

**Table 2. TYPICAL CRITERIA FOR SOIL NUTRIENT LEVELS IN PARTS PER MILLION (PPM)**

Nutrient	Low	Moderate	High
Nitrogen (N)	0-10	16-20	21-30
Phosphorus (P)	6-10	11-20	21-40
Potassium (K)	70-119	120-174	175-300
Calcium (Ca)	180-459	460-749	750-3560
Sodium (Na)	99-399	400-999	1000-3000
Magnesium (Mg)	50-99	100-150	more than 150
Sulfur (S)	8-15	16-24	more than 25
Manganese (Mn)	0-0.99	1.00-1.49	more than 1.49
Copper (Cu)	0-0.10	0.11-0.15	more than 0.16
Boron (B)	0-0.39	0.40-0.59	more than 0.59
Iron (Fe)	0-3.19	3.20-4.19	more than 4.19

Nutrient	None	Slight	Moderate	High	Very high
Salinity (ppm)	0-600	601-1200	1201-2000	2001-3000	3000+

Some of the nutrients applied to turfgrass are used in small quantities. It is best to keep the level of all nutrients in the medium and high categories.

will apply to the entire lawn.

It might make sense to take two or three sub-samples from each of the 18 golf course fairways so that a single recommendation can be used for all the fairways, rather than try to treat each fairway differently. Sub-sampling accounts for any variation in the soil over any size area.

#### Extension or private labs

Several different kinds of soil testing services are available. Some fertilizer companies will run soil samples as a way to prospect for new business. In every state, the local agricultural university offers soil testing for a fee through the cooperative extension service. Your local county extension agent can provide details. Private labs also test soil samples. If you live in a large city, check the Yellow Pages for these labs.

Choose a lab that you trust and stick with it. If you send a sample of the same soil to each of several labs, the results may differ. Not all labs use the same analytical procedures, which accounts for some variation in results. Someone at the lab must evaluate the results and convert them into a recommendation you can use. Just how

good the recommendation turns out to be depends a great deal on the experience of the person making the recommendations. Make sure the lab has had experience in dealing with lawn or ornamental plant soil samples.

#### Test regularly, watch for changes

A single yearly soil sample can provide valuable information, but one of the true values in soil testing is to track soil nutrient levels over an extended period. In other words, it's important to soil test every year at about the same time.

Make note of any changes from one year to the next. While it's important to know what the soil level of a particular nutrient is, it also is very important to know if those levels in the soil are increasing or decreasing over the years. Most labs will report soluble salt levels. If you're in a part of the country that has possible salt problems, they may show up on the soil test result sheets before you notice symptoms. That gives you time to adjust the management program before any permanent damage is done. **LM**

## How to take a soil sample

1. Soil samples should not include any sod or surface debris. Scrape away the  $\frac{1}{4}$  to  $\frac{1}{2}$  inch of plant debris that occurs at the soil surface before taking a sample.

2. The final sample sent to the lab should represent the soil from the whole lawn. Since urban soils tend to be variable, a series of small samples should be taken from selected sites around your home. If there is a great difference between the front and back yards, you may wish to sample them separately.

3. Remove a small sample of soil from each of the selected sites. There's no need to go deeper than about 6 inches.

4. Mix all the soil from the selected sites together in a plastic bucket forming one large sample. Fill the plastic sample bag with about one cup of soil.

5. Fill out the soil sample information sheet completely. □

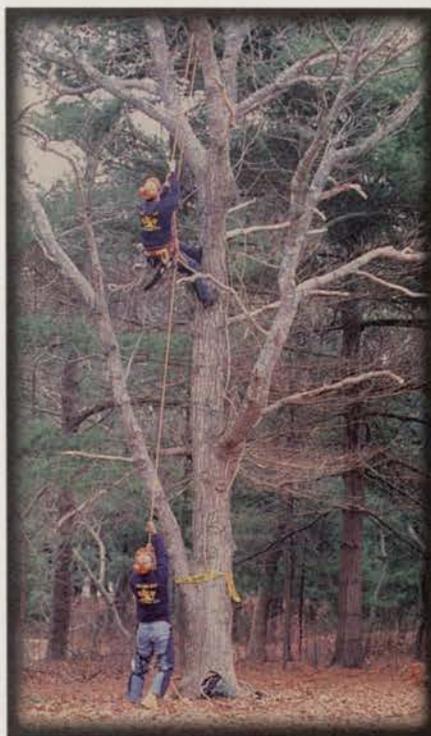
## Soil textures

**Clay:** Smaller soil particles with wafer-like shapes that provide greater surface area and higher water holding capacity.

**Silt:** Between clay and sand in particle size; spherical and cubical in shape.

**Sand:** Largest particle size; spherical and cubical shapes that provide smaller surface-to-volume ratio and therefore a soil that is better aerated and easier to work. Sand has the lowest water-and-nutrient holding ability.

**Loam:** A combination of all particle sizes, with the desirable attributes of each. □



ArborMaster Training combines climbing, rigging and cutting techniques from the logging and tree care industries.

## Climbing higher... and safer!

**T**im Crowley, owner of Crowley Landscaping, Marion, Mass., has been braving the many hazards of tree work for 10 years. Trained as a landscaper, he gained his tree care experience mostly by trial and error. He and his crews routinely did free climbs and cut improper hinges, two of the biggest dangers in tree care.

Crowley now admits that during the early part of his career, he didn't have the proper tools or specialized knowledge to keep him and his colleagues safe.

The ArborMaster Training Program—with its emphasis on safety and efficiency—changed the way Crowley conducts his landscape business, at least the tree work part of it.

ArborMaster Training teaches anyone who deals with trees the essentials for success: skill, safety and productivity. The program combines climbing, rigging and cutting techniques taken from logging and tree care industries.

### Safety often left to chance

Tree work can be hazardous work, and is not something to be learned solely by trial and error.

The National Safety Council says the major hazards to anyone who deals with tree maintenance include:

- ▶ falls from trees
  - ▶ contact with electrified limbs
  - ▶ trees and branches falling on workers
  - ▶ faulty work methods
  - ▶ high-speed power equipment.
- (The U.S. Consumer Product Safety Commission says that each year, 40,000 chain saw injuries require emergency care.)

- ▶ noise from the machinery

"I think back to all of the brittle trees we took down and how lucky we are not to have been hurt," says Crowley co-worker Timothy Nickerson.

At the ArborMaster training program, Crowley worked with arborists, utility crew and tree maintenance workers in three, one-day sessions. Each

of the course's three days are separated by several weeks, to allow students to absorb and practice the lessons of the previous session.

"The three-level program teaches strong foundational skills, so it can be tailored to individual needs," Palmer says.

More landscapers have become involved in the program as more customers prefer one company to do the majority of work on their property, Palmer says.

Crowley says risk to himself and his employees have been minimized, thanks to ArborMaster. He and his employees also wear uniform safety apparel and follow safety procedures closely.

He's now a firm believer and follower of the "HOPE" system. HOPE is an acronym for—Hazards, Obstacles, Pre-plan and Equipment.

Crowley says ArborMaster Training gave him a new professional attitude.

"Before, he felt like he was missing something, not doing the job the best possible way," Nickerson says of Crowley. The training has also given him added confidence. **LM**

—For more information on ArborMaster Training, call (770) 419-2026; or write P.O. Box 1048, Hiram GA 30141-1048.

# Staying productive in the summer heat

It's been a long time coming, but the hot days of Summer '96 are here. But there are ways to keep yourself and your crews productive no matter how high the temperature.

According to the U.S. Department of Labor, nearly 25 percent of the U.S. workforce, like the golf/landscape industry, works in high-heat environments.

In one day, a person can lose as much as two to three gallons of sweat working in a hot environment, according to the National Institute of Safety and Health (NIOSH). If salts and fluids lost through sweat are not replaced, the body becomes dehydrated. Dehydration, if left untreated, can cause heat illness, adversely affect job performance—even cause serious accidents.

Sweating is the body's natural cooling mechanism because it helps the body main-

tain normal functions by reducing excess body heat. When high humidity is added, the risk of heat stress increases because humid conditions prevent sweat from evaporating from the skin. (See Heat Index Chart.)

Here are symptoms that can lead to heat illness: **loss of energy, dizziness or lightheadedness, nausea, muscle cramps and/or headaches.**

"By the time your body tells your brain that it needs fluids, and your brain tells you you're thirsty, dehydration has already begun," says Dr. Bob Murray of the Gatorade Exercise Physiology Lab in Bar-

## Hot tips to beat the heat

- 1) Reduce physical activity
- 2) Stay in the shade or wear a wide-brimmed hat.
- 3) Drink plenty of liquids, but...
- 4) Avoid alcohol, coffee and tea, or other drinks that cause fluid loss.
- 5) Do not take salt tablets.

rington, Ill. "The effects of dehydration are cumulative, yet dehydration and heat illness can be prevented if you drink enough of the right kinds of beverages."

