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Four things to control diseases in cool-season turfgrass

**Support the turf system:
mow, mulch, fertilize, and
use fungicides when all
else fails!**

by John Watkins, Ph.D.,
University of Nebraska-Lincoln

■ Plant diseases need a host, a pathogen, and an environment that supports their growth.

Environment is the key factor. Initial disease outbreaks and, often, their severity depend on temperature, moisture and



The plot on the left received no nitrogen. Notice severe dollar spot. The plot on right received 4 pounds of nitrogen/1000 sq. ft. during the season.



Mowing wet turf infected with brown patch caused the disease to spread along the mower's path.

humidity.

- An irrigation schedule that produces alternate wetting and drying of thatch stimulates the *Helminthosporium*-type fungi that cause leaf spot and melting-out.

- Close mowing, especially during summer, creates plant stress by depleting carbohydrate reserves, which play a key role in the plant's ability to defend against and tolerate disease.

- Extensive use of landscape trees and shrubs in turf areas reduces air movement, which increases humidity and extends dew periods that favor pythium blight and brown patch.

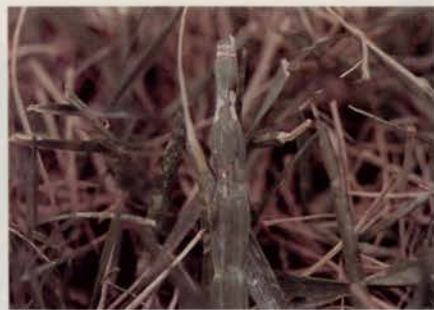
Fertilize properly—Kentucky bluegrass, the dominant cool-season turf in the temperate regions of North America, generally needs 2 to 4 lbs. of N/1000 sq. ft./season. Applications made in the late summer, fall and during dormancy are important when treating dollar spot, melting-out, summer patch and necrotic ring spot.

Studies at Michigan State University showed that applying 1 lb. of N per 1000 sq. ft. during each active growing month helped promote recovery of turf affected by necrotic ring spot or summer patch. Slow release nitrogen fertilizers and certain bioorganic fertilizers reduced necrotic ring spot intensity and helped promote recovery.

Probably the most critical fertilizer application is in the fall when shoot growth has stopped but roots are still actively growing.

Mow properly—Most cool-season turfgrasses do not like being mowed too short during the active growing season. The leaves generate energy needed for growth, reproduction and survival. Turfs mowed at 1 inch are more stressed and are more prone to disease than those mowed at 2.5 to 3 inches. Temperature is a key factor in turf pathogen activity, and the temperature is higher in a turf cut at 1 inch than in one cut at 3 inches. The taller turf has more biomass, is less dense, has better wear tolerance and has better recuperative capacity, all of which reduce its vulnerability to pathogens.

Mulch—Mulching recycles nutrients



A dull blade causes wounds that provide an entrance for pathogens.

and does not increase disease activity. Two key components to consider when mulching clippings are more frequent mowing and a mulching mower that chops the clippings into smaller pieces. Properly mulched clippings are used as nutrients by microorganisms that are antagonistic to pathogens. Long clippings can serve as a food base for pathogens and help pathogen mycelia move from plant to plant.

Use fungicides—Sometimes, no matter how hard a turf manager tries to follow good cultural practices, diseases still cause injury. Fungicides play a critical role in disease management.

Although turf managers have more than 30 different fungicides and fungicide combinations to choose from, no single fungicide product controls all major turf diseases. Products range from contact fungicides with 7- to 14-day residual activities to localized systemics and systemics that provide protection for 21 to 28 days.

In developing a fungicide program, consider which diseases present the greatest threat, which respond best to preventive treatment and which can be controlled by curative application. Some turf diseases are difficult to control once they are active. To defend against this, inspect the turf area regularly so you can detect early disease activity and make an immediate application.

—The author is an extension plant pathologist for the University of Nebraska-Lincoln.

