained in the turf and ornamentals areas. Some counties are even equipped with diagnostic labs to provide you with quick answers and recommendations for your turf and ornamentals problems. Even if you're in a rural county, your local agent has ready access to the labs and specialists at Cornell.

Cornell University provides several services to you through your county extension offices. The Plant Diagnostic Labs offer laboratory diagnosis of turf or ornamental disease or insect problems. Nematode detection and counts are once again available through the lab. The Cornell Nutrient Analysis Lab is available for testing soils, with fertilizer recommendations based on the results. The Physical Analysis Lab offers testing of soil and physical properties important in modified soils. Finally, the tissue analysis laboratory is available for plant tissue testing - a useful tool for identifying nutritional problems that a soil test may not pick up.

Turfgrass Diagnostic Course Offered

A turfgrass pest diagnostic course will be offered at Cornell from July 31 - August 2. The purpose of this "hands-on" course is to teach participants the proper techniques for sampling and identifying turfgrass pests. Discussions will also include the biology of some of the pests, and control strategies. On August 1, the course will move to the field where participants will learn field diagnosis and procedures for taking samples for lab diagnosis. On the morning of August 2, samples collected in the field will be prepared and observed under microscopes or dissecting scopes in the lab.

This course is designed for people with experience and some form of formal training in the turfgrass area. Enrollment will be limited to 30 people. For more information call or write Joann Gruttadaurio, 20 Plant Science Building, Ithaca, NY 14853 (607-255-1792).

Errata

The chart "*Biological Suppression of Dollar Spot, Brown Patch and Red Thread with Compost-Amended Topdressings*" which appeared on p. 4 of *CUTT* Issue Number One contained an incorrect figure. The Control Untreated 1 figure of 9.8 Dollar Spots/plot should read **19.8** Dollar Spots/plot.

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Supplementing Nitrogen with Iron

The succulent top growth caused by nitrogen (N) fertilizer is undesirable, especially during spring and summer. Can nitrogen rates be reduced, but quality maintained when iron is applied? Researchers at the University of Illinois are looking at this concept. They have tested three nitrogen sources (urea, Formolene, Fluf) applied at two rates (0.5 and 1 lb N/1000 sq. ft.) to Kentucky bluegrass. Iron (Fe) was applied at a rate of 6 ounces Fe where the lower rate of N was used. Turf color was judged acceptable on 78 to 85% of the rating dates where the higher rate nitrogen alone was applied, and 62 to 85% of the dates for the N + Fe treatments. The researchers concluded that it is feasible to substitute a portion of the N with iron when urea or Formolene are used. The half rate of Fluf with iron, however, did not perform nearly as well as the full rate of N.

(From: D.J. Wehner and J.E. Haley. 1989. "Iron fertilization of Kentucky bluegrass." *Agronomy Abstracts* p. 166.)

Bio-organic Thatch Decomposers

Researchers at Michigan State University looked at the effect of three bioorganic products on characteristics of thatch. Ringer's Lawn Restore, Lawn Rx and C-50 were applied at 2, 4 and 8 lb nitrogen per 1,000 sq. ft. per application 5 times during a year (no kidding). The thatch thickness decreased as the nitrogen rate increased for all three products. Likewise, earthworm populations increased as N rate increased with the Lawn Restore and the Lawn Rx. The researchers assumed that earthworm activity and the products both influenced thatch stability. They admitted that this work was preliminary and that more in-depth work was needed on these products at traditional N rates.

(From: W. L. Berndt, P. E. Reike, and J.M. Vargas. 1990. "Kentucky bluegrass thatch characteristics following application of bio-organic materials." *Hort. Science* 25:412-414.)

Golf Car Tire Design and Turfgrass Wear

Do you have responsibility for purchasing or maintaining a golf car fleet? If so, you may be interested in a study conducted at the University of Georgia. Researchers there ran turfgrass wear tests on 'Tifway' bermudagrass using several golf car tire designs (tread configurations, radial or non-radial), golf cars, and traffic patterns. Golf car traffic caused significant wear damage regardless of golf car, tire design, or traffic pattern. Differences in wear injury between tire designs did occur, but were minor in most instances. Whether a tire was radial or not did not make any difference in turfgrass wear. Golf car type had only a minor effect on wear. Therefore, the researchers concluded that management to minimize wear should concentrate on distributing traffic and avoiding sharp turns. The selection of pneumatic tire design or golf car is of minor relative importance.

(From: R.N. Carrow and B.J. Johnson. 1989. *J. Amer. Soc. Hort. Sci.* 114:240-246.)