Murray says workers should drink at least 4 to 8 oz. of fluids every 15 to 20 minutes

while working in the heat. For every pound lost, workers should drink two cups (16 oz.) of fluids to fully rehydrate their bodies. Besides water, if you can get carbohydrates and electrolytes (sodium, potassium, chloride) into your body, you will perform to higher standards. Fluids like Gatorade provide both. **LM**

## HEAT INDEX

		ENVIRONMENTAL TEMPERATURE (F°)										
		70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°
		Apparent Temperature*										
RELATIVE HUMIDITY	0%	64°	69°	73°	78°	83°	87°	91°	95°	99°	103°	107°
	10%	65°	70°	75°	80°	85°	90°	95°	100°	105°	111°	116°
	20%	66°	72°	77°	82°	87°	93°	99°	105°	112°	120°	130°
	30%	67°	73°	78°	84°	90°	96°	104°	113°	123°	135°	148°
	40%	68°	74°	79°	86°	93°	101°	110°	123°	137°	151°	
	50%	69°	75°	81°	88°	96°	107°	120°	135°	150°		
	60%	70°	76°	82°	90°	100°	114°	132°	149°			
	70%	70°	77°	85°	93°	106°	124°	144°				
	80%	71°	78°	86°	97°	113°	136°					
	90%	71°	79°	88°	102°	122°						
100%	72°	80°	91°	108°								

**90°-105°**  
Heat cramps or heat exhaustion possible

**105°-130°**  
Heat cramps or heat exhaustion likely; heatstroke possible

**130° and up**  
Heatstroke highly likely

\*Combined index of heat and humidity...what it "feels like" to the body

Note: This Heat Index chart is designed to provide general guidelines for assessing the potential severity of heat stress. Individual reactions to heat will vary. It should be remembered that heat illness can occur at lower temperatures than indicated on the chart. In addition, studies indicate that susceptibility to heat disorders tends to increase with age.

SOURCE: NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

# Events

## JULY

**15: Michigan Nursery and Landscape Association,** Michigan Certified Nurseryman exams, Lansing, Mich. Phone: (800) 879-6652.

**25-27: Turfgrass Produc-**

**ers International Summer Convention and Field Days,** Sacramento, Calif. Phone: (800) 405-8873.

**28-30: Outdoor Power Equipment Institute's International Lawn, Garden**

**& Power Equipment Expo,** Louisville, Ky. Phone: (800) 558-8767.

**31-Aug.1: Professional Grounds Management Society/Midwest Association of Physical Plant Administrators summer grounds maintenance conference,** William Rainey Harper College, Palatine, Ill. Phone: (708) 925-6350.

## AUGUST

**2-4: Associated Landscape Contractors of America, Masters in Management seminar,** Chicago, Ill. Phone: (800) 395-2522.

**2-4: Associated Landscape Contractors of America, Certified Landscape Technician exam,** Front Range Community College, Fort Collins, Colo. Phone: (800) 395-2522.

**2-4: North East Green Expo '96,** The OnCenter, Syracuse, N.Y. Phone: (315) 682-6542.

**7: Illinois Landscape Contractors Association Summer Field Day,** Onarga, Ill. Phone: Lenore Dupuis, (847) 272-9542 or Julie Nicoll, (708) 932-8443.

**7-8: Penn State Turfgrass Field Days,** Joseph Valentine Turfgrass Research Center and Landscape Management Research Center, University Park, Pa. Phone: (814) 863-3475.

**10: Associated Landscape Contractors of America, Certified Landscape Technician exam,** Prince George's Community College, Largo, Md. Phone: (800) 395-2522.

**10-14: International Society of Arboriculture Annual Conference and Trade Show,** Cleveland, Ohio. Phone: (217) 355-9411.

**15: Michigan Nursery and Landscape Association Summer Workshop,** Michigan State University. Phone: Amy Frankmann, (800) 879-6652.

# Info center

VIDEOS AND LITERATURE FOR THE GREEN INDUSTRY

**WATER ON THE COURSE...**As the perfect working reference, "Guide to Golf Course Irrigation Systems Design and Drainage" covers program scheduling to operation and maintenance of an irrigation program. The 400-page book costs \$45, plus \$3.50 shipping in the U.S. Now available from: Ann Arbor Press, P.O. Box 310, Chelsea, MI 48118; (800) 858-5299.

**CUT LEGAL COSTS...**The "CEO's How-to Guide for Successfully Managing and Controlling Attorneys, Legal Costs and Litigation Risks" is \$45, but write your order on letterhead and it's just \$22.50. The 1996 edition, based on actual cases, contains more than 30 pages of tips, techniques, tactics and strategies. Information and ordering: Pickering, Bell & Major, 580 Broadway, Suite 121, Laguna Beach, CA 92651; (714) 376-6188.

**INSECT TRAPPING...**"How Insect Pest Trapping Can Save You Money" is free from Gempler's. It explains the difference between visual, unbaited and pheromone baited traps, and shows how to interpret the results. Contact: Gempler's, Insect Trapping Guide, P.O. Box 270, Mt. Horeb, WI 53572; phone (800) 382-8473 or fax (800) 551-1128.

**BIZ TIPS...**"Small Time Operator" is a 224-page soft-cover book that carries the subtitle "How to Start Your Own Small Business, Keep Your Books, Pay Your Taxes, and Stay Out of Trouble!" The volume, written by certified public accountant Bernard Kamoroff, contains all the ledgers and worksheets you will need for a year. More than 475,000 copies are already in print. The book is available at most bookstores across the country, but can also be ordered by mail: send \$16.95 (includes shipping & handling) to Bell Springs Publishing, Box 640, Bell Springs Rd., Laytonville, CA 95454. For more information, phone (707) 984-6746.

**ALCA REPORT...**The Associated Landscape Contractors of America has released its 17th Crystal Ball Report: "Measurements, Reports, and Monitoring in a Total Quality Landscape Company." The report is a compilation of member reporting experiences, with copies of actual forms, reports and procedures used by the companies. Included is an examination of the total quality philosophy and steps to take to measure quality in the landscape industry. The report costs \$8 for ALCA members, \$18 for non-members. To order, contact ALCA at 12200 Sunrise Valley Dr., Suite 150, Reston, VA 22091; (800) 395-2522.

The Tessenderlo Group of Brussels, Belgium acquired **Hickson Kerley**, the manufacturer and marketer of specialty liquid fertilizer products like N-Sure, Formolene-Plus, KTS and Trisert. The company's name has been changed to Tessenderlo Kerley. Jordan Burns is CEO and Livio Lederer is president of Tessenderlo USA.

**Jacobsen Div. of Textron** announced winners of its Pacesetter Awards: Bill Barrett (Sawtelle Bros., Lawrence, Mass.), Brian VanderBaan (Valley Turf, Grandville, Mich.), Rod Durham (Illinois Lawn Equipment, Orland Park, Ill.), Dave Combe (Rocky Mountain Turf & Industrial Equipment, Salt Lake City, Utah), Bobby Johnston (Horizon Turf, Phoenix) and David Bunting (Capital Ford New Holland, Bryant Ark.).

**American Cyanamid's** Amdro fire ant insecticide is a new sponsor of "Shadow Traffic" radio broadcasts in Tampa, Orlando and Houston and a special Fire Ant Alert which began in mid-March on the Weather Channel's "Weekend Outlook," "A Look Ahead" and "Gardener's Forecast" segments. The company also named two new territory managers: Scott Turner in the Midwest and Kit Rowe in the Mid-Atlantic.

The Vermeer Charitable Foundation, administered by family members of **Vermeer Manufacturing**, recently made a \$10,000 grant to the National Arborist Foundation. "This money will provide for future scholarships to advance arbori-

culture and horticulture students' educational endeavors," says Paul McFarland of the NAF.

Wade Jacklin is new sales coordinator at **Medalist America**. His responsibilities will be customer satisfaction and blending and shipping coordination.

Dr. Erik K. Nelson has joined **JacklinGolf** to provide agronomic support to **Jacklin Seed Company** distributors located in the U.S. and assist with development of **JacklinGolf** activities. He is in charge of company technical publications, educational seminars and marketing.

**United Horticultural Supply** has added a Canada Division to service Ontario, Quebec and the Canadian Maritime Provinces, British Columbia and Manitoba, according to U.H.S. president Bert Eddins.

Bill Merrigan has joined **Zajac Performance Seeds** in the newly-created position of production coordinator. He will work out of Albany, Ore.

**Zeneca Professional Products** has named Matt Giese as product service lead for the Midwestern and Western U.S. He will operate out of Lincoln, Neb.

Paul Beazley is **Sandoz Agro's** new turf & ornamental sales representative for the Midwest: Illinois, Wisconsin and Missouri. He can be contacted at (847) 605-8180.

News from **Hardie Irrigation**: Christopher Todd Walden is sales manager for the Mid-At-

lantic territory; Denise Hoover and Kyle Crooke are specification managers; and irrigation contractors Ty Davis of Austin, Texas and Rick Jones of Bonsall, Calif. are winners of Harley-Davidson Sportster 883 Huger motorcycles from Hardie. David Andersen is product manager for the commercial controller line. He comes to Hardie from the Camcar Division of Textron, where he served as a sales representative and product manager.

Natural Fertilizer of America has acquired the business operations of **Sustane Corp.** and Bio Grounds Keeper. Sustane's new corporate headquarters is located with its manufacturing facility in Cannon Falls, Minn.

Five college landscape students are participating in **Hunter Industries'** 1996 Fellowship Program: Penny Batelli (Univ. of Ariz.), Mark Battaglino (SUNY Cobleskill), Steven Beattie (W. Va. Univ.), Dennis Golya (Cuyamaca College) and Greg Harteagan (Kansas St. Univ.). Mike Kearby is Hunter's new vice president of marketing.

The Homestead Co. of Slatersville, R.I. changed its name to **The Homestead Nitrogen Corp.** The company's methylene urea product, Nutralene, which has been sold through **AgrEvo USA**, is now marketed by Homestead. **Lebanon Seaboard Corp.** will be the distributor of Homestead bagged products.