Continued on page 44

Preventive and curative fungicide programs for cool-season turf diseases

Disease	Type of program	First application	Products available
Leaf spot/ melting out	P	May	chlorothalonil; iprodione; mancozeb; propiconazole; vinclozolin
Stripe smut	P	April or October	cyproconazole; fenarimol; flutolanil; propiconazole; thiophanate-methyl; triadimefon
Necrotic ring spot	P	When soil temperatures reach 60° at 2-inch depth	cyproconazole; fenarimol; iprodione; thiophanate-methyl
Fairy ring	P	At first symptoms of green ring	flutolanil
Dollar spot	P/C	June for ryegrass/ bentgrass	chlorothalonil; cyproconazole; iprodione; mancozeb; propiconazole; thiophanate- methyl; triadimefon; vinclozolin
Brown patch	P/C	June for ryegrass/ bentgrass	chlorothalonil; cyproconazole; flutolanil; iprodione; propiconazole; thiophanate- methyl; triadimefon; vinclozolin
Summer patch	P	When soil temperatures reach 65° F at 2-inch depth	cyproconazole; fenarimol; propiconazole; thiophanate-methyl; triadimefon
Pythium blight	P	June	chloroneb; ethazol; fosetyl-Al; metalaxyl; propamocarb
Rust	P	July	chlorothalonil; cyproconazole; mancozeb; propiconazole; triadimefon
Typhula blight	P	October/November	chlorothalonil; cyproconazole; fenarimol; flutolanil; iprodione; PCNB; propiconazole; triadimefon; vinclozolin
Fusarium patch	P	October/November	chlorothalonil; cyproconazole; fenarimol; iprodione; PCNB; propiconazole; thio- phanate-methyl; triadimefon; vinclozolin

P=Preventive C=Curative

Presented for information purposes only; no endorsement is intended for products listed, nor criticism for products omitted. Check with local specialists for specific recommendations. Read and follow label instructions. Chart provides approximate timing guidelines. Preventive treatment should be considered for turfgrass with a history of disease and should not be considered a blanket treatment for all turf. Remember, a successful fungicide program is one that is integrated with cultural practices. Proper fertilization and mowing may reduce the dependency on fungicides for disease control.

Source: Dr. Watkins

Fertility levels influence disease activity

■ During growing months, a ratio of roughly 3-1-2 balance of nitrogen-phosphorus-potassium will usually meet the plant's demand for nutrients. When this ratio becomes imbalanced, particularly when the nitrogen component is excessively high or deficient, many turf diseases become more severe.

A study at the University of Nebraska-Lincoln showed that nitrogen levels of 6 and 8 lbs. of actual nitrogen (N) 1000 sq. ft./season caused significantly greater brown patch intensity than 4 or less pounds on a Rebel tall fescue turf. At 4 pounds of applied nitrogen, brown patch severity was intermediate and at two pounds the turf quality was acceptable although a low level of disease activity remained. Although the

turf was more vigorous at the 6- and 8-pound nitrogen rates, disease activity extended later into the season. Our findings are consistent with the objective of using tall fescue as a lower maintenance turf requiring one to three pounds of nitrogen per season. Two-thirds of the nitrogen should be applied as a dormant treatment in the fall, followed by one-third in May.

Do not fertilize tall fescue during summer because of the threat of brown patch and the promotion of excessive growth during heat stress periods.

The presence of dollar spot and to some extent, leaf or stem rust often means the turf is under-nourished. At the University of Nebraska-Lincoln, we are studying the influence of nitrogen on dol-

lar spot intensity on Penncross creeping bentgrass and crown rust severity on Manhattan perennial ryegrass.

Dollar spot was significantly less severe when the bentgrass received 4 or 6 pounds actual N/1000 sq. ft./season than at nitrogen rates of 2 pounds or less. Similar results were noted for crown rust severity on ryegrass. Crown rust was severe on plots receiving 0 or 2 pounds actual N/1000 sq. ft./season. It was moderately severe at the 4 pound rate, and rust severity was light on plots receiving 8 pounds of nitrogen. In both the dollar spot bentgrass and the crown rust-ryegrass ecosystems, the higher rates of nitrogen stimulated plant vigor, which allowed the turf to outgrow the pathogens.

