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*Consult your operator's manual for safety instructions when mowing hills.

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CLIPPINGS, FERTILIZER AND MONEY

Landscapers must be more environmentally conscious about minimizing landscape waste. Picking the right fertilizer by studying the on-site effects of numerous N sources helped at Aurora University in Illinois.

By Michael A. Jinks and G. Allen Mayer

Lawn clippings have been an aggravation to most lawn maintenance companies. "To leave it lie or pick it up?" was the question most asked by their customers.

The State of Illinois is implementing a new law which prohibits dumping landscape waste in landfills. Some companies pay more to dump while others stack it in the back of their property, and still others illegally dump it along the road. As another season is about to open, more landfill sites are closing to the landscaper.

At Aurora University, a study was devised to help the university minimize grass clippings while producing a satisfactory lawn color at a reasonable cost. We listed our possibilities:

- The new varieties of dwarf turf-grasses would not realistically work here, because the old turf would have to be removed in favor of new grass.

- Growth regulators have been on the market for years promising many things, but not living up to what we hoped for or wanted.

- So we thought the easiest way to control growth was to control the amount and kind of fertilizer used.

Getting a start

Many fertilizer companies like to

EDITOR'S NOTE: The information on the ensuing pages can be used to plan a fertilizer study of your own, on your own turf. No specific product endorsement by either Aurora University or LANDSCAPE MANAGEMENT magazine is intended. The accompanying chart should not be used to judge the effectiveness of the products listed.

promote their lawn care products and tell how well it will green up your lawn. Most will not commit themselves to how long the grass will stay green. More importantly, in light of recent events, they will not commit themselves to the amount of grass clippings their product will produce.

Many fertilizers use a form of slow-release nitrogen. These products in theory produce a slowly-rising curve of nitrogen availability to generate consistent green color.

There are many different forms of slow-release nitrogen, and each has its own curve patterns. This leads many landscapers to use only the "tried-and-true" fertilizers. It is difficult for anyone to compare last year's

green with this year's green and take a chance on it.

The intention of this study was not to prove false claims, nor was it to promote any particular products. Rather, it was to provide a method of evaluating fertilizer performance in a given area.

The campus was divided into 15 areas bordered by sidewalks and streets. The areas were measured, then each area was assigned a different fertilizer. Athletic fields became a "control" for the study because in the past, athletic field maintenance has conformed to standards for most lawn maintenance programs.

Dry, granular fertilizers were used in this study. They were applied on May 5 of the year. A second dose was applied on August 28. An additional dose was applied to the athletic fields on July 13.

A 100-square-foot area was marked off from each treated area. Each area marked had as similar as possible sun-to-shade ratio. Every two weeks, the test sites were mowed with a hand mower with bagger. After each test site was mowed, the clippings were loosely poured into a five-gallon bucket marked in half-gallon increments. The number of gallons of clippings per 10 sq. ft. was then recorded. The area was then checked for overall lawn color and recorded. To keep it simple, we devised a four-grade color scale: dull green, light green, good green and very green.

Here at Aurora University, we have a very heterogeneous grass species mix with no dominating dark-pigmented varieties. The color grade "very green" is the color of lush grass high on fertilizer: beautiful, expensive, usually high clipping producers and high on disease. People love the color because it "looks" healthy.