**The Scotts Co.** has a new interim chief executive officer, Tadd C. Sietz, the current chair-

man of the Board of Directors and former CEO. Seitz will sit until a replacement is found for Theodore J. Host, who resigned. Scotts' common stock is now listed on the New York Stock Exchange, using the symbol SMG, to represent the Scotts/Miracle-Gro merger.

A new four-color catalog featuring its 1996 product line is now available from **Husqvarna Forest & Garden**. The 56-page catalog is available by calling (704) 597-5000.

**Briggs & Stratton's** 5K Fun Run/Walk competition will be held on Monday, July 29, the second day of the Outdoor Equipment Expo in Louisville, Ky. The event is open to all show attendees and will be held on Expo grounds. Interested contestants may register at Briggs & Stratton's inside booth in the South wing of the exhibit area, #3510. The race will benefit the Special Olympics.

**Snapper, Inc.** has promoted Mark Smith, a 10-year company veteran, to the position of Commission Distributor Sales Manager. Smith joined the equipment company in 1986.

**Highway Equipment Company** is folding its Groundskeeper line into its widely-known Hi-Way line. The Hi-Way line has been selling its Model P and Super P pickup-mounted salt and sand spreaders to lawn and landscape businesses for more than 25 years. With the addition of the Groundskeeper line, Hi-Way will continue to target this

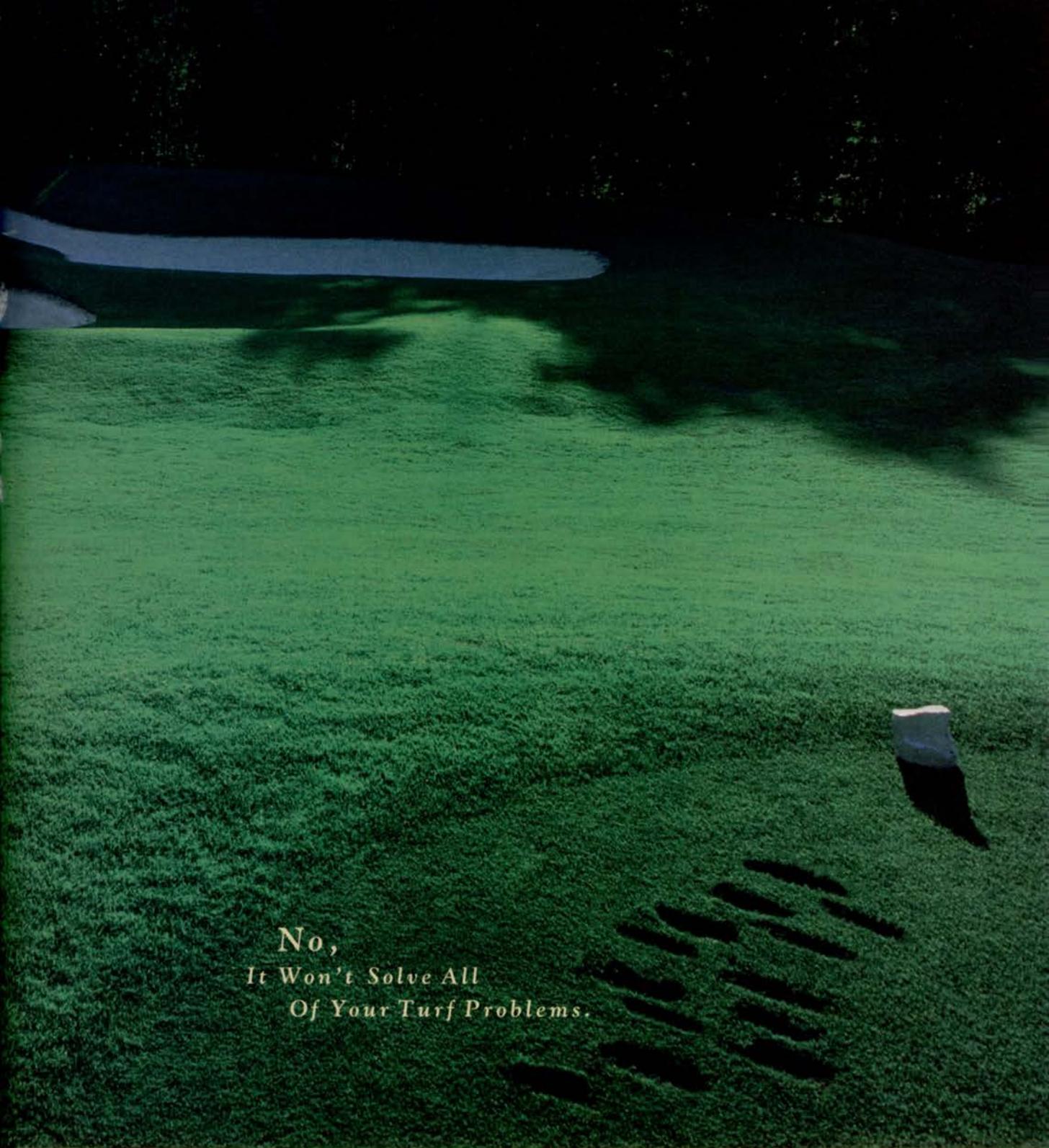
A FEW WORDS ABOUT NEW CHIPCO ALIETTE SIGNATURE.

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to expect from CHIPCO ALIETTE, plus cost-effectiveness that no other turf stress management option can offer. And, CHIPCO ALIETTE SIGNATURE not only helps your turf stay more vigorous and healthy, but it actually enhances its appearance, too. This year, let new CHIPCO ALIETTE SIGNATURE fungicide take some of the stress out of your life. Because, goodness knows, you've got enough problems to worry about.

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Circle No. 119 on Reader Inquiry Card

## > SUPPLIERS CORNER

market by manufacturing the pickup and trailer-mounted AG-18 leaf vacuum; the AM-23 and AM-30 axle-mounted leaf vacuums; and the fully-hydraulic, pickup-mounted Dump "E" dump box.

Carlos Ryes and Charles Wise received scholarships from the **O.M. Scott**/Golf Course Superintendents Association of America (GCSAA) Scholarship Program. Each received \$2500. As part of the scholarship program and selection process, both Reyes and Wise served as 1995 summer interns with Scotts.

**The Promersberger Company**, a full-service marketing, advertising and public relations

agency specializing in the construction and industrial markets for more than 20 years, has been named agency of record for **Burkeen Manufacturing Company**. Burkeen makes and markets trenching equipment, including vibratory plows, hydraulic walk-behind trenchers, and hydrostatic riding trenchers.

Richard H. Elyea has joined **Tee-2-Green Corporation** and **Turf-Seed, Inc.** as a turfgrass consultant. Elyea provides domestic and worldwide site-specific recommendations on turfgrass, agronomic and environmental issues for golf course architects and designers. Elyea earned a degree in horticulture from Iowa State Univer-

sity, specializing in turfgrass management. A former golf course superintendent, Elyea has 10 years of experience in marketing seed and fertilizer to golf course and sod production accounts.

**Foley United** and American Equipment Leasing will jointly offer lease financing to help golf courses acquire Foley United reel grinding equipment. Foley United, a division of Foley-Bel-saw, is a leading maker of reel grinding equipment, located in River Falls, Wisc.

Tom Duffy has been named national sales manager of **Morbark's** E-Z Beaver Sales Company. He will head up sales of the company's line of hand-fed E-Z Beaver brush chippers.

**FMC Corporation** has named Amy Gabrielian sales representative for the Midwest. She is responsible for promoting the company's line of pest control products in a nine-state territory. Gary Cramer is FMC's new technical representative for the Western region. Janet Holland now represents the company's lawn and tree products for landscape and golf course industry in 12 Midwestern states.

At **Seed Research of Oregon, Inc.**, Stephanie Ward has been promoted to advertising manager. Ward has been with the company since 1987.

Virgil D. Meier, Ph.D., of **The Scotts Company**, recently received the John A. Long Excellence in Research Award. Meier has been with Scotts for

25 years. He is an expert in turfgrass variety development.

**Rain Bird Sprinkler Manufacturing Corp.** will enter a float in the Tournament of Roses Parade, scheduled for January 1, 1997. The float will have an Egyptian theme, as the ancient Egyptians invented many irrigation techniques.

**Gempler's**, makers of personal protective equipment and tools for integrated pest management practitioners, has hired Dr. Rami Soufi as a member of its team of technical specialists. Soufi earned a Ph.D. in Plant Pathology from Oklahoma State University.

**Warren's Turf Nursery**, Crystal Lake, Ill., was sold in May to E.J. Woerner & Sons, Inc., of West Palm Beach, Fla. The acquisition is meant to broaden Woerner's geographical base by adding operations in Georgia, Virginia, Indiana, California and Hawaii.

Jerff Carowitz is marketing manager for **Hunter Industries'** residential, commercial and large turf products. He oversees domestic and international marketing activities for the irrigation equipment manufacturer.

**Ransomes** is the exclusive turf maintenance supplier for the St. Andrews Links in Fife, Scotland. Under a three-year rolling agreement, only Ransomes, Cushman and Ryan equipment will be used to maintain the six public golf courses which comprise St. Andrews. **LM**

# WAIT'LL YOU HEAR WHAT ECHO'S DOING TO

GET NOISE PROBLEMS  
OFF YOUR BACK!