—Dr. Watkins

Warm-season control: longer growing season presents special problems

Proper warm-season disease diagnosis is essential to effective turf care. It can't hurt your professional image, either.

by Gary W. Simone, Ph.D.,
University of Florida



Helminthosporium blight on bermudagrass.

■ Disease diagnosis on warm-season grasses offers quite a challenge to the turfgrass manager. The longer growing season allows for longer periods of disease incidence and potentially higher plant pathogen populations on established turfgrass.

When one considers the number of grass species grown and the use of overseed during the winter period, the task of disease diagnosis becomes very complex. And there are often overlaps in disease incidence periods as well as soil pathogen complexes affecting turfgrass sites.

Common diseases

Anthracnose— Primarily a disease of centipedegrass, but can invade bahiagrass, bermudagrass and ryegrass. It occurs in warm, moist periods, often in sites stressed from winter damage, fertility problems, or nematodes. Control methods include stress elimination, thatch removal and fungicides if needed.

Gray leaf spot—More areas of intensively maintained bermudagrass are being damaged by bermudagrass decline. It also invades St. Augustinegrass, and has been associated with "patch" or decline diseases of centipedegrass, zoysiagrass and bahiagrasses. Low mowing heights, nematodes, other disease or soil insects encourage this

disease.

Brown patch—Perhaps the most widely-recognized turf disease, brown patch affects all warm-season grasses. This fungus is active between about 73-90 degree weather.

Brown patch is most damaging when temperatures are between 80 and 85 degrees.

Brown patch appears as three symptoms: as variably-sized spots that may span many feet in diameter; a second symptom is a "doughnut-like" ring, with healthy grass in the center. The third type is an aerial blight where tips of blades discolor as the fungus moves downward on the grass stems.

Maintain balanced fertility and avoid applications of readily available nitrogen sources during active disease.

Mow affected areas last and collect clippings if possible to avoid spreading the fungus. Dethatch turf, and apply fungicides at first sign of disease.

Cercospora leaf spot—Practically identical to grey leaf spot in appearance and timing. Initial spots are very small, and dark brown-to-purple in color.

As lesions mature, they turn tan in color, enlarge and can cause leaves to yellow, wither and die. Affected turf appears to thin. Yellow-green (common) selections

of St. Augustinegrass appear more susceptible than bitter-blue selections.

Avoid frequent, shallow watering.

Cottony blight—Considered a disease of cool-season grasses, this disease can be quite damaging on overseeded bentgrass/ryegrass and on bermudagrass. It thrives in a broad temperature range (68 to 95 degrees). Poor air circulation and poor drainage favor development.



Scattered, chlorotic fascicles are still alive in root rot (St. Augustinegrass).

Avoid maintenance while turf is wet, and avoid frequent irrigations.

Dollar spot—Occurs in all warm-season grasses, especially bermudagrass, bahiagrass and zoysiagrass, and grasses used for overseeding.

Favored in temperatures between 60 and 80 degrees, but warmer weather strains have been observed in Florida.

Free moisture from fog, dew or irrigation triggers disease development in sites with low nitrogen and potassium levels and ample thatch.

Affected areas range in size from one to two inches in finer grasses, to six to eight inches in coarser varieties.

Time irrigations for early in the day, and water deep when needed. Minimize thatch and fertility imbalances for long-term control.