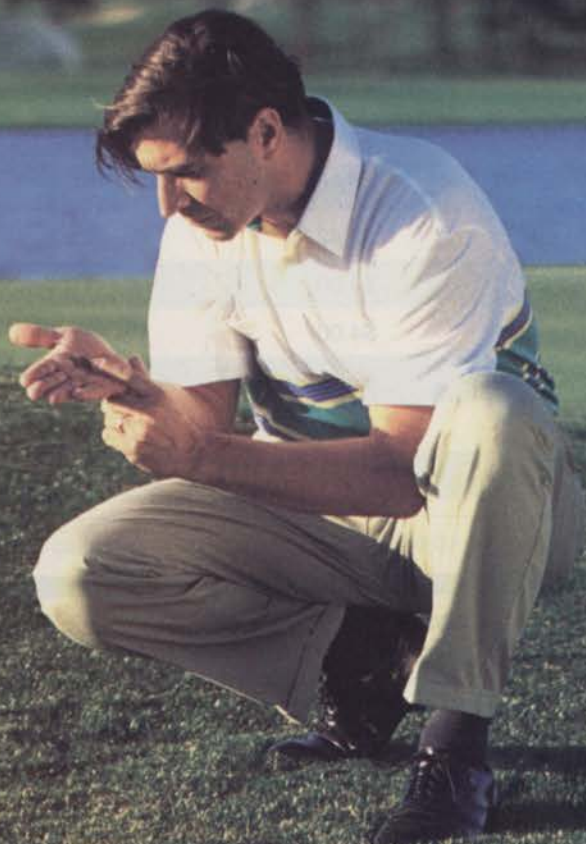
"Good green" is a bright green, the color of healthy grass. "Light green" is a paler version of good green; the color can be an indication of low fertility. Dull green indicates stress.

The amount of rain received each day was also recorded. This helped



Dunham Hall, center for computer studies at Aurora University, where a 34-3-7 analysis granular fertilizer that cost \$1.21 per 1000 sq. ft. was used in this study last season.

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AURORA UNIVERSITY FERTILIZER STUDY

Test Number	N-P-K Analysis	Product Cost Per 1000 sq. ft. ¹	Color Grade ²	Clippings Per cu. yd.
1	24-4-14	\$2.52	2.92	2.55
2	15-1-10	\$4.28	3.07	3.90
3	13-13-13	\$1.52	2.69	3.64
4	12-4-14	\$2.10	3.07	4.00
5	25-5-14	\$2.88	2.92	3.48
6	25-5-14 ^a	\$8.62	2.38	0.90
7	18-4-10	\$3.56	3.15	4.40
8	40-0-0	\$2.68	3.30	3.64
9	20-5-10	\$2.68	2.92	3.94
10	6-1-16	\$2.32	2.61	3.81
11	34-3-7	\$2.42	2.92	4.70
12	15-0-30	\$4.06	2.30	2.90
13	22-0-12	\$4.00	3.07	3.40
14	26-4-13	\$6.18	3.23	3.58
15	18-5-9	\$2.94	3.00	4.58
Control	28-6-12	\$3.12	3.07	4.49

¹ total for two yearly apps

² scale: 1-4, 4.0 highest

^a plant growth regulator added

evaluate the results; heavy rains explained sudden jumps in color and volume. Furthermore, the breakdown of product components was recorded.

The cost of fertilizer per treatment of 1000 sq. ft., the number of pounds of nitrogen per 1000 sq. ft., the unit cost and the square footage of treated area were calculated and recorded.

Readings were taken every two weeks.

The lawns on campus were maintained at two to four inches. The lawn was also sprayed with 2,4-D broadleaf weed killer.

All clippings were left on the lawns. (The piles of clippings did after a few days begin to detract from the campus's overall appearance.)

As the clippings dried up and grass grew up through the dry material, the campus started to look satisfactory. As the season wore on, fewer and fewer clippings were evident. It is possible that a bonus effect of the unremoved grass clippings was increased organic matter in the soil and thus increased fertility.

This was our study; the numbers that can be generated by your own study should be enough for any landscape company manager to make sensible decisions on environmental concerns, aesthetics and the bottom line.

Results

One would think that the most expensive fertilizer would yield the best turf, but that was not always the case.

Fertilizer numbers 6 and 12 both show the worst on color grade and nearly the least on the amount of clippings generated, this with nearly the most dollars per square foot. Number 12's 15-0-30 analysis may have a specific purpose, not as a general use lawn fertilizer.