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Circle 112

**Last Year, It Was Daconil Ultrex®  
To Bring Fast, Thorough Mixing  
To Dry Fungicides.**

**Now, It's New Daconil Weather Stik™  
To Bring Greater Sticking Power  
To Flowables.**

**These Micrographs Show It.**



**Daconil Weather Stik**

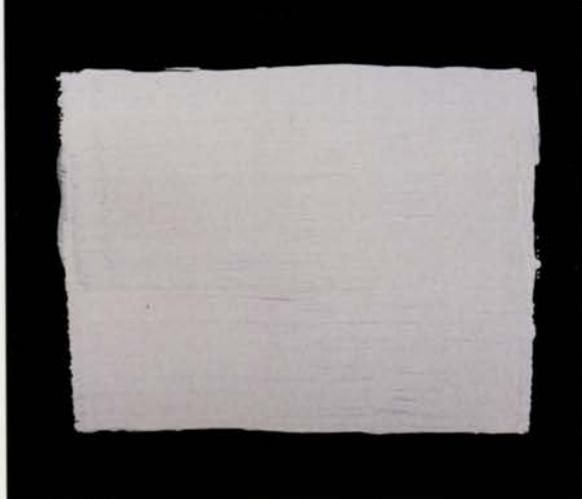
Chlorothalonil Fungicide  
after a 1/2" rain stress (SEM - 330X)\*



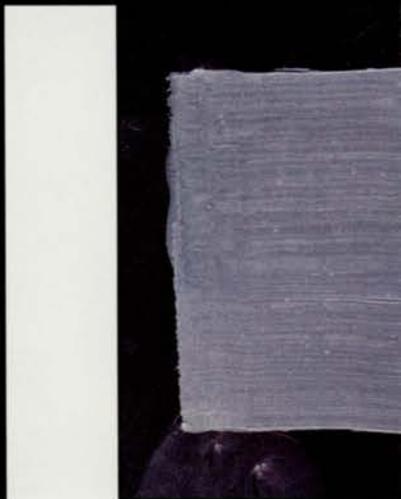
**Flowable Generic**

Chlorothalonil Fungicide  
after a 1/2" rain stress (SEM - 360X)\*

## **Daconil Weather Stik Chlorothalonil Fungicide**

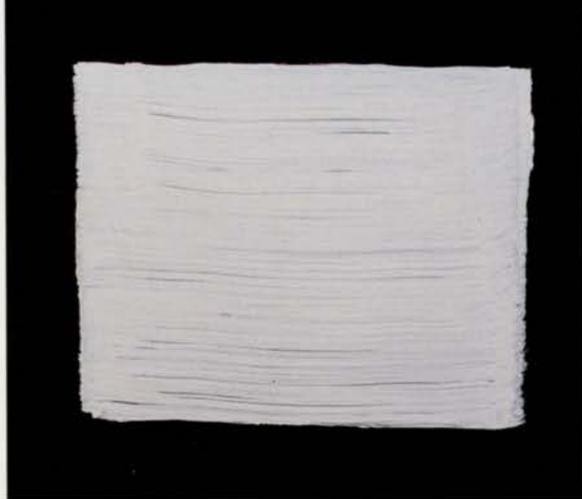


*Initial Application*

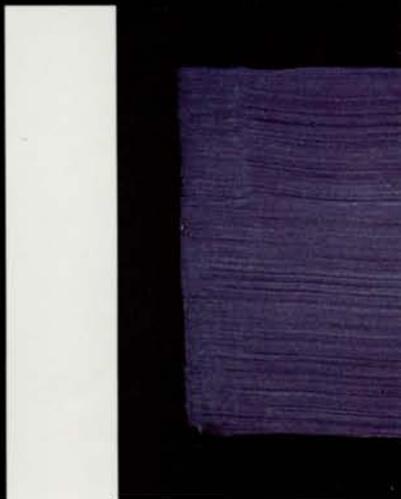


*After Moderate Simulation*

## **Flowable Generic Chlorothalonil Fungicide**



*Initial Application*



*After Moderate Simulation*

## **And Wash-Off Tests Show It, T Sticks And Stays Like T**

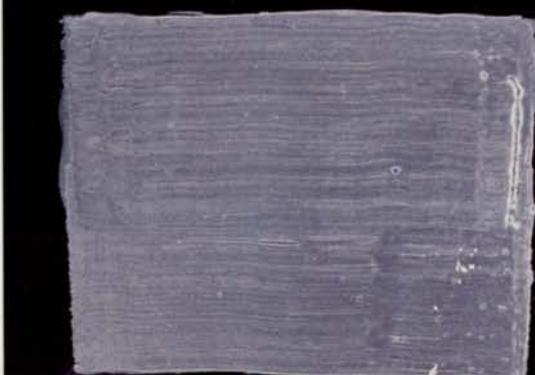
They say seeing is believing, and here's enough seeing to make anyone a believer. Because high magnification scanning electron microscopy of treated turf samples shows it. And so do Plexiglas<sup>†</sup> wash-off studies — studies that have been shown to correlate directly to real-world performance. New Daconil Weather Stik<sup>™</sup> fungicide sticks and stays like the competition can't.

So when other fungicides might wash away, you can continue to count on Daconil Weather Stik for control of major turf diseases on both warm and cool season grasses. That includes brown patch, leaf spot, melting out, dollar spot, anthracnose, rust, red thread, and snow mold. Plus control of most ornamentals plant diseases and algal scum, too.

le



ed Rainfall/Irrigation



After Heavy Simulated Rainfall/Irrigation



ed Rainfall/Irrigation



After Heavy Simulated Rainfall/Irrigation

## Too. New Daconil Weather Stik The Competition Can't.

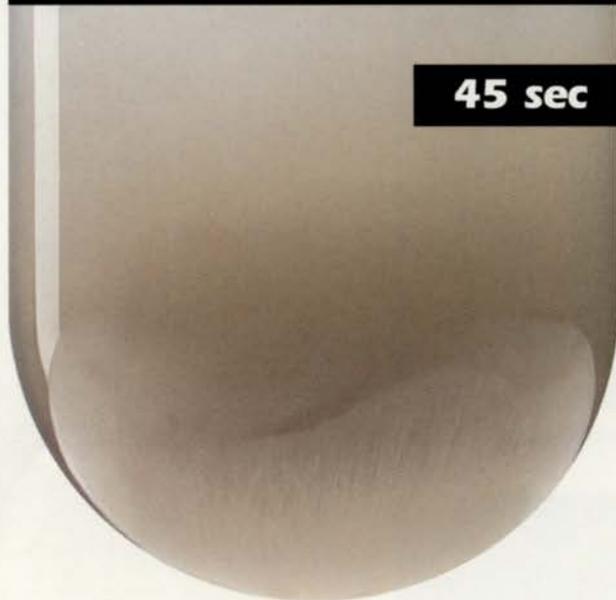
In addition, Daconil Weather Stik can be tank-mixed with a wide range of turf and ornamentals fungicides (consult label), so you can also count on it for broad-spectrum support of your systemics, as well as disease resistance management. Remember, there's never been a documented case of disease resistance to a Daconil brand fungicide in over 25 years.

And Daconil Weather Stik is more concentrated than prior formulations, so you'll have fewer jugs to get rid of, too. Which simply says from better protection to easier disposal, Daconil Weather Stik is the right flowable choice for you.



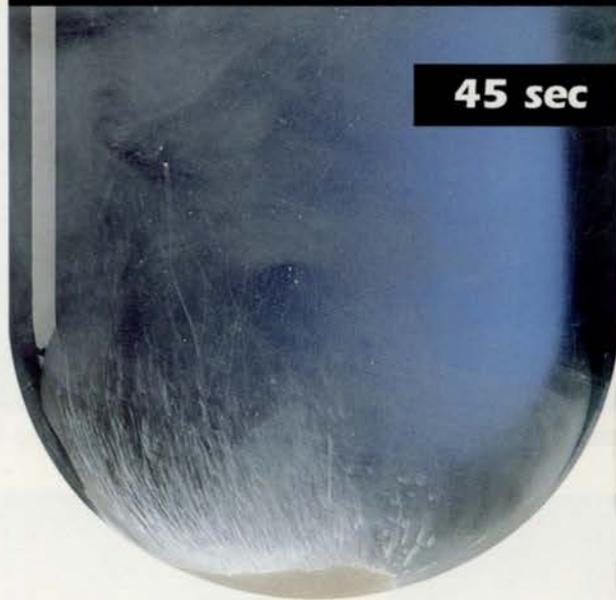
**Daconil Ultrex  
Chlorothalonil Fungicide**

**45 sec**



**Dry Generic  
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**T**he green industry continues to develop new ideas and career-building products. The golf/grounds industries provide numerous opportunities for employment and growth. Golf construction is trying to keep up with demand. There seems to be plenty of room for leaders, and followers are always welcome.

So many advancements have come along in the past seven or eight years: water injection aeration; plant growth regulators; and natural turf grown outdoors and sustained indoors for soccer.

Recently, we've seen new bentgrass varieties—such as the Lofts L-93 and Penn "A" and "G" series—that grow best at minimum heights and have incredibly dense growth habits.

We can make all kinds of new and improved products, yet we have trouble when it comes to finding, getting and enjoying cooperation from people.

Superintendents tell us of their struggle to find good help among American youth. One says it's been a couple years since a teen has even walked

in to apply for work at his golf course!

Try this message in your next ad:

*"Golf course seeks eager, energetic, curious people for outdoor summer work.*

*"You'll earn \$6/hour, and not have to take drive-thru orders for burgers and fries at 1 a.m. You get to work with people who can teach you a thing or two about the value of hard work, get a feel for an exciting and growing industry, and you'll also get free golf. We want you to be happy here!"*

(That \$6 might seem high, but it's part of the draw. Fast food's paying \$5.)

If that doesn't help bring in more able-bodied youth, there's still that alternate labor pool, composed of seniors, more women and migrant workers. They want to contribute and aren't afraid of work.

