

plant also has the ability to produce some 50 million spores.

Emerging problem

The big question is: Why has moss become such a problem recently? There is no sure answer to this question, only theories. The biggest single factor may be the disappearance of a number of older snow mold fungicides. Some believe these materials delivered a moss control side effect due to their metals content, such as mercury, in the formulations. Some believe the use of these materials over time provided an indirect control for moss.

One factor most agree with is that the increasing demand for low cutting heights to achieve faster green speed contributes to the problem. Matt Nelson of the USGA Green Section has noted, "I've never had anyone tell me that they have a moss problem on collars, tees, or fairways." At the same time, Nelson adds, "In reality, we can't cut our greens at 3/16 of an inch in today's golf climate, although this might solve the moss problem."

In achieving faster green speed, superintendents are also being forced to alter their fertilization practices by reducing nitrogen inputs. Low nitrogen fertilization reduces the vigor and density of greens turfgrass, which in turn allows easier invasion and competition by moss.

From a cultural practice standpoint, golf course superintendents have their hands tied. Because of the need to maintain green speed, inputs that could solve or help solve the problem – such as raising the cutting height and increasing nitrogen inputs – are not feasible.

This leaves chemical control as the primary option to combat an increasing moss problem. In attempts to find a silver bullet solution, superintendents have tried a wide variety of materials. Remedies have included iron sulfate, dishwashing soap, baking soda and others. Chemical companies have also brought products to the market, all of which have offered varied success.

Some of the first moss research was initiated in 1997 by Frank Dobie, superintendent of the Sharon Country Club, in Sharon, Pa. Dobie created a "Moss Network" of superintendents to deal with the ever-increasing moss problem and develop control options. He teamed with superintendents from neighboring states and tried various products for moss control. The "Moss Network" considered Ultra Dawn dishwashing soap, iron sulfate, ferrous ammonium sulfate and DeMoss. Unfortunately, the most effective option was de-

termined to be Ultra Dawn dishwashing soap. They found that 4 ounces of Ultra Dawn per gallon of water, drenching the moss on sunny days with temperatures between 60-80 F resulted in good control.

At that time Ultra Dawn seemed promising as the method of choice for control. Although an illegal use of the product – it is not labeled for use to control moss – a number of superintendents heard from others that it was effective and gave it a try. However, as more tried using the detergent, it failed to be the answer. The results were hit-or-miss and there were some drawbacks. It seemed to work one day but not the next, weather conditions being a critical factor, so superintendents began to scratch their heads once again.

Next came university research, most initiated in 1997-98. Various studies were conducted by Oregon State, Cornell, North Carolina State, Pace Consulting and others. Products evaluated for control including Ultra Dawn, Daconil, terracyte, copper sulfate, zinc sulfate, iron materials, copper hydroxide (Junction), fatty acid soaps (Moss-Aside) and others. The results to date show no conclusive control. Some products that showed promise at one site, completely failed at another. For example, Wendy Gelernter, Ph.D. and Larry Stowell, Ph.D. at Pace Consulting in San Diego, achieved good results with the use of Daconil and Ultra Dawn, while these products performed poorly at other sites. The research, although varied, also indicated that moss continued to reappear with time, under all control measures.

The latest and most promising news comes from work performed by Dr. Arthur P. Weber, published in the July/August 2003 edition of the *USGA Green Section Record*. The work focused on the relationship between metals and the destruction of moss chlorophyll. Weber found that Mercury was highly effective in its toxicity to moss chlorophyll but was not used in his work because of environmental concerns. This finding alone indicates the strongest relationship to date for the theory of control by the former mercury-based fungicides. It also could give credence to the fact that maybe lower cutting heights for greens is not as big a factor as the elimination of these fungicides.

Weber's research found that the metal silver has some of the same characteristics of mercury in destroying moss chlorophyll and re-



Photo: Kevin Ross

sulting in death of the plant. He then conducted research in conjunction with Thomas O. McAvoy, CGCS, superintendent at the Old Westbury Golf Club in New York. They conducted experimental applications of an aqueous silver nitrate solution on bentgrass/*Poa annua* greens. Their work indicated that under all environmental conditions, they were able to successfully eliminate moss infestations without any reemergence and with only a single application.