Number 6 is the only site we use a plant growth regulator, mefluidide. When treatment was given in the spring and the lawn turned brown for a week and treatment was done in the fall, the lawn turned brown until snowfall. We were hoping for a full recovery by spring.

The next group of fertilizers are the high producers of clippings and rating high on the color grade. Numbers 2, 4, 7, 9, 11 and 15 also represent the main kinds of fertilizers found in the marketplace: they will give a fat green lawn at a wide variety of prices.

The next group of fertilizers is an oddball group. Number 3 (13-13-13 analysis) is an all-purpose fertilizer. This is one of the better lawn starter feeds. Number 8's claims to fame is that it consists of only 40 percent

nitrogen from only Nutralene. This fertilizer took a considerable amount of time and moisture to "kick in." Number 10 has the lowest nitrogen percent of six. This one also has the lowest non-PGR readings on the color grade scale.

The last group are outstanding in color grade and below average clipping amounts. They also vary in price from \$2.52 to \$6.18 per 1,000 sq. ft. per year. Numbers 13 and 14 were the most expensive of the high quality fertilizers. Numbers 1 and 5 rated low in cost, average in color grade and below average in amounts of clippings produced. These two fertilizers would be the choices I would make for the next year's fertilizer program.

We in the landscaping/lawn care professions must be environmentally-conscious about what we do here at work and at home. For 30 years the horticulture industry has been blamed for many environmental ills. We must be tougher on ourselves and others and take the lead to make the environment our real cause and not just an advertising gimmick **LM**

Michael A. Jinks is groundskeeper at Aurora University in Aurora, Ill., and G. Allen Mayer is a student who helped conduct the project and write this paper.

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Nationwide testing gives Arid the lead.

Mean Turfgrass Quality Ratings of Tall Fescue Cultivars At Four Shade Locations in the United States

Name	Mean
Arid	6.0
Finelawn I	5.6
Trident	5.4
Pacer	5.3
Mustang	5.3
Apache	5.2
Tempo	5.1
KY-31	5.0
Falcon	5.0
Hounddog	5.0
Adventure	4.9
Jaguar	4.9
Bonanza	4.8
Olympic	4.8
Maverick	4.7
Willamette	4.6
Rebel	4.5
Clemfine	4.4
Brookston	4.4
Johnstone	4.0
Kenhy	3.4

Data from USDA National Turfgrass Evaluation Program

Drought Tolerance (Dormancy) Ratings of Tall Fescue Cultivars

Dormancy Ratings 1-9		9=No Dormancy	
Name	Mean	Name	Mean
Arid	7.7	Chesapeake	5.7
Olympic	7.7	Tempo	5.3
Apache	7.3	Hounddog	5.0
Jaguar	7.3	Pacer	5.0
Finelawn I	6.3	Johnstone	5.0
Mustang	6.3	Kenhy	5.0
Rebel	6.3	Maverick	5.0
Bonanza	6.0	Brookston	4.3
KY-31	6.0	Clemfine	4.3
Adventure	5.7	Trident	3.7
Falcon	5.7	Willamette	3.3
Finelawn 5GL	5.7		

Data from USDA National Turfgrass Evaluation Program

Brown Patch Ratings of Tall Fescue Cultivars

Brown Patch Ratings 1-9		9=No Disease	
Name	Mean	Name	Mean
Arid	6.3		
Adventure	6.2		
Jaguar	6.1		
Rebel	6.0		
Pacer	5.9		
Maverick	5.8		
Falcon	5.8		
Clemfine	5.7		
Apache	5.6		
Tempo	5.6		
Olympic	5.6		
Hounddog	5.6		
Chesapeake	5.5		
Finelawn 5GL	5.5		
KY-31	5.5		
Mustang	5.5		
Bonanza	5.5		
Trident	5.5		
Johnstone	5.5		
Finelawn I	5.3		
Kenhy	5.0		
Willamette	4.9		
Brookston	4.3		

Data from USDA National Turfgrass Evaluation Program

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Geotextiles solve erosion problems



These before-and-after photos, taken at a golf course in Meridian, Miss., illustrate the effectiveness of geotextiles in repairing an eroded creek bed. Once in place, the matting is invisible.