Fairy ring—Caused by a variety of mushroom and puffball-type fungi. Occurs in any site where organic matter is an abundant food source. Fungi often produce a variety of irregularly-sized arcs or circles on turf sites. Fairy ring control

continued on page 47

STEP ON IT

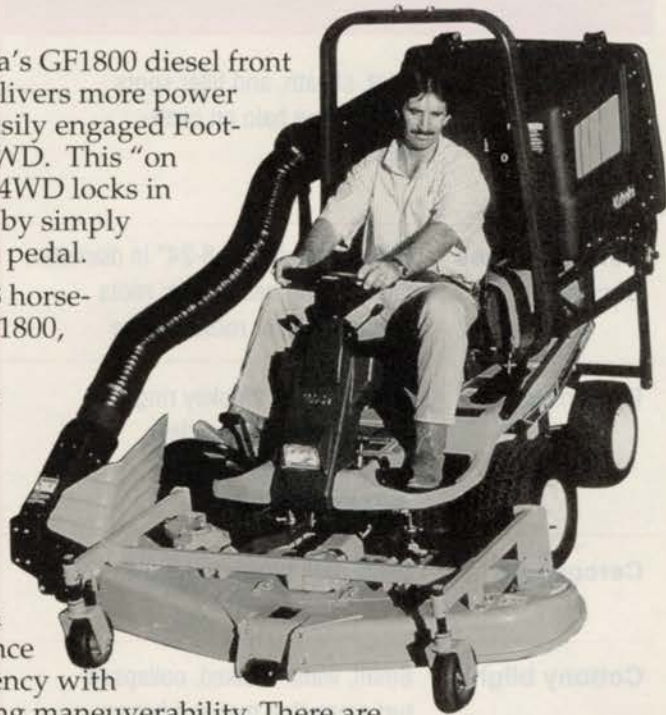
Kubota's GF1800 diesel front mower delivers more power with its easily engaged Foot-Control-4WD. This "on demand" 4WD locks in on-the-go by simply pressing a pedal.


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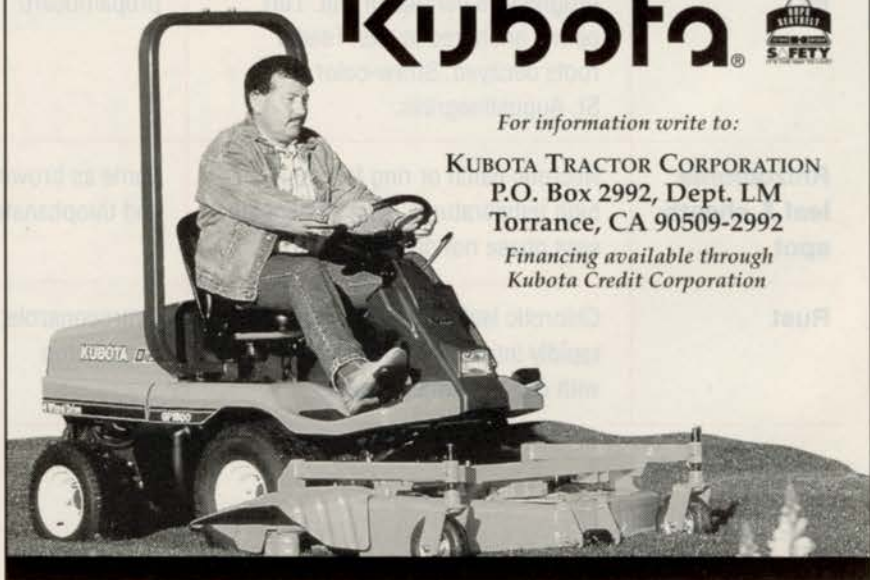


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Warm-season disease diagnosis and control