This may be the most exciting development in moss control, but where does this leave the superintendent anxious to eliminate a moss problem? Obviously, no one should go out and start spraying silver nitrate on their greens without the necessary research, product development and registration. However, this research does show promise for a true *silver* bullet control for what has become a major problem. GCN

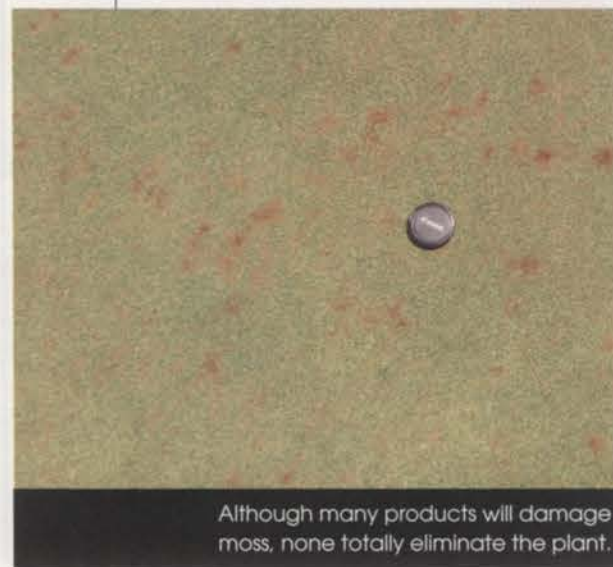


Photo: Kevin Ross

SUMMARY

Development of an effective soil microbial enhancer and organic fertilizer

DATA

2002 (part of field dissertation involving extensive field research)

SOURCE

William Torello, Ph. D, professor Emeritus, University of Massachusetts, Amherst and vice president for research and development, EcoOrganics, Inc.

MORE INFORMATION

wtorello@ecoorganicsfertilizer.com

Commercially competitive organic fertilizer/soil microbial enhancer

One of the significant problems associated with organic turfgrass management programs has been the inability to develop and maintain the needed high levels of overall turf quality and aggressiveness (recuperative potential) when using natural organic fertilizers. The literature published regarding the positive soil structure/building and disease reduction effects of organic fertilizers and amendments on professional turf is voluminous, as well as the negative aspects of usage volumes, mower/roller pickup, bulk storage, foul smell, seasonal effectiveness and cost. In view of these disadvantages, the most desirable natural organic fertilizer/amendment should include: The highest level of *natural organic* nitrogen available; the lowest C/N ratio possible (preferably under 4 for more rapid microbial breakdown and nitrogen availability); easy application (preferably a liquid soluble/flowable spray application to avoid particle pickup during mowing and to enhance response time or a very fine greens grade granular); and high microbial populations and activities after application. EcoOrganics, Inc. has developed and tested a line of soybean-based natural organic materials. The central product was named "SoylMicrobial" due to the very rapid and extensive enhancement of soil microbial populations. It is formulated as a wettable powder which forms a suspension for spray applications. It has one of the highest natural organic nitrogen levels in the industry (13-2-1) allowing, for the first time, the ability for spray-applied spoon-feeding. It is a 100 percent natural organic de-

rived through a complex extraction of soybeans – not a by-product of the meat/fowl industry. Use of a totally food-grade product eliminates the foul smell, and a no "salt index" allows for mid-summer applications. Importantly, research shows it provides rapid and extensive enhancement of soil microbial populations. Turf quality ratings for USGA greens profiles showed no observable differences between SoylMicrobial and Inorganic treatments indicating, for the first time, that a 100 percent natural organic material can perform equally as well as an inorganic material during a nitrogen "spoon feeding" program, particularly to USGA sand greens (Fig. 1). Applications of SoylMicrobial result in extremely rapid and large increases in existing soil microbial populations compared to Milorganite and inorganic nitrogen treatments (Fig. 2). This rapid response is again due to the low C/N ratio of the material and application as a flowable liquid spray (flowable powder) which carries the material into the soil more effectively, as well as having a much larger surface area for microbial activity. These results suggest that the elevated microbial activities enhance degradation of native soil organic matter as well as overlying mat and thatch. Research is now in progress to further quantify these results in addition to potential weed control characteristics. A roster of six different flowable, greens grade and coarser fairway and rough granular products should reduce disease and thatch pressures, result in more rapid increases in color and density and become components of strong IPM programs.