An increasing number of golf course superintendents are turning to lightweight, easy-to-handle geomatrix materials to manage areas pestered by soil erosion.

Usually constructed of woven nylon, geotextile matting provides turf roots in sloped areas with a secure reinforcement against the damage caused by wind and heavy rain.

Golf course superintendents who have tried geotextiles wonder how they ever got along without them. The typical scenario is one in which supers get tired of endless complaints from disgruntled golfers.

After heavy rain, they would have to suffer endless questions and comments on the unplayable condition of

one or two especially eroded and unsightly areas. Cart paths also fall prey to erosion after heavy rain. Inadequate drainage can worsen the problem, as can a creek that can't always handle the large volume of stormwater.

Skip Lambert, staff agronomist with Turf Services, a division of Erosion Control Systems, Inc., sug-

Fabrics stabilize, need little or no care

Jim Kirchdorfer of the Golf Development Co., Louisville, Ky., and agronomist Louis Miller, recently installed Supac, a geotextile made by Phillips Fibers Corp., a division of Phillips 66. The Louisville supplier was Irrigation Supply Co., Inc.

"We were basically looking for two main functions," says Kirchdorfer, "separation and stabilization."

Kirchdorfer has found bunkers especially tough to maintain. "You want to keep your sand nice and clean, and you don't want to infiltrate your drainage system," he explains.

"A correctly installed geotextile does this nicely."

Kirchdorfer says the geotextile stabilized weak areas besieged by heavy wheel traffic, and lessened erosion. The Supac geotextiles are made from polypropylene, a petrochemical-based polymer. They are chemically and biologically inert, will not decompose in soil due to bacterial or fungal action, and are unaffected by acids, alkalis, oils and most chemical solvents.

Materials are available in weights from four to 18 ounces per square yard; Each roll 15 feet wide and 150 feet long. □

Where to find geotextiles

ACF, Inc.

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Akzo Industrial Systems.

Circle No. 302 on Reader Inquiry Card
Atlantic Construction Fabrics, Inc.

Circle No. 303 on Reader Inquiry Card
Belton Industries, Inc.

Circle No. 304 on Reader Inquiry Card
Conwed Fibers.

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Dewitt Co.

Circle No. 306 on Reader Inquiry Card
E. I. DuPont de Nemours & Co.

Circle No. 307 on Reader Inquiry Card
Jonathan Green, Inc.

Circle No. 308 on Reader Inquiry Card
Hoechst Celanese Corp.

Circle No. 309 on Reader Inquiry Card
Hydro-Turf & Assoc.

Circle No. 310 on Reader Inquiry Card

North American Green, Inc.

Circle No. 311 on Reader Inquiry Card
Phillips Fibers Corp.

Circle No. 312 on Reader Inquiry Card
Proseed USA, Inc.

Circle No. 313 on Reader Inquiry Card
Reemay, Inc.

Circle No. 314 on Reader Inquiry Card
Warren's Turf Nursery, Inc.

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gests superintendents try the Enkamat three-dimensional nylon geomatrix matting. The soil-reinforcement matting, from Akzo Industrial Systems, Asheville, N.C., is placed on a sloped surface and covered with soil or sod. Vegetation takes root around the nylon fibers of the flexible geomatrix, making the soil almost impervious to damage by heavy water flow.

Once in place and covered by vegetation, the matting is invisible, adding an aesthetic appeal not available with traditional erosion control materials, according to Akzo.

Following an engineering survey at a golf course in Meridian, Miss., a proposal to stabilize the erosion in a two-phase project was approved by the club membership.