## Products are easy to work with, people are not.



*Terry McIver*

TERRY McIVER  
Managing Editor

**GOLF/GROUNDS**

PAGE 2 G ▶

Develop a greens rating system

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Semi-tropical management tricks

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Floods and freezes hard on turf

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Quality control for new greens

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Serenity is yours if you want it

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Cart paths not part of the game

Many superintendents still walk a narrow corridor between employment and dismissal, as their fates rest in the hands of club members who don't know what it takes to grow healthy turf-grass. Rainy weather or drought not only means the turf's in trouble; somebody's job might also be on the line.

Athletic field managers face a different problem, as funds from municipalities are cut.

It'll be nice when the business management consultants decide that it's time to start investing more in overhead.

That's when quality—all-around quality—will again be a desired commodity. **LM**

**Comments? Write Terry at** 7500 Old Oak, Cleveland, OH 44136; **phone him at** (216) 891-2709, **fax him at** (216) 891-2675 **or e-mail him at** 75553.502@compuserve.com.

# Why greens 'flunk'

*USGA Mid-Continent*

*Director Jim Moore proposes*

*a grading system (like in*

*school) to point you and your*

*greens committee members to*

*a workable greens improve-*

*ment program.*

by RON HALL / Senior Editor

**F**orget that you're a golf course superintendent and pretend that you're a grade school teacher. Ask your

greens committee members, even golfers at your course, to participate. Your task—all of you—is to grade each and every green on your course.

Do any of your greens deserve an "A"? Mark down a "C" in the column denoting average greens. Hopefully, you don't have many "F's" because if you do...well, as a superintendent, you know what's going to happen.

Why stop there?

James F. Moore, USGA director in Waco, Texas, suggests that the grading also extend to each performance category and stress factor affecting every green. This past winter he worked up a "Greens Performance Rating Sheet" for just that purpose. (See accompanying chart.)

For example, say the fifth green at your course is located on a slight rise with nothing surrounding it except two small bunkers, while the green at hole six, a much smaller green, is in a depression, surrounded on three sides by mature trees.

Which of the two greens is more prone to problems?

You might give the fifth green an "A" or "B" in the categories of "sunlight" and "air

circulation," and a "B" for "size." Meanwhile, the sixth green would probably receive lower grades in all three categories.

While it's unlikely you could upgrade or rebuild the sixth green into an "A" without materially changing its character, you could, perhaps, remove some of the trees or branches, and install fans to improve it a grade or two. That, in fact, may be enough to satisfy your membership.

The Greens Performance Rating Sheet provides two immediate benefits.

It gives you, the superintendent, greater insight into why some greens are so easy to maintain and, conversely, why others are seemingly always in trouble. It demon-



The USGA's Jim Moore says you can educate members with a greens grading system.

# Common failures of new greens

Your new greens are suffering and you need answers.

You've been a superintendent long enough to know that there is no specific maintenance formula that you can follow to ensure each green's success, including those built to USGA specifications.

Being a good turf detective, you focus on factors that could be affecting your new greens. You don't limit your thinking to a single cause, but consider combinations of causes, too.

To start the process, James Moore, USGA Mid-Continent Director, offers some trouble-shooting suggestions. You may have others.

## ► Greens open for play before

**they're ready.** Tender new grass plants aren't yet strong enough to sustain traffic.

► **Improper or incomplete cultivation** of the green, particularly after seeding or sprigging.

► **Poor location** leading to poor growing conditions. Are your trouble greens located in areas with shade and/or poor air movement?

► **Too much traffic.**

► **Improper fertilization** causing slow establishment. Pay attention to phosphorus. Phosphorus will move through sandy soils.

► **Poor water quality.** It's becoming common as more courses irrigate with treated wastewater.

► **Temperature extremes.** Do bent-grass greens make sense in the Deep South?

► **Pest/disease problems.** They're often associated with other factors such as lack of air movement and heavy traffic. Nematodes will become more of a problem as treatment options shrink.

► **Improper watering.** New greens require more precise irrigation than established greens. Their water requirements change as they mature.

"The first year of a new green's life will probably be the most difficult year of that green for the next 10 years," says Moore. "It's hard to bring in a new green. It's not normal maintenance."

strates that rarely does a single factor cause a green to suffer. It's usually a combination of factors.

But perhaps the bigger benefit is that the rating sheet will act as an educational tool. It will, hopefully, open the eyes of your greens committee and/or membership to the complexities involved in delivering top-quality greens.

"For the first time, you might get them (green committee members) to realize that improving a problem green is not just a matter of buying just one more piece of equipment, or planting the right grass," says Moore. "They'll realize that they have to look at all of the factors on the check list."

Moore says that any superintendent is welcome to use the Greens Performance Rating Sheet, or to adapt it in any way they feel will most help them.

"I cannot emphasize strongly enough the benefit of involving green committee members and golfers in the grading process. If nothing else, it helps drive home the point that successful green management requires their support and understanding," he adds. □

## Greens Performance Rating Sheet

Stress Factors	Green Number						etc.	PG
	1	2	3	4	5	6		
Sunlight exposure	A	B						
Air circulation	C	B						
Root competition	B-	B-						
Purity of stand (Poa/bent)	B	C						
Disease pressure	B	B-						
Insect pressure	A	D						
Walk on/off	D	C						
Cupping area	C	C						
Size	C	F						
Surface drainage	B	C-						
Internal drainage	B	C						
Irrigation coverage	C	D						
Overall historical performance	B-	C						
Greens construction*	1	2						

\*Construction key: 1-USGA Spec Green 2-Modified USGA Green 3-Pushup Green (native soil)

Instructions: Assign a letter grade--A, B, C, D, F--to each performance category or stress factor. Consistency in your ratings is key--as is assigning a grade for each green's overall performance. This will show the combined impact of the various stresses and which greens deserve the most immediate attention.





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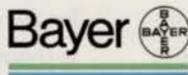
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In fact, MERIT is effective at rates 85% to 96% lower than other  
conventional soil insecticides. And when applied in the spring to control billbugs  
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activity to effectively control grubs throughout the summer.

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Do it for those in golf who actually like landing in trees  
and splashing in water hazards.





# Semi-tropical

*Use these maintenance hints to bring paradise—or a reasonable facsimile thereof—to your neighborhood.*

by STEVE & SUZ TRUSTY

**T**hink of Hawaii—sandy beaches, perfect soils, ideal weather and lush vegetation. But even paradise needs a little help from its friends to meet tourists' vacation expectations.

The island of Kauai's "red dirt"—a sticky, mucky clay—is one hindrance to plant growth at the Kauai Marriott Resort and Beach Club in Hawaii. Landscape superintendent Kevin Gavagan, however, has a multitude of answers to local problems.

"Red dirt is hard to push a shovel into, and it sticks to the shovel when you dig it out," explains Gavagan, who adds that the material drains and dries quickly to compensate for high moisture. "We create specific, pot-like planting areas for plants that prefer lighter soils. We tailor fertilization programs by plant type to include sufficient nitrogen at the proper intervals to sustain even plant growth."

▲ Salt-resistant seashore paspalum thrives on the lawn areas bordering the ocean.

▶ Gravel beds were added to the water features so they'd serve as biological filters.

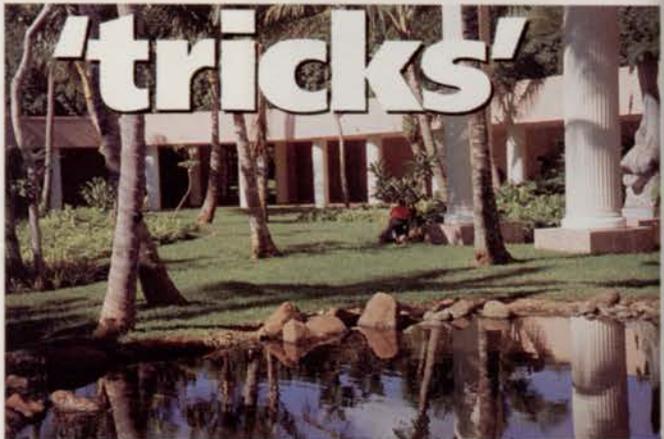
## High moisture, low light

It rains nearly every day in Kauai, so little irrigation is needed. And while the stunning rainbows breaking through the clouds delight tourists, light levels are too low for some sun-loving plants.

Almost unbelievably, seasonal fluctuations are also a factor.

"Though seasonal changes are minimal by most stateside standards, by December we've gradually lost one hour of light and five degrees of temperature, so adjustments must be made," says Gavagan.

"We do frequent changeouts of the annual beds to keep color at its peak. Impatiens here hold prime condition for about two months. In similar settings on Maui, they'll last five months. We also use the annual beds to create seasonal effects, such as the massive plantings of poinsettias during December."



# 'tricks'

## Other solutions

Gavagan increases landscape color with a wide variety of trees and shrubs so that several different plants will be in bloom at any given time. Some provide only a few weeks of color, but add texture and shape to the overall design. Others, like the bougainvillea, bloom year-round.

"Plants grow rapidly here, so tree and shrub trimming is a constant task," observes Gavagan. "At approximately 40 pounds each, a falling palm frond could cause injury or property damage. To avoid liability, coconuts must be removed when they approach the size of oranges."

Coconuts washing up on the beach become seedling trees. Windborne seeds sprout wherever they find a foothold. Small plantlets form in the blossoms of plants like

red ginger, and when the weight of the bloom drops the tip of the plant to the ground, these plantlets quickly root. Even trimmings left in place for a few days put out roots. So selective removal is as important as planting in maintaining the integrity and diversity of the design, Gavagan notes.