Insecticide Mobility and Degradation

Public concern has intensified over the fate of pesticides applied to land and their potential to pollute groundwater. Researchers at the Wooster experiment station of the Ohio State University are answering many questions on persistence and movement of several pesticides applied to turf. Working with isofenphos (Oftanol), diazinon, trichlorfon (Dylox, Proxol), ethoprop (Mocap), chlorpyrifos (Dursban), isazofos (Triumph), carbaryl (Sevin), and bendiocarb (Turcam), the researchers found 98 to 99% of pesticide residues in the thatch 1 and 2 weeks after application. Residues in the top inch of soil did not exceed 0.8 ppm over 34 weeks of sampling. These preliminary results point out that insecticide movement is greatly inhibited where thatch is present. In related work, the researchers also reported enhanced degradation of isofenphos and carbaryl on areas where previous applications of isofenphos were made.

(From: H.D. Niemczyk and A. Krause. 1989. *Agronomy Abstracts* p. 162.)

Scanning the Journals

A review of current journal articles

Turfgrass Management

continued from cover

These results suggest that well fertilized lawns do not pose a big threat to groundwater quality when fertilized at the traditional times of the year.

The leaching of pesticides into groundwater is not well understood, especially when they are applied to turfgrass.

late fall fertilization with highly water soluble N source. We recommend you use slow release sources instead.

The question then that needed answering was how would a more typical N fertilizer program influence the magnitude of nitrate leaching. In the fall of 1987, a study was initiated to evaluate the degree of nitrate leaching from ten different N sources applied to a typical home lawn. The study was conducted at the Long Island Horticultural Research Laboratory at Riverhead. The fertilizers were applied at a yearly rate of 4 lbs N/1,000 sq. ft. as either four applications of 1 lb/1,000 sq.ft. or two applications of 2 lbs/1,000 sq.ft. applications. Treatments were made in September, 1987 and May, August, September, and October, 1988. The amount of fertilizer nitrate leaching past the root zone was determined. The results of N source effects on the nitrate leaching are shown in Table 1. The extent of fertilizer nitrate leaching past the root zone was very small and not greatly influenced by the N source, even from the highly water soluble sources. These results suggest that well fertilized lawns do not pose a big threat to groundwater quality when fertilized at the traditional times of the year.

Pesticide Leaching

The leaching of pesticides into groundwater is not well understood, especially when they are applied to turfgrass. Several factors of the turfgrass ecosystem should result in little or no pesticide leaching into groundwater. These include the following:

- Thatch layer that can easily tie up or allow for rapid degradation of a pesticide.
- Heavy turfgrass canopy that can intercept much of a sprayed pesticide. In this case there is greater chance the plant may take up the pesticide, that the pesticide may be degraded by sunlight (photodegradation), or be lost back to the atmosphere (volatilization).

When turfgrass is limed, the surface layer of soil and/or thatch is at pH of 8.3. Some pesticides are highly insoluble at pH's higher than 7 and are therefore unlikely to leach.

The initial study on pesticide leaching was conducted last October in the ARESTS Facility (Automated Rainfall Exclusion System for Turfgrass Studies). This facility is very unique, and is designed to monitor very closely the fate of fertilizers or pesticides applied to turf. Pesticides (2,4-D, dicamba, carbaryl and chlorothalonil) were applied to the plots in the ARESTS Facility on 3 soil types (sand, sandy loam and a silt loam). Irrigation provided leaching conditions either three times weekly or once a week for a three week period. The leachate samples are now being analyzed. The results of this study will be used to evaluate the effectiveness of pesticide leaching models to predict the leaching of pesticides from turf.

Future Plans

The environmental pressures being placed on the turfgrass industry are mounting. Answers to some of the concerns raised will likely be given by research like this. Areas for future research include the influence of the amendment zeolite in sand on pesticide/nitrate leaching from putting greens. The effects of cultivation and irrigation on nutrient and pesticide leaching will also be looked at under the different soil types.

A. Martin Petrovic, Deptartment of Floriculture and Ornamental Horticulture

Table 1. Amount of total Nitrogen leached (NO_3 + NH_4) from the rootzone of Kentucky bluegrass, May 1988 to May 1989.

Nitrogen Source	Number of Applications 4	2
	% of Applied Nitrogen	
Sulfur-coated urea (No sealant)	3	1
Sulfur-coated urea (Sealant)	2	0
Urea	1	0
$Ca(NO_3)_2$	1	1
Resin-coated urea (100 day)	2	0
Resin-coated urea (200 day)	2	0
Ureaformaldehyde	4	0
Methylene urea	2	0
IBDU	3	0
Milorganite	3	0
Mean	2	0

Values adjusted for background levels.