Figure 1. Enhancement of microbial populations in response to Soy/Microbial, Inorganic and Milorganite applications on a USGA sand green profile

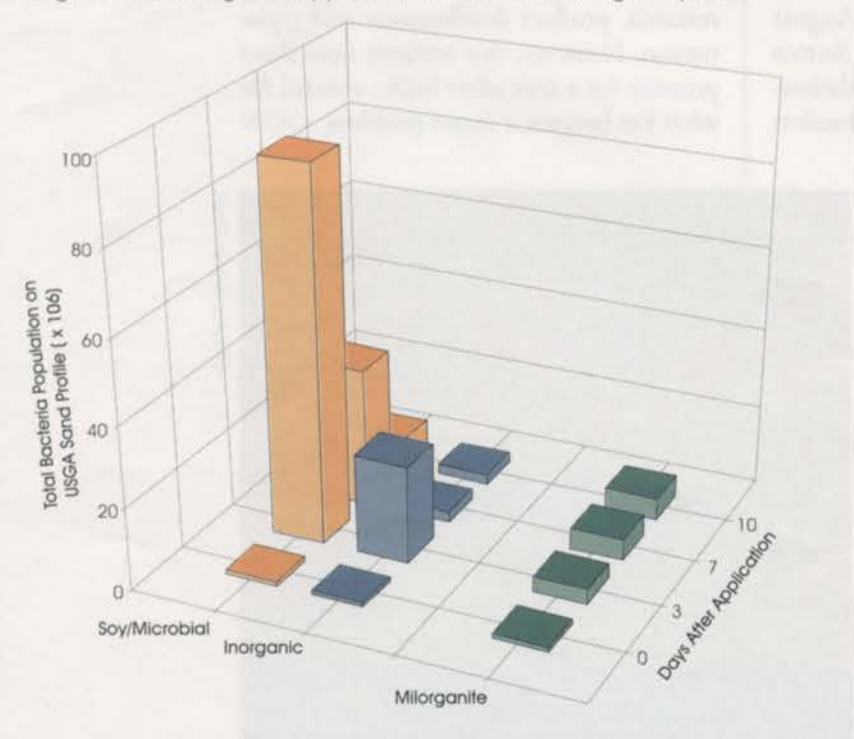
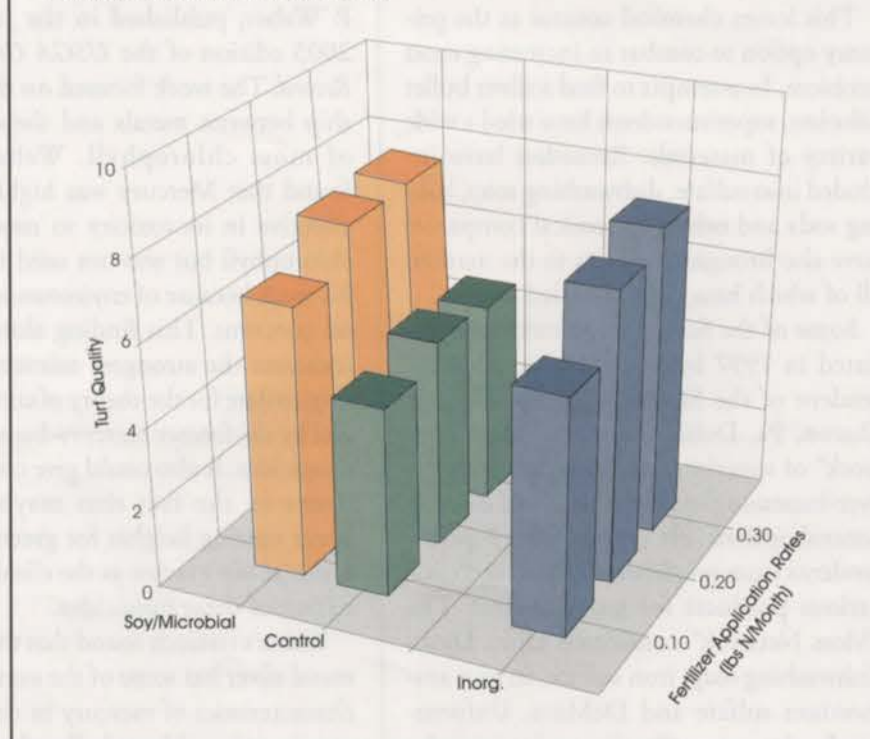


Figure 2. Seasonal Turf Quality comparison of Soy/Microbial with Inorganic fertilizer on a silt-loam native soil.



SUMMARY

Ground rubber as a drainage layer medium under greens

DATA

2001-2004. Research site near University Ridge golf course, Madison, Wis.