Invasive weeds and grasses also require constant attention. As aggressive kalinga grass struggles for a foothold on the sandy beaches, Gavagan fights back with the equally aggressive salt-resistant seashore paspalum on the lawn areas bordering the ocean.

#### Battling high costs

Any landscape renovation on Kauai is compounded by the natural limits of the remote islands—space, materials, equipment and transportation time and costs.

"We're gradually crowding out weeds and bringing existing turfed areas up to our standards," Gavagan says. "With labor costs included, sod runs \$7 per square foot. We can stolonize an area for \$1 per square foot, including labor. We've been working with St. Augustine planted in furrows of rhizomes spaced six inches apart. Our red dirt is deficient in phosphorous, so we incorporate 10-30-10 fertilizer during soil preparation to get it down to the rootzone.

"With our low light levels, it takes twice as long to establish here, about eight weeks, as compared to an average of four weeks on Maui. We'll get full fill-in by five months. To keep existing turf thick and thriving through all the rainfall, we keep steady fertility levels with applications of slow-release nitrogen every three months. Other nutrients are added according to soil

## Kevin's tricks:

WHAT:	Create pot-like planting areas for plants that prefer lighter soils.	WHY:	To correct areas with heavy soils.
WHAT:	Frequently change annual beds so plants are seen at their peak.	WHY:	To create seasonal effects where seasons are subtle.
WHAT:	Shape and control taller plants.	WHY:	To allow sun penetration and air movement to understory plantings, turf and groundcover.
WHAT:	Selectively remove some new plants promulgated by Mother Nature.	WHY:	To maintain diversity of the original design.
WHAT:	Use seashore paspalum on areas bordered by salt water.	WHY:	To keep invasive weeds and grasses from getting a foothold.
WHAT:	Avoid susceptible plant materials; use cultural practices to discourage pests.	WHY:	To let natural predators work and avoid extreme pesticide use.
WHAT:	Use ferns and vines as groundcovers.	WHY:	To provide cover for natural predators when people traffic becomes intense.

test results."

In the hard-to-establish shady areas, Gavagan also is using "El Toro" zoysiagrass, which is a good blend of texture and color with the St. Augustine. Because of its performance in tough spots, Gavagan plans to integrate "El Toro" with the bermudagrass in the sunny areas as well.

#### A little design

Gavagan worked with Kauai Nursery & Landscaping to create an open, interior courtyard with a meandering stream from what had been one massive pool.

"We brought in cranes and earth-moving machines to change the pool to a con-

throughout the islands.

To retain some of that original biodiversity, and to spread interest in and appreciation of the Islands' unique beauty, Gavagan plans to establish "pockets" of native areas on the property. "We'll plant natives in natural settings, mark the plants with their botanical names and Hawaiian names, the background of the plant, including the

crete 'pot,'" he says. "We planted mature trees through the membrane of the pool and used its existing suction lines for underground drainage. We added gravel beds to the water features so they'd serve as biological filters. Once excess water works its way through the natural organisms within the gravel beds to the suction lines, it's pure enough for landscape use. Smaller trees and shrubs were selected for their color, texture and form as well as their bloom cycles, so there's always something to see, night or day." □

—The authors are frequent contributors to  
LANDSCAPE MANAGEMENT.

## Native grasses are imports

Tourists seeing the Hawaii of today assume all the lush plants are native to the area, but many are tropical imports. Most are propagated for landscape use; others have escaped cultivation and "naturalized"

story behind its name, and its original and current use.

"For example, the kikuyugrass that holds the beach together against winds and washing was named for the priests, the kikuyus of the old island culture who held the people together throughout adversity."

—S.T.



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TO-160

2/96



# Of floods and freezes...

## Consider this:

► One million cubic meters of material were layered over the Nicklaus North Golf Course in Whistler, B.C., to bring it up to the flood elevation required by law.

► Fairways were raised six feet to ensure proper drainage to meet specifications for the 100-year flood (that is, a flood of a severity not seen but maybe once in 100 years).

► Greens and tees were raised 10 feet to meet the standards for the 200-year deluge.

► A finishing layer of sand, six inches thick, was brought in to ensure proper drainage and better rooting in the substructure.

The turf requires more fertilizer and water, but these considerations made it possible to seed the course in August of 1994 and begin play exactly one year later.

### Moving water

To deal with drainage problems, 20 miles of sub-surface drainage and a fully-automated irrigation system supply 1000 gallons per minute through 900 irrigation heads.

The design called for smooth-wall pipe rather than perforated pipe to increase water flow. Total cost for the upgrade: \$24,000.

Three lakes surrounding the course are interconnected with a 1.5 percent grade. Using



**Darren Burns plays two rounds a week at Nicklaus North: one to take notes, and another round for fun.**

18-inch perforated pipe helps minimize erosion, percolating out unwanted sediment. Superintendent Darren Burns adds that the bunkers were designed with a minimum 1% slope to ensure drainage. USGA-specified sand from nearby Harrison Lake fills the bunkers.

"The drainage issue has been solved as best we could," says Burns. "With all the grating, catch basins and pipes, we keep the water moving. Even on this new course we have no standing water."

### Water from Green

Lake is free, but its temperature is between 34 and 52 degrees. Early in the spring, with soil temperatures near freezing, Burns must ration irrigation to prevent freeze burn on greens and tees. The staff's only recourse is to use water sparingly, and wait for warm weather. Two greens are in constant shade and require hand watering with warmed water.

### Integration

A Vegetation and Habitat Management Plan integrates the course design with existing terrain, using topographical maps made

**Be sure that your greens care does not further aggravate heat-stress conditions.**

from aerial photos. Seven thousand trees—firs, cedar, spruce, pine, mountain ash and hemlock—were replanted, and 12- to 24-inch fescue were replaced as habitat for small mammals.

About 30,000 shrubs and aquatic plants were planted, and 120 bird, wood duck and bat boxes were placed around the course.

An Audubon Sanctuary certificate is another of Burns' goals.

As a golfer, Burns is able to view the course from a player's perspective and that of a superintendent. He plays one round a week to take notes, and another round for fun.

### Just ask

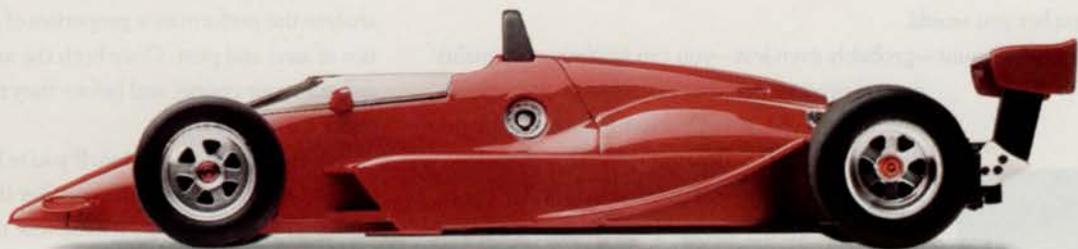
Burns is a talker. He'll answer questions from golfers, and he knows how to communicate with his staff.

Burns holds weekly meetings with his 24-man crew. They discuss positives and negatives to course maintenance. Burns relays what looks good and how it got that way.

He doesn't expect his crews to be as driven as he, but says, "I want the crew to think of the consequences when they are working. They need to evaluate their work and promote our product." □



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# A SMALL PRICE

*to pay*



► The grade of the gravel layer should follow the contours of the green, and be 12 inches below finish grade across the green.

by RON HALL /  
Senior Editor

If you could spend an extra \$1,000 during the construction of greens on your golf course, and eliminate problems that might later cause you sleepless nights, would you do it?

You bet you would.

For that amount—probably even less—you can implement a quality control program for your course-wide greens construction project, says Dr. Norm Hummel, Jr., president of Hummel & Co., a consulting and testing firm headquartered in Trumansburg, N.Y.

While a quality control program doesn't guarantee success, it reduces the risk of failure, explains Hummel. Here are stages of the greens construction process where quality control is essential, he says:

**Subgrade and installation of subsurface drainage.** Is the green's subgrade stable and compacted? Are the cavity edges firm? Do drain lines cover the entire green cavity? Are all pipe connections cemented properly?

**Gravel layer.** Test to ensure it conforms to the correct particle size. (The USGA provides guidelines for selection of gravel.) Make sure that the gravel that's delivered to your golf course is what you originally approved and accepted.

**Grade of the gravel layer.** It should follow the contours of the green, and be 12 inches below finish grade across the green. If the gravel layer is not uniform, it will result in varying depths of rootzone mix in different areas of the green. This could result in wet and dry spots on the green, and make the green difficult to irrigate properly.

**Rootzone mix materials.** Whatever the mix ratio, have the sand tested for correct particle size, and select a high quality peat. A laboratory can do tests to analyze the performance properties of different ratios of sand and peat. Once both the sand and peat arrive at your course, and before they're blended, check them again.

**Rootzone mix production.** If you're buying pre-blended rootzone mix from a supplier that sells mainly to the turf market, it's still wise to pre-approve 500 to 1,000 one-ton stockpiles prior to delivery.

If you're blending the rootzone mix at the golf course, establish a sampling procedure for each 500 to 1,000 tons. (Some professional blenders like the Kurtz Bros. in Ohio bring a quality control laboratory to the site.)

To get a rootzone sample, use a long narrow sampling tube known as a sand robber, but a length of PVC pipe works almost as well. Collect rootzone mix by sticking the tool into different areas of the pile.

Dump the material on a piece of carpet, mix it up, split it in half, mix the remaining amount, then collect about a gallon to be tested at a laboratory.