Weed Control

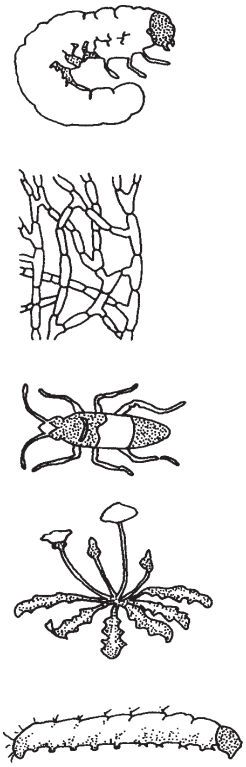
Mid-June is usually the time to apply MSMA or Acclaim for postemergent control of crabgrass. The wet, cool spring followed by record warmth in late April could reduce preemergent herbicide effectiveness. Escaped crabgrass plants should be controlled while they are still young. MSMA at 2 lb ai/A will control crabgrass at this time with one application. Acclaim at 0.125 lb ai/A has controlled crabgrass at the 1 tiller stage. Later in the season, repeated applications or higher rates will be necessary. In areas with heavy crabgrass pressure, a second application of a preemergent herbicide may be needed. This may be tank mixed with the Acclaim or MSMA. Goosegrass and spurge will also be germinating in June. Preemergent herbicides should be applied by the first of June for these summer annual weeds. Nutsedge will sprout in by mid-June. Two applications of Basagran or MSMA are generally required to achieve acceptable control. Apply 2 lb ai/A of either Basagran or MSMA by the end of June. Follow with a second application 14 to 21 days later.

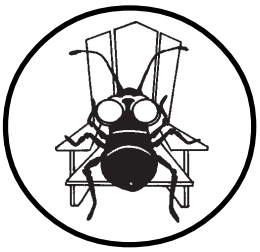
Disease Control

Summer is the time of the year when turfgrass disease pressure is at its greatest. Many of the modern fungicides used for disease control are systemic fungicides. This means that they move in the plant's vascular system from the point of absorption to other plant parts. Most of the systemic fungicides currently used move only upwards in the plant. Rubigan and Banner have limited downward mobility, while Alliette will move readily downward. The systemic properties of fungicides should be considered when developing a disease control program. In general, foliar disease control with systemic fungicides will be prolonged when they are drenched into the root zone. Drenching will also provide control of root and crown diseases. Root disease control with upward moving systemic fungicides is possible only if they are drenched into the root zone, whereas, downward moving systemic fungicides can control root diseases when applied as a foliar spray.

Insect Control

The time to control white grubs will soon be upon us. White grubs are most susceptible to insecticide applications when they first hatch in early to mid-August. Inspect lawns or other turf areas for the presence of grubs in mid-August. Since grubs will be found in almost all turfgrass areas, try to make a judgement on how many there are. Generally, damage will not occur on non-irrigated turf unless there are 8 or more grubs per square foot. Irrigated areas should tolerate more grubs before visual damage occurs. There are several species of grubs found in New York. Identify the species so that the most effective control strategy can be selected. This is most important if biological insecticides are used. If grubs are found in large numbers, select an insecticide labeled for the grub species found. Consult the Cornell Pest Management Recommends for insecticides labelled in New York. Water the affected area two days before the scheduled application. This is to move grubs up to the soil surface. Apply the insecticide according to label directions. Be sure to thoroughly water the lawn immediately after application to move the insecticide through the thatch to where the grubs are feeding.





Pest Watch

Generally, damage will not occur on non-irrigated turf unless there are 8 or more grubs per square foot. Irrigated areas should tolerate more grubs before visual damage occurs.

Successful grub control in August will eliminate the need for grub control the following spring.

New York's Top Twenty Ryegrasses

Ryegrasses are attractive, and very easy and quick to establish.

No wonder they are becoming the grass of choice on athletic fields, golf course fairways, tees, roughs, and other areas.

Perennial ryegrasses have gained wide acceptance in the turfgrass industry. Ryegrasses are attractive, and very easy and quick to establish. No wonder they are becoming the grass of choice on athletic fields, golf course fairways, tees, roughs, and other areas. The proliferation of ryegrass cultivars on the market has made it difficult, if not impossible for most people to keep track of them all.

In the fall of 1987, we established the National Perennial Ryegrass Test in Ithaca and Plainview, Long Island. Sixty five entries were evaluated and compared during the 1988 and 1989 seasons for quality and disease resistance. Rankings were made for both locations, and the final top twenty determined based on weighted averages of the two locations. Many new cultivars are on the top twenty list, with a few of the older ones still performing well. Listed below are the Top Twenty Perennial Ryegrasses in New York State.