SOURCE

Jim K. Park, Ph.D., professor of civil and environmental engineering

MORE INFORMATION

jkpark@wisc.edu

Recycled rubber as a drainage layer medium under greens

Research has led to the development of an innovative technology to remove toxic compounds in landfills by replacing gravels in the leachate collection system with shredded tires, which have significant capability to adsorb toxic compounds. To see if this research could have possible use on golf course greens, confetti-sized pieces of scrap tires (ground rubber) were placed in 4-inch thick layers between the layers of sand, peat root mix and subgrades commonly used beneath golf greens. The greens were then soaked with water spiked with nitrate. The results showed that fields with a 10-centimeter layer of tire chips released about 58 percent less nitrate than samples without rubber layers (crumb rubber used in the sublayer compared with pea gravel). Nor was pH of infiltrated water altered with the crumb rubber sublayer addition. In addition, the health of the plots suggests the rubber layers did not alter the turfgrass quality or growth in terms of quality, color or density of turfgrass among three configurations (see Table 1). While the research focused on nitrates, because many golf greens are built near groundwater level or wetlands, it is believed ground rubber would also adsorb a range of pesticides and fertilizers as demonstrated in laboratory-scale experiments. The layer of ground rubber under the greens and fairways in golf courses would

also lengthen the playing time due to less freezing and a longer growth period because ground rubber has eight times better insulation value than gravel. Further benefits could include less compaction due to the resilient property of ground tires and easier construction due to the light weight of ground tires in comparison to gravels. Since ground rubber is 1/3 to 1/2 times the weight of soil, it could be used as backfill material for greens constructed in soft foundations and the construction cost is cheaper, although the cost of the material may be higher than for gravels. The research indicates that in areas where the sub-grade soils are porous this technology could prevent groundwater from potential contamination. An added environmental benefit could be a useful market for the 280 million scrap tires generated annually in the United States. While the research was not directed at a means to dispose of scrap tires, but rather to make golf courses environmentally safer and friendlier, the researcher estimates that a rubber layer under the greens for just one 18-hole golf course could require up to 72,000 scrap tires and over 1 million tires if also installed in fairways and drainage systems. In addition to this, ground rubber-based products are already being used on golf courses as a topdressing to improve traffic tolerance and as a soil amendment to improve porosity. GCN

Table 1

Average Turfgrass Quality, Color, and Density for Three Configurations

Treatment	Quality		Color		Density	
	range ^a				0-100%	
	16-Jul	28-Sep	16-Jul	28-Sep	16-Jul	28-Sep
USGA ^a	4.8	6.0	6.0	6.0	93.3	100.0
Rubber Intermediate Layer ^b	5.5	5.7	6.0	6.7	93.3	100.0
Rubber Drainage Layer ^c	5.2	6.0	5.7	6.2	96.7	100.0
Least significant difference (P < 0.05)	ns ^e	ns	ns	ns	ns	ns

^aUnited States Golf Association sand-based golf course putting green profile.

^bFine-ground rubber produced by Tire Grinder, Aurora, IL.

^cCoarse-ground rubber produced by Tire Grinders, Aurora, IL.

^dTurf quality and color were rated visually on a one (poor) to nine (best) scale (six acceptable).

^ens = not significant.



Photo: Jacobsen

Jacobsen's E-Walk all-electric walking greens mower generates no more than a whisper of noise to avoid disturbing golf course residents and enable early-morning mowing.

New greens mowers go low ...and do so much more

MANUFACTURERS ADDRESS MOWER PERFORMANCE AND PLAY ISSUES

It's a fact that golfers assume another personality when the topic is green speed. It doesn't matter that height of cut is only one factor that affects the speed of a green. According to this group, low is never low enough. All that matters is double digits on the stimp meter.

As a result, manufacturers are constantly challenged to design mowers that can drop the height of cut to levels that would have killed grass only a few years ago. While 1/4

inch was the standard for a long time, today 1/8 inch is probably the average. It's not unusual for some courses to dip beneath that mark.

The expectations for greens mowers get tougher for other reasons. To meet golfer demand, golf course architects are building more contoured greens, which call for mowers that will float over undulations to reduce scalping. Then there's the environmental factor. Many municipalities are imposing noise

restrictions in residential areas. This particularly affects golf courses surrounded by homes.

Thankfully, the ability to provide consistent, playable greens has to a great degree been satisfied by today's line of greens mowers. To find out how manufacturers are addressing these issues, *Golf Course News* contacted major manufacturers and superintendents who are using the latest innovations in greens mowers.

Toro Flex 21 answers the call on contoured greens

It takes a capable piece of equipment to mow greens at 1/8 inch or lower, especially if they are contoured. The Toro Flex 21 was designed to support the agronomic demands of greens cut to 1/16 inch and the increasing demands on today's superintendents who are expected to achieve that height.

The Flex 21 features a unique flexible cutting unit, specially designed for undulating greens and ultradwarf grasses. The innovative cutting unit flexes from side to side around the bedknife centerline, as well as forward and backward around the reel centerline. The flexible cutting mechanism is separate from the traction unit to further ensure crisp, tight mowing at the desired height with less scalping.