Disease	Damage	Common fungicides
Anthracnose	Leaf, sheath, and tiller spots with yellow halo on centipede grass	chlorothalonil; chlorothalonil + fenarimol; fenarimol; cyproconazole; mancozeb + thiophanatemethyl; propiconazole; thiophanate methyl; triadimefon
Bermudagrass decline	Chlorotic patches, 8-24" in diameter; thins during heat spells; roots shorten, feeder roots decline	fenarimol; propiconazole; thiophanate methyl; triadimefon
Brown patch	Round patch, smokey ring or aerial blight; fascicles rot at the base, with dark discoloration at base.	benomyl; chlorothalonil; chlorothalonil + fenarimol; cyproconazole; fenarimol; flutolanil; iprodione; mancozeb; maneb; pentachloronitrobenzene (PCNB); propiconazole; thiophanate methyl; thiram; triadimefon
Cercospora	Small dark brown to purple	benomyl; chlorothalonil; mancozeb; maneb; thiophanate methyl
Cottony blight	Small, water-soaked, collapsed turf areas that mat and brown quickly. Disease spreads in the direction of traffic or surface water runoff.	chloroneb; etridiazole; fosetyl aluminum; metalaxyl; propamocarb
Dollar spot	Small spots one to eight inches in diameter wilt and bleach to a straw color.	benomyl; chlorothalonil; chlorothalonil + fenarimol; cyproconazole; fenarimol; iprodione; mancozeb; mancozeb + thiophanate methyl; pentachloronitrobenzene (PCNB); propiconazole; vinclozolin
Pythium root rot	Gradual thinning, browning with progressive periods of wilt. Turf poorly anchored in site. Feeder roots decayed. Straw-color in St. Augustinegrass.	chloroneb; etridiazole; fosetyl aluminum; metalaxyl; propamocarb
Rhizoctonia leaf & sheath spot	Necrotic patch or ring forms under high temperatures; Leaf and sheath spot phase not distinctive.	Same as brown patch. Avoid using benomyl and thiophanate methyl.
Rust	Chlorotic leaf flecks that enlarge rapidly into linear pustules filled with red-to orange spores.	Cyproconazole; mancozeb; maneb; propiconazole; triadimefon

Source: Dr. Gary W. Simone

WARM DISEASE from page 45

involves:

□ Tolerance: it is primarily a cosmetic disease.

□ Cleanup of the mushrooms when formed since some are toxic and represent liability situations.

□ Camouflage symptoms through nitrogen fertilization for the rest of the turf and/or water for the browned-out fairy ring sites.

Flutolanil (ProStar) is a newer fungicide being used to suppress the reproductive stage of these fungi.

Gray leaf spot—This is the primary scourge of St. Augustinegrass. The disease is favored by the hot, moist summer months, especially on turf sites with poor air circulation, low light, frequent light irrigation and high available nitrogen levels.

Grass cultivars derived from the bitter-blue types are more susceptible. Symptoms begin as small brown spots on leaves, sheaths and stems. These enlarge to brown-to-ash colored lesions with dark brown to maroon margins.

Repeated fungicide applications are

Detection tips

- ✓ Inspect turf daily, in early-morning hours (especially after dew, rain or nighttime irrigation) are critical for perceiving physical signs of certain fungal pathogens like *Pythium* or the *Sclerotinia* complex.
- ✓ When you spot trouble, inspect the turf areas for the type of damage. Notice which part of the grass is affected, and how is the disease distributed.
- ✓ Use your knowledge of the fertility, irrigation and pesticide programs at each site, weather information and photographs prior to diagnosis and treatment.
- ✓ Have a three- to four-inch turf sample analyzed before applying control products. This sample can usually be analyzed within a calendar week, before the need arises for a second fungicide treatment.

—Dr. Simone

often needed during hot, moist months of summer. Irrigate deeply and only when needed early in the day to break influence the disease cycle.

Helminthosporium spots—Disease is favored by low fertility and thatch and disease spread is favored by frequent irrigations. Symptoms include leaf spots and a general melting out syndrome. Lesions are more numerous near the base of leaves and the crown of the plant. Manage thatch, provide balanced fertility, avoid frequent irrigations and use fungicides as needed.

Pythium root rot—Thrives in poor drainage.

Symptoms are thinning or browning out of turf, with progressive wilt as a result of feeder root decay. Grass pulls up easily. Roots are discolored, soft-decayed, with few feeder roots.