Phase I, which was initiated during the summer, was designed to take care of the most immediate concern, stabilizing the upper slopes of the ditch.

Taking action

The ditch was enlarged, straightened and the top slope dressed. The Enkamat, in widths from three to 15 feet, was rolled into place, cut and anchored with 10-inch wooden

Geotextile matting will secure roots in sloped areas against damage caused by wind and heavy rain.

stakes. Sod was installed on top of the matting. More than 4,800 square feet of matting and 54,000 square feet of sod were used.

"We used Tifton hybrid bermudagrass sod with roots that can grow to a depth of two feet in a year," says Lambert. "The matting serves as a root supporter, permanently anchoring the grass."

Phase II of the project will be put into action next year, and will involve laying Enkamat in the lower sections of the ditch.

According to Lambert, there are several advantages to using the nylon geomatrix rather than rip rap or concrete.

"It would have cost twice as much to use rip rap, and three times as much to use concrete to line the ditch," says Lambert. "We don't have rip rap in this part of the country, which means we would have to truck it in. Our experience has also shown that rip rap can be washed out in

heavy storms.

"Concrete is expensive," continues Lambert, "and water can get underneath it and cause it to crack. We would have had to worry about balls ricocheting off concrete or rip rap and hitting someone. You can't hit a ball out of a ditch covered with concrete or rock either."

Club members were also worried about what an endless stream of heavy trucks hauling in concrete would do to the course and cartpaths.

"Rip rap and concrete can also be unsightly," says Lambert. "Once we lay sod on top of it, you will never

see the matting. The result will be a channel lined with lush grass that will be pleasant to look at."

The maintenance crew found grass along the highly eroded creek banks difficult to mow. Once the grass takes hold in the matting, they will be able to go right up to the edge with the riding mower. Before, the area had to be cut by hand.

"These improvements will enhance the appearance of the course and along with some additional drainage improvements, reduce significantly the number of days the hole is unplayable," says Lambert. **LM**

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THE COST OF BEING CARELESS

Each day, more than five percent of service industry workers have an accident. Here's a look at how the costs add up.

by E.T. Wandtke

To most workers, safety means driving with caution and using equipment carefully. Yet, more than five percent of service workers have some type of accident each day.

The lawn care and landscape industries are not immune to danger, and costs for accidents are on the rise. Where are the costs of not being safe accounted for in most green industry companies? Can they be reduced, and preventive measures taken to guard against accidents in the future?

Where accidents happen

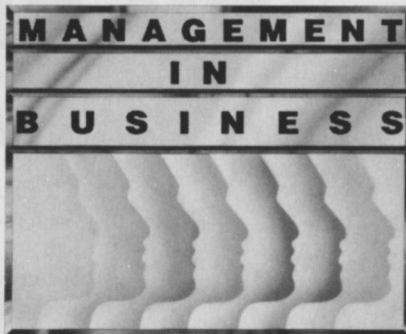
The three places where green industry accidents most happen are: in the shop, on the road, or on the job. Three other not-so-obvious locations are: parked along the highway or property being serviced, driving to and from work, and at home.

Where you pay

You pay for safety lapses with higher workman's compensation premiums. This cost is irrespective of where your accountant is charging the expense. The size of this premium is directly dependent on the size of your company and the job classifications which your employees are assigned to.

Disability insurance is another area where higher premiums will increase your safety costs. The premium rating for disability insurance is directly dependent on the experience the carrier is having with your industry and company. These safety costs may be charged by your accountant to a variety of different accounts depending on the sophistication of your bookkeeping system.

Many companies are experiencing insurance premiums averaging \$600-



\$800 per year per insured vehicle. In major metropolitan areas, the cost could be 50 to 150 percent higher.

Equipment breakdowns due to

More green industry companies are having their vehicle insurance rated by insurers because of accidents.

unsafe operation is another problem area. Motor vehicle accidents in the parking lot and on the highway increase your safety costs even though they may be accounted for as repair and maintenance expenses. Many companies incorrectly see this cost and blame the equipment for the cost. Carelessness in the workplace is accounted for in payroll costs, when an employee is paid for time off when injured, or while visiting a doctor or hospital.