A California superintendent says the Flex 21 gives him the ability to push the mowing envelope.

"It's definitely given me a measurable difference on taking the greens down," says Brian Hardin of The Palms Golf Club in La Quinta, Calif.

"Our caliber of player really likes fast, challenging greens. I was sneaking under 1/8 inch and wanted something that didn't scalp. I put the Flex 21 on one of my greens with a really gnarly slope, and it took it fine. It's definitely following the contours better than a stationary unit. I haven't had any scalp problems."

Toro riding mowers feature new cutting units

Toro took its riding greens mowers to another level with the introduction of the dual-point adjust Greensmaster cutting unit. Features include:

- Lower height of cut to 1/16 inch
- Superior quality of cut at all heights
- Sealed bearings to eliminate greasing
- Simplified adjustment
- Greater rigidity to eliminate squaring-up problems
- Compatibility with all current and previous units

This new cutting unit is available in 8- or 11-blade reels. It replaces all 4-bolt and single point adjustment units in favor of the dual point adjustment proven on the Greensmaster 1000.

The new cutting unit impressed Pete Peterson, superintendent of Riverbend Golf Complex, Kent, Wash.

"We mow down to a little over 1/10 inch," he says. "When you cut that short you're going to notice any imperfections or misadjustments. These units hold adjustments better. Everything just seems to be a little tighter, a little better designed."

Superintendent Steve Kealy of Glendale Country Club, also in Washington, praises the Greenmaster units.

"They performed like a walking greens mower," he says. "The cut was more uniform, and it seemed like the units floated better over undulations with no scalping. The quality of cut was very high, and we were mowing down to 0.110 inch, which is pretty low."

Deere walk-behinds boast consistent cutting height

John Deere Golf and Turf One Source product manager Tracy Lanier says one of the advantages of the manufacturer's walk-behind greens mowers is their ability to deliver a consistent height of cut.

"Our 18-inch 180B walk mower is the ideal width for closely following green contours," he says. "The reels don't ride up and down at the ends like some flex mowers, which can result in an uneven cut. The mower's true 18-inch frame allows the operator to follow cut lines and overlap with more accuracy."

Other features of John Deere walk-behind mowers are designed with safety and operator comfort in mind. The operator-presence safety system is engaged when the handle is depressed.

"When the operator lets go," Lanier says, "wheel traction is disengaged and the cutting reels stop. This can be important early in the morning when the grass is covered with dew and the operator could slip while making turns."

Sound reduction features include high impact-resistant polymer chain covers, which also limit rust and dents, and a larger muffler. A drum drive and oil drain trough simplify maintenance.

John Deere's riding greens mowers have also been improved. One of the most important features on the 2500A triplex is the patented offset cutting units, especially critical on daily cleanup passes. The mower can move clockwise one day and counterclockwise the next and the wheel pattern will not be in the same track. This greatly reduces the "triplex ring" associated with this operation.

For operator comfort, the command arm on the 2500A triplex puts the key switch, mow switch, throttle lever and raise/lower lever conveniently at the operator's fingertips. This riding mower also has tilt steering and a two-foot-pedal system for forward and reverse.

"One of the keys to all our reel mowers," Lanier says, "is the commonality of parts and adjustments. On a 7-blade reel, for example, it doesn't matter if it is used for a fairway mower or a 2500A for mowing approaches. The parts are the same and there is the same easy adjustment on top of the reel."



One of the most important features on John Deere's 2500 triplex riding greens mower is the patented offset cutting units, especially critical on daily cleanup passes.

Photo: John Deere

Engine options for triplex electric reel greens mowers

John Deere continues to place special emphasis on technological advancement. This year the 2500E triplex electric reel greens mower is being produced for limited distribution, with full production expected in 2005.

Equipped with two engine options, the 2500E gas model offers an 18-hp, 4-cycle Kawasaki V-Twin engine, while an 18-hp 3-cylinder John Deere Series 220 powers the diesel model. However, reel circuits are all electric, supplied with power from the engine through an alternator.

"When developing the 2500E," Lanier says, "engineers focused on a growing concern of superintendents—hydraulic leaks that burn golf course greens. With the new electric reel motors, John Deere has eliminated more than 100 leak points at the reel circuit, while still providing superior cut quality and the power required to run various attachments."

Additionally, engineers equipped the 2500E with verticutting capability, providing golf courses with increased productivity from one machine.