St. Augustinegrass often turns straw-colored as a result of root rot.

—The author is an extension plant pathologist and associate professor at the University of Florida.



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HOT TOPICS

South, led by Atlanta, best new home market while Central is 2nd

DES PLAINES, Ill.—If you're into new home lawn installation/maintenance, the southern part of the country is the best place to be located in.

According to Professional Builder magazine, of all homeowners in the continental U.S. seeking new homes, 44 percent reside in the South, including 24 percent in the eastern seaboard states from Maryland/West Virginia to Florida.

Areas where homeowners are most likely to buy new homes, from most frequent to least frequent:

DE, WV, MD, VA, SC, NC, GA, FL	24%
OH, IN, IL, MI, WI	17%
TX, OK, AR, LA	14%
CA, OR, WA	14%
ME, VT, NH, CT, RI, MA	12%
NY, PA, NJ	9%
AZ, NM, CO, UT, NV, ID, MT, WY	7%
KY, TN, MS, AL	7%
ND, SD, MN, KS, IA, NE, MO	6%

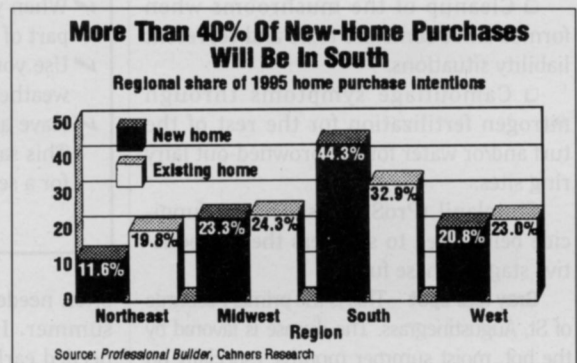
Home shoppers living in a metro area with a population of 2 million or more are most likely to choose new construction, according to the survey, which was conducted by National Family Opinion, Inc. Least likely to buy a newly-built house are home shoppers in areas with a population between 100,000 and 499,999.

Among major U.S. cities, Atlanta led the way in 1994 with 48.0% of its residents purchasing newly-built homes. According to Chicago Title & Trust's "Who's Buying Homes in America," the top cities in new-home buying in 1994:

Atlanta	48.0%
Phoenix	36.1%
Minneapolis	30.0%
Orlando	29.6%
Dallas/Ft. Worth	29.5%
Seattle/Tacoma	24.8%
Washington, D.C.	24.7%

The information appeared in the April

issue of "Professional Builder," a Cahners Publishing Company magazine located here (telephone 708-635-8800).



Dr. Bill Daniel: teacher, inventor

WEST LAFAYETTE, Ind.—One of the giants of the turf industry passed away Feb. 24: Dr. William H. Daniel, professor emeritus at Purdue University, author, inventor and—most of all—friend to the industry.

Dr. Daniel, who had been semi-retired in recent years, remained active almost until the end. He was a frequent visitor at national and regional conventions of golf course superintendents and athletic field managers.

He developed both the Purr-Wick Water Management System and Prescription Athletic Turf (PAT), which is used in many major college and professional stadiums. He was senior author of the popular "Turf Managers Handbook." He was a Fellow in the American Society of Agronomy and received distinguished service awards from the Golf Course

Superintendents Association, USGA Green Section and Midwest Regional Turf Foundation.

Dr. Daniel is survived by his wife of 51 years Gwen, son Donald, daughter Sue Eiler, two brothers and a sister.

Memorial funds, according to the Midwest Regional Turf Foundation, can be sent to the Daniel Scholarship Fund at Purdue University or the Endowment Fund of the Federated Church, West Lafayette.

—Jerry Roche



New bermuda, centipedegrass

ATHENS, Ga.—Two new turfgrasses will be released this summer by plant breeders at the Coastal Plain Experiment Station in Tifton, Ga. They are TifBlair centipedegrass and Tift MI40 bermudagrass.