An indication of "not available" means that the cultivar is not yet on the commercial market.

SR-4000

- Ranked 1 in Ithaca, 5 in Plainview.
- Dark green, medium-fine texture, high density.
- Excellent wear tolerance and good brown patch resistance. Has insect resistance due to the presence of endophyte.

Fiesta II

- Ranked 2 in Ithaca, 3 in Plainview.
- Dark green, fine texture, high density.
- Good heat hardiness.

Commander

- Ranked 3 in Ithaca and Plainview.
- Medium dark green color, fine texture, high density.
- Good heat and drought tolerance, good resistance to brown patch. Has insect resistance due to presence of endophyte.

Pennant

- Ranked 2 in Ithaca, 6 in Plainview.
- Medium dark green, medium fine texture, high density.
- Good heat and drought tolerance, excellent resistance to brown patch. Has insect resistance due to presence of endophyte.

Bar LP 454

- Ranked 3 in Ithaca, 4 in Plainview.
- Dark green, medium-fine texture.
- Excellent Fusarium patch resistance.
- Not available.

SR-4100

- Ranked 4 in Ithaca, 3 in Plainview.
- Dark green, medium fine texture.
- Excellent red thread resistance. Has insect resistance due to presence of endophyte.

Ranger

- Ranked 4 in Ithaca, 5 in Plainview.
- Medium dark color, medium fine texture, medium density.
- Good heat, drought, and wear tolerance and good resistance to brown patch and Fusarium patch.

Saturn

- Ranked 6 in Ithaca

3 in Plainview.

- Dark green color, fine texture.
- Good Fusarium patch and red thread resistance. Has insect resistance due to presence of endophyte.

PSU-222

- Ranked 6 in Ithaca

3 in Plainview.

- Medium dark color, medium fine texture, medium density.
- Good red thread resistance.
- Not available.

Pennfine

- Ranked 5 in Ithaca, 6 in Plainview.
- Medium dark color, medium fine texture.
- Good drought tolerance and excellent brown patch resistance.

Riviera (Pick 647)

- Ranked 6 in Ithaca, 4 in Plainview.
- Dark color, medium fine texture, high density.
- Medium Fusarium patch resistance

PSU-333
- Ranked 6 in Ithaca, 8 in Plainview.
- Medium color, texture, and density.
- Good red thread resistance.
- Not available.

DEL-946
- Ranked 7 in Ithaca, 6 in Plainview
- Medium color, medium-fine texture, medium density.
- Very good red thread resistance.
- Not available.

Derby
- Ranked 7 in Ithaca, 6 in Plainview.
- Medium dark color, fine texture, medium density.

Dillon
- Ranked 8 in Ithaca, 6 in Plainview.
- Medium color, texture, and density.

Patriot
- Ranked 10 in Ithaca, 2 in Plainview.
- Dark color, fine texture, medium-high density.
- Good heat hardiness.

Runaway
- Ranked 8 in Ithaca, 7 in Plainview.
- Medium dark color, medium texture, medium density.
- Good Fusarium patch and red thread resistance.
- Not available.

Repell
- Ranked 11 in Ithaca, 1 in Plainview.
- Dark color, medium-fine texture, medium-high density.
- Good brown patch and red thread resistance.
- Has insect resistance due to presence of endophyte.

PST-2ME
- Ranked 11 in Ithaca, 2 in Plainview.
- Dark color, medium-fine texture, medium-high density.
- Good red thread resistance
- Not available.

Ovation
- Ranked 9 in Ithaca, 6 in Plainview.
- Medium color, fine texture, good density.
- Excellent brown patch resistance.

Honorable Mention

Acrobat, Omega II, Dasher II, Pick 715, SR-4031, Pavo, Blazer II, Allaire, Citation II, Gator, Manhattan II, and Goalie. Cultivars that have performed well in past tests, but not included in this test include All*Star, Blazer, Dasher, Elka, and Premier.

The Cornell Recommends provides a complete list of ryegrass and other turfgrass cultivars recommended for New York State. Consult the Recommends prior to establishing or renovating turfgrass areas. No doubt most of the Top Twenty will be included in future Recommends.

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

SR-4000 Ranked 1 in Ithaca.

Repell Ranked 1 in Plainview.

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Cornell Cooperative Extension

Welcome to the *Cornell University Turfgrass Times - CUTT,* a new quarterly newsletter from the Cornell University Turfgrass Faculty. The purpose of *CUTT* is bring to you the latest research results from Cornell, as well as other universities, in a timely manner. We want to keep you abreast of activities in our research, extension, and teaching programs at Cornell, and to inform you of other educational opportunities around the State. To stay on the cutting edge - read *CUTT* ■

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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