If you're in a hurry to find out about the rootzone mix, some laboratories provide priority testing services and can return results within 24 or 48 hours.

Hummel says all the quality control procedures he recommends won't add any more than \$1,000 to the cost of a greens' construction project, a small price to pay for added peace of mind. □



Hummel: Some laboratories can have soil test results within 24 or 48 hours.

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*Geoffrey R. Blind  
Golf Course Superintendent  
Hillendale Country Club  
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Circle No. 130 on Reader Inquiry Card

# The sun does shine, after all

*Winter's officially over, thank goodness. Now, for your own peace of mind, remember that it's more how you feel about what you do than what you do.*

by JERRY ROCHE / Editor-in-Chief

**C**all the winter long, harsh, cold, mean and nasty. Call a handful of golf course superintendents angry, shaken, perturbed, disgusted and scared.

But, as spring was breaking, Alan Culver was the picture of serenity. The GCSAA-certified superintendent at Mahoney Golf Course in Lincoln, Neb., was looking forward to the 1996 season with unbridled enthusiasm.

"The last 12 months have been the harshest I've ever seen," says Culver. "We had two months of non-stop rain last spring, followed by two months of absolute heat and blowtorch-type winds that caused ryegrass and bluegrass to go dormant. Then, we had a -50° wind chill factor in the fall that didn't give the grass a chance.

"Last night (April 28th) was the first decent rain of more than one inch that we've had since last June.

"You could fire every superintendent in Nebraska and the greens wouldn't have been any greener. Even the guys who have been around longer than me (20 years) have dead grass."

Culver was luckier than most, though an astute observer might add "smarter." Mahoney was ready for the spring onslaught of golfers, even though the course lost about 10 percent of its tees and fairways, and about 35 percent of its bluegrass/ryegrass roughs, which never came out of dormancy.

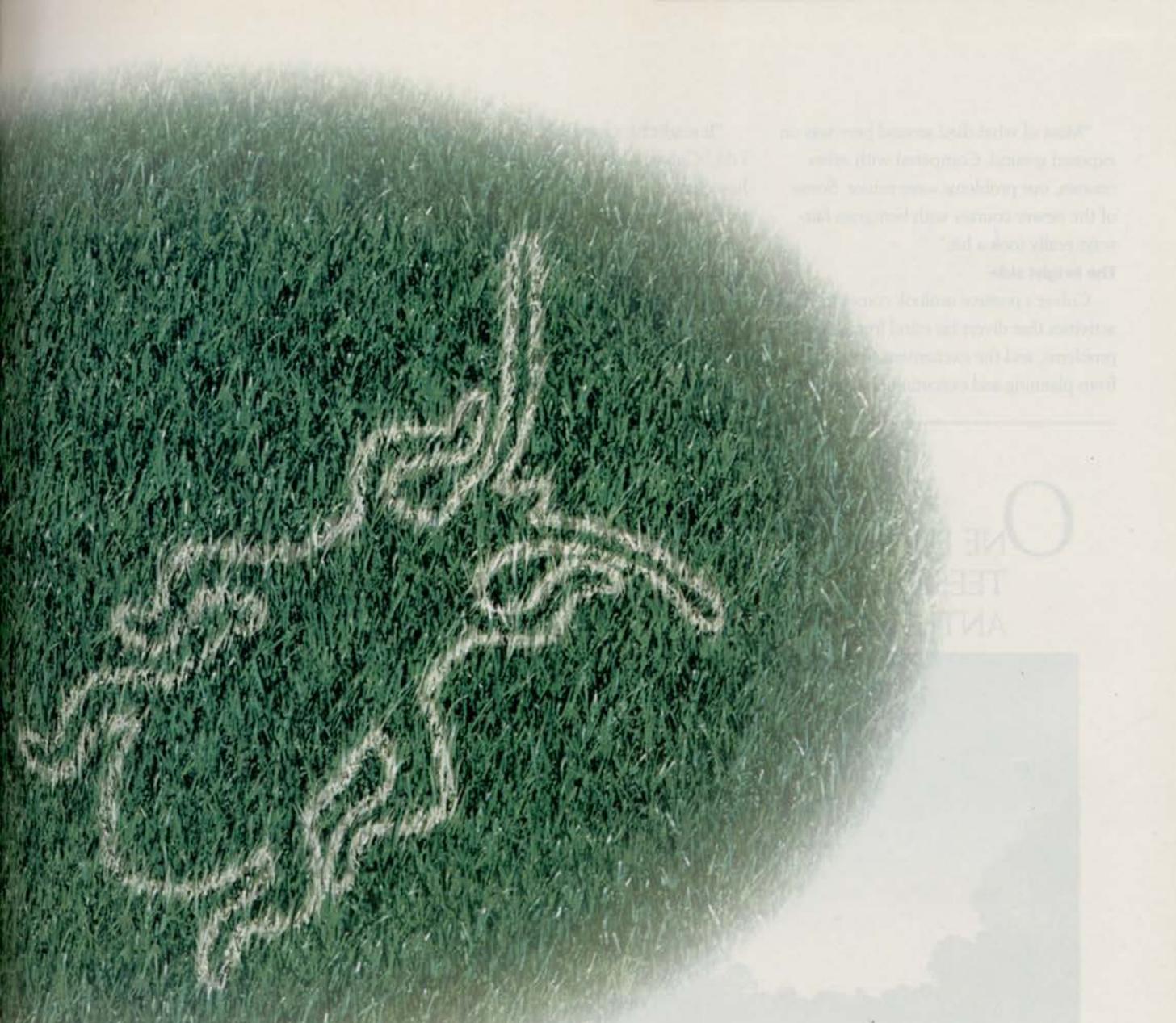


◀ *'You could fire every superintendent in Nebraska and the greens wouldn't have been any greener.'*

## Helping the grass

"There are certain things that we do religiously in the fall that helped our greens survive the winter," he says. "We give them a real heavy sand topdressing to where just the tips of the grass show and the crowns are covered. We also require 'Soft Spikes' from Nov. 15 to April 15 so we don't get damage from normal spikes on frozen greens."

This spring, 4000 lbs. of bluegrass/ryegrass seed went down on the course. Next comes spring deep-tine aerification to 9-10 inches. The greens will be overseeded again with the fall aerification.



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**FMC**

Circle No. 113 on Reader Inquiry Card

"Most of what died around here was on exposed ground. Compared with other courses, our problems were minor. Some of the newer courses with bentgrass fairways really took a hit."

#### The bright side

Culver's positive outlook comes from activities that divert his mind from the job's problems, and the excitement that comes from planning and executing new projects.

"It might be a hard job, but I love what I do," Culver admits. "But you've got to have some escapes. If the job is the only thing you've got, it'll drive you nuts."

His "escapes" are three: playing golf; spending time with his wife Jan, daughter Jennifer, 24, son Justin, 16, and six horses on a 20-acre farm; and interacting with his peers. He's an officer of the local superintendents' association.

"We get together and play golf once a week, what we call our 'travelling circus.' All the courses and country clubs and private people: superintendents, their assistants and sometimes crew members. Terry Riordan and Roch Gaussoin (turf faculty at the University of Nebraska, just down the road) come out, too, and every fall we have a tournament/supper with them and their students."

#### Rarin' to go

He's involved in two special projects this summer: planting prairiegrass (little bluestem, big bluestem and switchgrass) in out-of-play areas that don't require a lot of mowing; and installing a new \$500,000 double- and triple-row irrigation system "to help avoid the fairways getting toasted like they did last summer.

"Getting the new irrigation system is something I look forward to, because I didn't have a lot of experience when we put our first one in, back in 1975. I've shopped around. In Lincoln, the courses use a combination of two brands and four different computer-controlled systems, all less than five years old.

Aqua Engineering of Fort Collins, Colo., is designing an electric valve-in-head, computer-driven, state-of-the-art system for the course. "I'll be like a little kid in a candy store," Culver notes. "I'd like a radio-controlled system because then you can control any head on the course from your hand, and flow control so the pumps run as efficiently as possible."

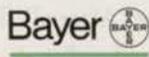
The last two years, water for irrigation cost \$60,000. Culver is convinced computer-based irrigation will reduce that. He's also convinced that the new system will free up most of the 10 to 15 hours a week his crews normally spend on irrigation repair. "Hopefully, it'll be a phased-in installation in the fall and we'll pull as much pipe as possible so that we don't have to trench the fairways and make a mess. Play shouldn't be interrupted. We'll also have water on the driving range for the first time." □

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Circle 104

# Cart paths bring materials and labor costs into play

by STEVE & SUZ TRUSTY

**C**art paths provide a hard-surface route for golf carts at frequently-damaged spots on the course, or in a course-wide trail. In times of wet weather, golfers can still play when cart paths are in place as an alternate route for fairway traffic.

Many superintendents believe cart paths are a convenience to the golfers, and that they help speed up play without adversely affecting course aesthetics.

## The road less travelled

Probable ball landing zones help determine path routes. Cart paths should be close enough to fairway landing zones to allow easy access for golfers, yet not so close the paths come into play.

Hiding cart paths from view along the edge of the roughs may be best for aesthetics, but forcing players to walk long distances from car to ball and back slows play. Construction materials that blend with the environment or accent other course features make visible

► **Cart paths should be wide enough and sturdy enough to support passage of heavy equipment.**

paths seem less intrusive.

The most appealing, functional and cost-effective cart paths are developed cooperatively between the architect, developer, course owner and superintendent. In today's litigation-happy environment, a civil engineer may be required in cart path design to insure structural integrity and user safety.