TifBlair is a cold-tolerant centipede that grows well in acid soils. Its color, quality and green-up characteristics are similar to common centipede.

"This cultivar tends to grow faster and produce better quality turf than common centipedegrass at low soil pH in the 4 to 5 range," notes its developer, Wayne Hanna,

a USDA research geneticist. "Winter-hardiness is one of the greatest needs for bermuda, especially on golf courses where the grass is cut short and frequently."

Tift MI40 is a fine-textured, cold-tolerant bermuda adapted to close mowing and resistant to mole crickets. It is intended for use on golf course fairways, athletic fields and home lawns, according to Hanna. Tift MI40 grows well as far north as Lexington, Ky. and Stillwater, Okla.

"This bermudagrass has nice color and a much finer texture than Midiron," notes Hanna.

For more information, contact the University of Georgia Ag Experiment Station, Athens, GA 30602.

Publishing veteran named to head LM

CLEVELAND—Less than a week after he was named publisher of *LANDSCAPE MANAGEMENT* magazine, John D. Payne was sitting in the office of Crowley Lawn Care in eastern Cleveland. He spent two hours exchanging ideas with owner Phil Fogarty, and that's the type of active role Payne likes to see his magazines take.

"Our goal," says Payne, "is to serve landscape professionals throughout this industry by providing valuable insight and practical how-to information. We also want to tackle the tough issues—as you would expect an industry leader to do. We'd like to make a difference in our readers' businesses."

"The work done in the green industry has a tremendous impact on quality of life and the environment. That's why we see our magazine's role as so important."

Payne brings 20 years of publishing experience to Advanstar Communications.

He's worked at Stagnito Publishing, Gorman Publishing, the former Gralla Publications, PennWell Publishing and Hanley-Wood. He spent 12 years in the \$340 billion food industry, as publisher of "Prepared Foods" and "Food R&D." For two years, he was associate publisher of "Architecture."

"We're delighted to have John here," says group publisher Alex DeBarr, "He's got a great track record of managing business publications, and he's a very creative person."

If you should find yourself at the other end of the phone with the new publisher, it's because he wants to visit with you and learn more about the industry. "And that gate swings both ways," he notes. "I want everyone to feel free to pick up the phone and call. And if you're going to be in Cleveland, we'd love to see you."

Advanstar Communications publishes 54 other specialized magazines and journals; produces and manages 70 exposition and conference events around the world; and sells database, reference and direct marketing products.

—Jerry Roche



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SUPPLIERS CORNER

PBI/Gordon has a new president and chief executive officer, **Richard E. Martin**, who has been with the company since 1982. **Everett Mealman** will continue as chairman.

The Scotts Company has become a supporting sponsor for the GCSAA television show "Par for the Course" on ESPN.

Gary Clayton is new business manager for turf and ornamental products at **Sandoz Agro**. He has previously worked in the green industry at Perma-Green, the PLCAA, PBI/Gordon and Pro Turf Specialties.

Harmony Products expanded its product line to include biosolids (mechanically dried sewage sludge) with its poultry manure-based products for the pro turf industry. The biosolid's analysis is 4-2-0.

Bob Leslie, a commercial representative for **W.A. Cleary Chemical Corp.**, was "senselessly murdered in the Montclair,

N.J. post office robbery" in March, according to company president **Barbara Cleary**. "We will all miss Bob very, very much and will remember him fondly." Donations for the education of his two young girls can be made to: GCSANJ Bob Leslie Fund, 66 Morris Ave., Suite 6A, Springfield, NJ 07081.

Feldmann Manufacturing promoted **Clifford Feldmann** from vice president to president. Former president **Myrtle Feldmann** is semi-retired, serving as secretary and treasurer.

Century Rain Aid irrigation company has added six branch offices/warehouses with the acquisition/merger of an Atlantic Irrigation outlet in Virginia and Professional Turf Supply in Atlanta. In addition, president **Wayne Miller** has been named to the board of directors of the Irrigation Association.