Jacobsen's "floating cutting reel" takes contours

Jacobsen's Tournament Cut-22 floating-reel walking greens mower is the solution to several issues for director of golf course operations Chuck Green at Sage Valley Golf Club, Graniteville, S.C.

"We needed a mower with a floating head



John Deere's 18-inch 180B walk mower is the ideal width for closely following green contours. The reels don't ride up and down at the ends like some flex mowers, which can result in an uneven cut.

for our contoured greens," he says, "and the Tournament Cut-22 works great for us. This mower is more gentle on cleanup passes because the reel floats over steep inclines and roll offs. It has solved a number of our scalping issues. We're planning on acquiring additional Tournament Cut-22s to mow our tees."

The Tournament Cut-22 features turf-hugging, fully floating cutting reels with beltless, direct-drive to the cutting reel and separate traction drum. The mower has a narrow, 22-inch cutting width to better follow green contours.

This unique and balanced "floating cutting reel" design separates and unloads the weight of the rear traction wheel/power source from the suspended floating cutting reel. This enables the suspended reel to move up/down, front/back and left/right as it "floats" over uneven turf to avoid scalping and deliver a more even cut on undulating greens.

Mower is a hit at 2003 PGA Championship

The Tournament Cut-22 was used at the 2003 PGA Championship at Oak Hill Country Club in Rochester, N.Y. The mower was used to manicure fairways, walk areas, tees and greens. Able to follow ground contours precisely, the Tournament Cut-22 created the visual effect of apparently seamless greens and approaches.

"We were really glad we had the Tournament Cut-22 greens mower," says Paul Latshaw, then Oak Hill's manager of golf courses and grounds. "It let us give approaches and walk areas an extremely fine finish. We even used them to cut the greens on our other

course when they weren't mowing approaches during the tournament."

All-electric walk mower ends oil and fluid concerns

Responding to environmental and noise issues, Jacobsen's E-Walk all-electric walking greens mower uses no oil, no hydraulic fluids and has no emissions. It delivers a quality cut while generating little more than a whisper of noise to avoid disturbing golf course residents and enabling early-morning turf care.

But this mower has another benefit, which was demonstrated last year at the PGA Tour Memorial Tournament at Muirfield Village Golf Club in Dublin, Ohio. The E-Walk actually increased green speed without lowering height of cut.

Mike McBride, who was Muirfield's superintendent at the time says, "We calculated that the E-Walk, with its higher frequency of clip, would give us the same finish and green speed without having to drastically lower the height of cut.

"When we tested the E-Walk we used the same walk speed we normally do, but with reel speed set to give a higher frequency of clip. When we finished single-cutting the greens we had 30 percent more clippings mowing with the E-Walk than with our other mowers. That meant we could get an improved quality of cut and the same speed on the greens without putting additional stress

on our newly planted grass."

Clip frequency that is independent of walk speed

The E-Walk is unique among walking greens mowers because the frequency of clip is independent of the mower's walk speed. This is accomplished by using a patent-pending electrical control system that has two separate electric motors and two separate speed circuits. One motor and speed controller powers the drive drum and is used to control walk speed. The other motor and speed control deliver power directly to the reel and allow the operator to adjust the frequency of clip. Because the speed of the reel can be set independently of the speed of the traction drum, a unique phenomenon is produced. As walk speed slows, the number of clips per inch increases. The result is a smoother finish and faster green without stressing the plant.

During the Memorial, the Jacobsen E-Walk allowed McBride and his crew to increase green speed without severely lowering the height of cut.

"Jack Nicklaus likes the greens to be fast during the tournament and he was very pleased with the results we got from the E-Walk," McBride says. "Our greens were faster than the previous year, even though the height of cut was actually higher. In addition, this mower produces no emissions and has no fluids to leak or fuel to spill. And, it's so quiet." GCN



Toro's Flex 21 features a unique flexible cutting unit, specially designed for undulating greens and ultradwarf.