Reducing the cost

Posting the days since the last auto accident, number of hours since

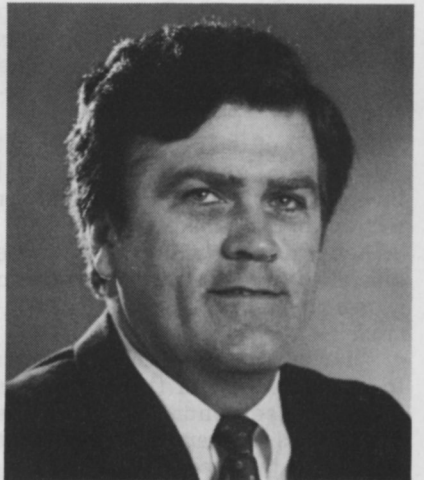
a lost production hour was recorded, or number of days since an employee missed work due to an accident are excellent visible methods of reducing your safety costs. Implement a safety awareness program to complement the posting idea. Provide a safety tip of the week or month. Institute a safe employee-of-the-month award.

Each of these efforts will increase your employees' safety awareness.

Financial incentive

A safety program requires the lead and involvement of management. Use reminders like buttons, pins, decals. All help to increase your employees' awareness of the need to be thinking and acting safely. Tying their safe job performance to a year end bonus has been used as a motivator in the past.

Don't wait. Make your company "safetywise" today. **LM**



Ed Wandtke is a senior consultant with All-Green Management Associates in Columbus, Ohio.

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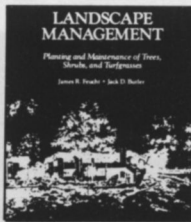
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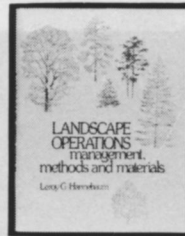
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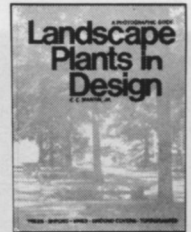
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by Leroy Hannebaum
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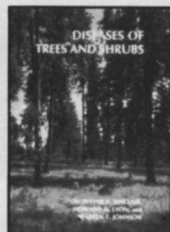
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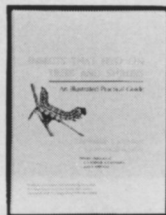
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by Edward C. Martin
An annotated black & white photographic guide to the design qualities of ornamental plants and their aesthetic and functional use in landscape designing. Over 600 trees, shrubs, vines, ground covers and turfgrasses are described in non-technical language. Over 1900 photographs. Provides a basis for selecting the best plant materials for any particular use in landscape design. Contains detailed indexes that provide quick reference to particular design qualities and growing conditions. **\$69.95**



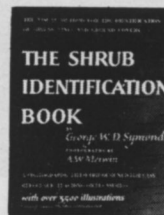
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by Richard W. Harris
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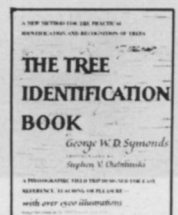
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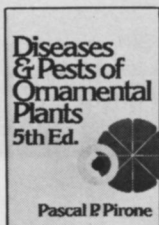
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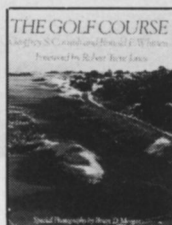
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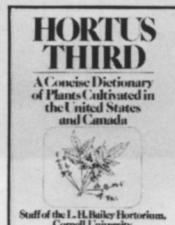
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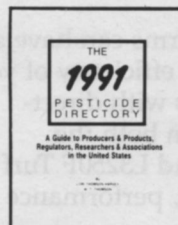
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