INFO CENTER

Useful videos and literature for the green industry

PESTICIDE CONTAINMENT... Advanstar Communications' new book, "Containment System Design: Chemical Storage, Mixing and Recycling," costs \$74.95.

The book, written by Frederic R.

Haskett, contains information that allows both large and small operators to design and construct an affordable, viable and safe pesticide handling facility. The book also explains how to prepare for the scrutiny of government regulators and how to comply

with new regulations. To order a copy, phone (800) 598-6008.

CUSTOMER INFO... The Professional Lawn Care Association of America is offering a new brochure, "Tips on Choosing a Lawn Care Service" to members and non-members alike, though members receive a discount.

Other brochures that are available from the PLCAA cover a wide range of topics, from turf benefits to grasscycling to specialized videos. For more information, phone the PLCAA at (800) 458-3466 or fax to (404) 578-6071. A free product sourcebook and order form is available.

SAFETY BY VIDEO... The Associated Landscape Contractors of America has a nine-step video program on landscape safety available to the industry. Each video costs \$75 (\$50 for members) and can be ordered in English or Spanish.

The safety topics are: general safety, trim mowers, mid-mowers, power edgers, string trimmers, power hedge trimmers and backpack blowers. The entire package costs \$450 (\$300 for members).

To order, write ALCA, 12200 Sunrise Valley Dr., Suite 150, Reston, VA 22091; phone (800) 395-2522 or fax (703) 620-6365.

SOD USES... Five informational four-color brochures about the best uses of turfgrass sod are available free from the Turf Resource Center. Titles are "Turf Installation Guide," "Why Are Most Lawns Now Sodded?," "The Dream Lawn Is Yours in Hours with Sod," "How to Establish a Lawn," and "Being a True Environmentalist Begins Right Under Our Feet."

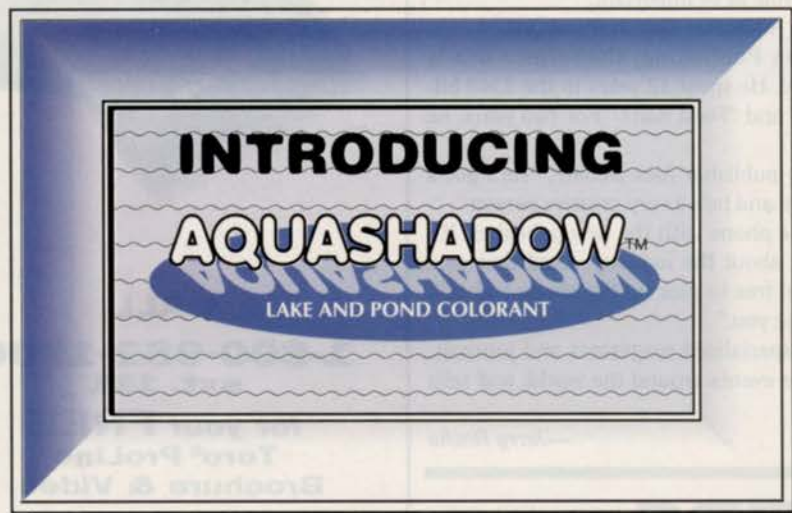
To receive any or all of the brochures, mail a self-addressed stamped envelope to Turf Resource Center, 1855-A Hicks Rd., Rolling Meadows, IL 60008. Indicate which brochures you want; if you request more than three, two stamps will be needed.

ON TEAMWORK... McGraw-Hill just published a book titled "Teaming Up: Making the Transition to a Self-Directed Team-Based Organization."

Authors Darrel Ray and Howard Bronstein focus on employee teams that not only manage themselves successfully in the workplace, but also create extraordinary gains in productivity, efficiency and worker satisfaction.

The 247-page book retails for \$24.95. To order your copy, phone the McGraw-Hill order department at (800) 262-4729. Request ISBN No. 0-07-051646-4.

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