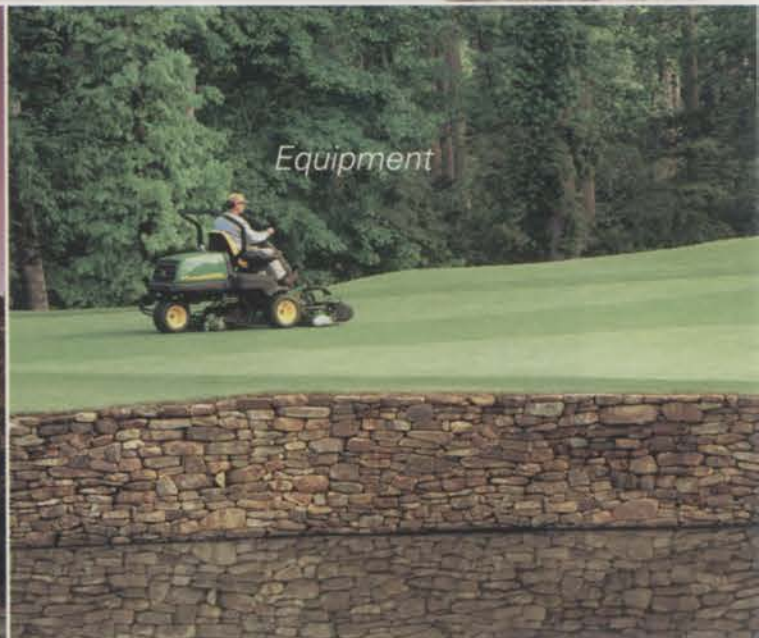
Official
Golf Course
Equipment
Supplier



Leasing



Irrigation



Equipment



Landscaping

**WHEN YOU'RE RESPONSIBLE FOR THE MOST IMPORTANT ASSET ON YOUR COURSE,
YOU NEED THE ONE COMPANY THAT CAN HANDLE ALL OF YOUR NEEDS.**

As a golf course superintendent, you're well aware of what it takes to keep your course looking in top shape, day in, day out. What you might not be aware of is that there is now one group that can take care of your course's many needs. John Deere Golf & Turf One Source™ not only has a full-line of golf & turf equipment, but also irrigation and landscaping supplies. Plus we have the JDC Masterlease™, financing built especially for the golf course market. Call your local John Deere Golf & Turf Distributor.

JOHN DEERE GOLF & TURF
ONE SOURCE™



JOHN DEERE

www.JohnDeere.com

Golf Greens "Fore" U T-line Driving Surface

- Driving turf provides a consistent, cost-effective and environmentally sensitive hitting surface
- Looks, feels and reacts just like natural grass
- Features a five-year warranty
- Allows heavy usage and percolation of water
- Does not require mowing, watering or chemicals
- Plays like natural grass, even when wet

Circle 200 on reader service form



Divot Mix Container from Starting Time

- Lightweight, convenient sand-and-seed dispenser
- Can be used by golfers while walking (can be clipped on bag) or driving the course (fits in a cart cup holder)
- Durable and waterproof
- Easy to fill
- Also available in a storage box, which holds 60 dispensers and stands 14 inches high

Circle 203 on reader service form

Western Signature Ball Washer



- Available in eight colors (red, black, hunter green, granite gray, oatmeal, sandstone, dark granite green, desert stone)
- Two models: Signature console with black powder-coated pipe, or with pipe cover sleeve
- Free club logo printed on ball washer with unlimited number of colors and no minimum orders
- Molded tank made using a high-impact granite polymer finish that will not break, chip, fade or crack
- Washer capacity is 11 pints

Circle 204 on reader service form

Carson Hosenclose

- Grade-level garden hose enclosure
- Allows out-of-site house storage below ground level
- Complete with a garden hose nozzle and built-in plumbing
- Five-year limited warranty
- Eliminates unsightly clutter and tripping potential by storing hose out of sight
- Nozzle has six adjustable spray patterns
- Connects to water line with built-in 1/2-inch PVC union
- Constructed of high-density polyethylene for strength
- Available in green, desert tan and bark brown colors

Circle 201 on reader service form



Stover AZ-1 Kikuyugrass

- Low growing, warm-season perennial grass
- Spreads vigorously by both rhizomes and stolons
- Exhibits excellent drought tolerance, disease and insect and wear tolerance with a rapid recovery rate, making it an ideal grass for golf
- Less aggressive, grows lower at maturity and has smaller stolons and, as a result, does not produce as much forage
- Exhibits greener color
- Coastal climates with moderate temperatures are most favorable

Circle 205 on reader service form

Grigg Brothers Nu-Blade

- Unique extract designed to accelerate growth and development of seedlings
- When applied over the new seeds before germination, the root and shoot are increased significantly in the first 10 days of growth
- Establishes a larger root mass and provides a shoot that is able to penetrate the soil faster
- When applied at 4 gallons per acre, the growth of the seedlings is increased by an average of 66 percent

Circle 202 on reader service form



Products That Work. From People Who Care is a trademark of Valent U.S.A. Corporation. Orthene is a registered trademark of GMS Investments, Inc. Orthene 97 is U.S. patent 6,013,272. ©2004 Valent U.S.A. Corporation. 2004-OTTOT-AD

Walks the course every morning.

Mole cricket mercenary.