Environmental concerns should be addressed in the initial design stages. Paths, even on bridges or elevated crossovers, in wetlands or other environmentally fragile areas, generally require pre-approval by the appropriate regulatory agencies.

Cart paths, especially curbed ones, can be used to channel and control water runoff.

## Material mix

Material options have expanded greatly in recent years. Stone and simulated stone pavers come in a wide variety of sizes, shapes and finishes. Traditional rock and wood mulch materials have been joined by such "natural" by-products of regional industries as hulls and crushed shells. Concrete costs have dropped and installation methods improved. Textile reinforcement materials extend the life of asphalt and make spot repairs

more practical.

Native soils of sand or heavy clay may allow natural surface cart paths over most of some courses. These can be augmented in extremely wet or dry sections and heavy traffic areas with concrete, asphalt or pavers.

## Consider maintenance costs

Upfront costs, projected cart path "life" and long-term maintenance costs all must be considered.

Degree of use, site-specific characteristics and regional weather conditions influence cart path life. Natural and mulched paths may need annual renovation. Asphalt path life can range from 12 to 18





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years; concrete and interlocking paver paths may last 50 years.

"Bring the superintendent into the golf course design process early on to assess long-term maintenance," of cart paths, suggests Nolan Meggers of John Deere.

Meggers says to consider:

- Labor hours and cost
- Equipment needed to maintain paths
- Turf bordering the path

The superintendent, says Meggers, will see the practical aspects that better balance the cost equation.

"Maybe an elevated section of the path with sloping sides is planned to keep golfers from driving onto the fairway at a critical point," suggests Meggers. "But too steep a bank may limit mowing options or require considerable hand work with a string trimmer. Upkeep of a natural mulch path in a heavily wooded area may be less labor-intensive than continual removal of slippery fallen leaves from a concrete path."

A clearer picture of true costs can be obtained by tracking labor hours related to maintenance of cart paths and bordering turf in various sections of the course. This information is essential in plotting future budgets or when considering

cart path renovations.

#### Wide bodies

Consider equipment use throughout the course, notes Meggers. Cart paths become the preferred route in transporting equipment to the work site and such traffic does add to path use. Paths should be wide enough and sturdy enough to support passage of heavy equipment. Well-maintained paths expose equipment to fewer bumps and bounces, resulting in less adjustment, maintenance and repair time.

Cart paths are becoming wider, up to eight feet on single paths. Double lane paths of 12 to 14 feet accommodate heavy traffic near the club house, two-way traffic, double-back routes and stop-offs on par 5s.

Wider paths increase upfront construction costs but may pay for themselves in reduced maintenance because the biggest issue with cart paths is keeping golfers on them.

The "two wheels on the path, two wheels in the grass syndrome" of golf car maneuvers creates patches of turf wear and destruction at tees, greens and prime fairway landing zones. Curbs at these spots make it more difficult for drivers to stray from the path. Performed curbing "strips" or pres-

◀ **Fairway width and the flight of the ball make it difficult to keep paths entirely out of play.**

sure-treated lumber can be used to add curbing to existing paths. But consider extra string trimmer maintenance time that may be required along curbed areas.

If major path widening or renovation isn't possible, creating graveled or mulched cut-outs at regular intervals in heavy use areas may encourage golf car drivers to park or pass at those points.

Some cart paths cover only small sections of a course, often at tees. This results in extra turf wear at entry and exit points. A flared cart path at these points helps to spread the traffic over a wider section of turf, reducing the wear on any one spot.

#### A new angle

When golf cars stray from cart paths, the exit points along the fairway bear the brunt of wear, even when golfers are urged to employ the "cross at 90 degrees" rule. A system of changing those exit points daily, such as movable decorative

fencing, can keep turf damage within the manageable range.

During wet conditions, golf car entry onto the turf often can be restricted at specific sites by ropes strung along portions of the cart path. While this eliminates turf damage at those spots, it often transfers damage to the next most convenient exit point.

Even with rules in place, drivers of turf vehicles will often make sharp turns or sudden stops and starts, and tire tracks and turf wear patterns remain.

#### Wear-resistant turf

Grass varieties selected by the superintendent for wear, compaction tolerance and regional adaptability may better withstand moderate golf car stress. A well-planned program of cultivation, topdressing, irrigation, fertilization, mowing height adjustments and thatch level monitoring will increase turf density. Restricting turf access during overly wet or dry periods, when still-green turf is frozen or while turf is dormant can eliminate severe damage.

**LM**



The biggest issue with cart paths is keeping golfers on them.

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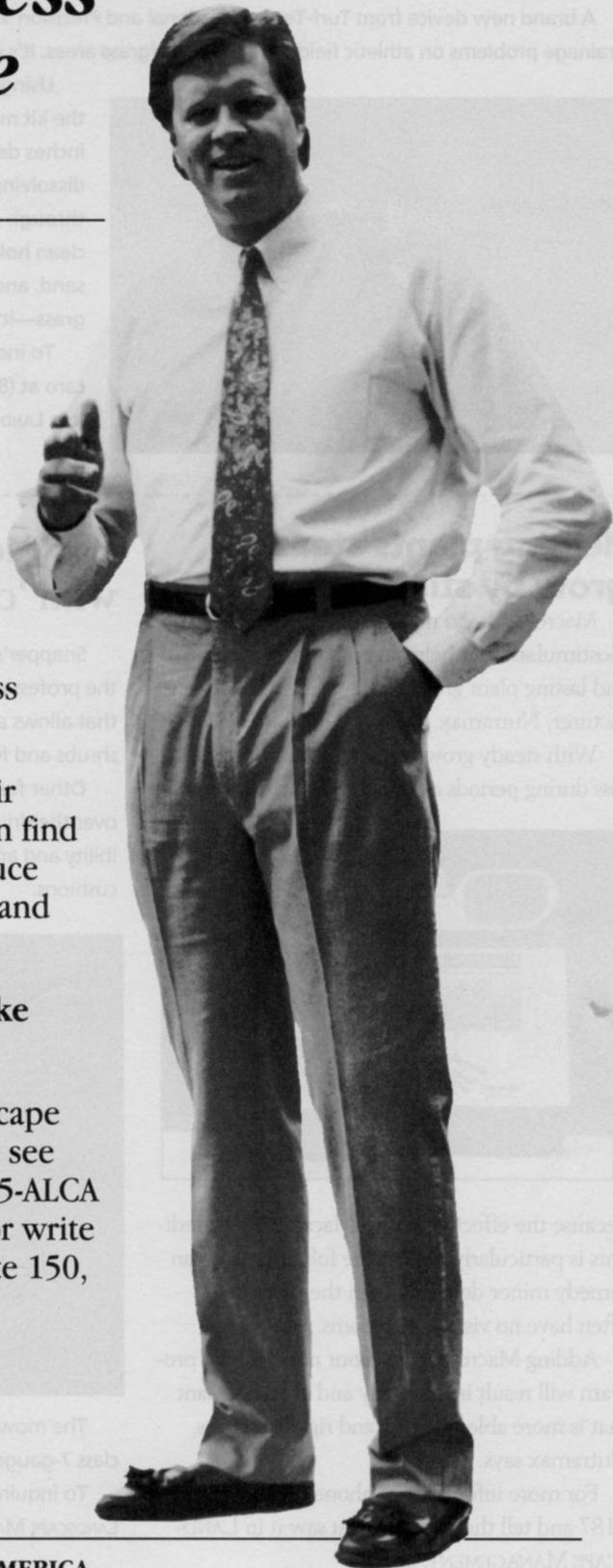
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## Eliminate small drainage woes with new kit

A brand new device from Turf-Tec International and Precision Small Engine Co. will eliminate small drainage problems on athletic fields and other turfgrass areas. It's called the Turf-Tec Drain-Jet Kit.

Using water from any irrigation system, the kit makes a clean vertical hole, 32 inches deep and 3 inches in diameter by dissolving and then exhausting the soil through a hose to a non-use area. The clean hole is filled with gravel or coarse sand, and—after replacing a plug of grass—it's ready again for play.

To inquire further, contact John Mascaro at (800) 258-7477 and tell him you saw it in **LANDSCAPE MANAGEMENT**, or

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## Helping plants steadily grow by stimulation

Macro-Sorb is a new amino acid-based plant biostimulant that helps maintain more uniform and lasting plant growth, according to its manufacturer, Nutramax.

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because the effectiveness of Macro-Sorb ingredients is particularly high at the foliar level, it can remedy minor deficiencies in the plant that often have no visible symptoms.

Adding Macro-Sorb to your normal IPM program will result in a healthy and efficient plant that is more able to withstand rigorous stress, Nutramax says.

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## Easy access comes with 'cruisin' mower

Snapper's TurfCruiser outfront mower for the professional market has a low-profile deck that allows access for mowing under trees, shrubs and fences.

Other features: users are positioned directly over the drive wheels for enhanced control; zero-turning radius steering; wide visibility and an ergonomically-designed adjustable high-back seat with padded vinyl cushions.



The mower comes with a 22 hp Kohler Command OHV engine, heaviest-in-its-class 7-gauge steel deck and 61-inch cutting swath.

To inquire further, phone (770) 954-2500 and tell the operator you saw it in **LANDSCAPE MANAGEMENT**, or

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## S. Carolina gets label

Pinpoint 15 granular insecticide has been approved for use in South Carolina against mole crickets in residential lawns, athletic fields, parks and commercial landscapes. According to Valent USA, the granular formulation makes Pinpoint more user-friendly in public areas such as golf courses.

For more information, phone (510) 256-2700 and mention **LANDSCAPE MANAGEMENT**, or

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