Happy hour with the crew on Fridays.

True to the game.



True to



Products That Work, From People Who Care™
www.valentpro.com | 800-89-VALENT (898-2536)
Read and follow the label instructions before using.

USE READER SERVICE #25




Orthene®
TURF, TREE & ORNAMENTAL
SPRAY 97

SOLUBLE INSECTICIDE

Replanting costs
more than you think!

- ✓ your reputation
- ✓ time
- ✓ money

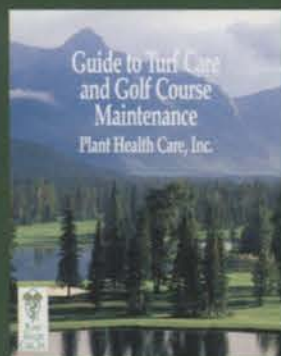
Plan for
Success!

Plant with PHC®
Mycorrhizal
Fungal planting
Products

- Benefits more than 99% of earth's plant species
- Increases absorptive surfaces of root systems up to 700%
- Increases plant tolerance to environmental stresses such as drought, compaction and poor soil quality
- Occupies up to 100 times more soil volume than a non-mycorrhizal plant's entire root system



Plant Health Care, Inc., offers a full line of high-quality mycorrhizal and biofertility products that treat plants "from the root up" by cooperating with natural plant processes to strengthen root systems to promote the health and long-term survivability of landscape plantings, trees and turf.



For additional product information, distributor locations or to request a copy of

PHC's Guide to Turf Care and Golf Course Maintenance

Call **1-800-421-9051** or go online to **www.planthealthcare.com**

USE READER SERVICE #26

new products — GCSAA Show

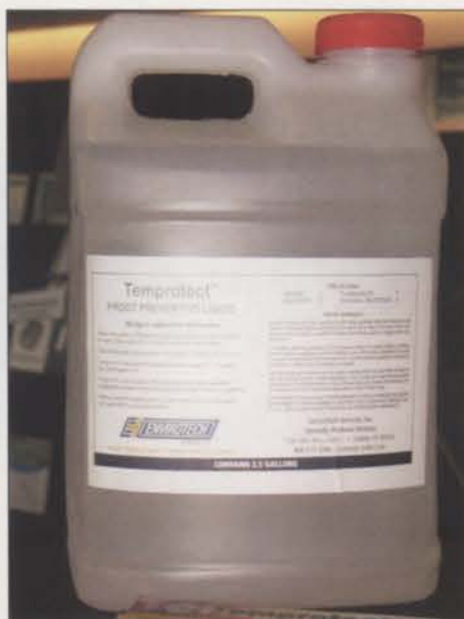
Strike Guard Lightning Warning System

- Monitors cloud and cloud-to-ground lightning within a user-set radius
 - Sensor data is communicated via lightning-proof fiber-optic cable to an independent receiver
 - Fully automatic alarm triggering
 - Detection radius of 20 miles
 - Sensor is battery powered for easy installation
 - Optional Strike View Windows-based software
- Circle 206 on reader service form



Green Saver 2285 Golf Valve

- Designed by Griswold Controls for valve-in-head systems
 - Anticipates and eliminates pressure surge to protect pressurized joints and fittings to prevent course-damaging blowouts
 - Factory preset
 - Reduces and maintains exact required pressure
 - Self-cleaning valve without the aid of filters and screens
 - Ideal for use with reclaimed water
 - Available in straight or angle pattern
 - Includes manual shut off and water-resistant pressure gauge
- Circle 207 on reader service form



Temprotect by Envirotech

- Blend of freeze point depressants and a polymer
- Applied before a frost event to eliminate or reduce frost
- Gives golf course personnel the ability to control start times and reduce the amount of damage to greens and tees
- Application costs range between \$20 and \$40 per green and tee
- Application rates are from 2 to 4 gallons per thousand square feet depending on conditions

Circle 208 on reader service form



Dakota Turf Contractor Dump Box

- Dump box available in two models: 525 and 550
 - Both models feature automatic tailgate, jack stand, A-frame construction, 4-wheel walking beam axles
 - Model 525 features 14-inch tires and a 2-yard or 5,000-pound capacity
 - Model 525 is 140 inches long and 79 inches wide, with a box dimension of 55 inches wide by 84.5 inches long
 - Model 550 features 16-inch tires and a 4-yard or 10,000-pound capacity
 - Model 550 is 172 inches long and 96 inches wide, with a box dimension of 84 inches wide by 120 inches long
 - Both models are easy to maneuver
 - Two or four-wheel brakes available as options
- Circle 209 on reader service form