

(*Phyllanthus urinaria*): small, erect summer annual broadleaf weed, escaped from ornamental industry; leaves oblong, arranged in two rows; flowers inconspicuous; fruit green, warty, without a stalk, attached directly to underside of branch; reproduces by seed.



Annual blue-eyed grass



Spreading day flower

Thin (Bull) Paspalum
(*Paspalum setaceum*):

clump-forming perennial grass; leaf blades flat, hairy to almost smooth with a fringe of stiff hairs along margins; common in sandy soils; reproduces by seed & clump fragments.

Annual Sedge (Water Sedge) (*Cyperus compressus*): summer annual sedge; seedhead is a cluster of flat greenish, glossy spikes, at top of bare stems with a few long leaves; tolerates close mowing; reproduces by seed.

Annual Blue-eyed-grass (*Sisyrinchium rosulatum*): winter annual, member of iris family; mistaken as goosegrass, has zigzag-shaped stems; leaves flat, light green, all clustered at the base; flowers pale purple to with with a rose-purple eye ring; reproduces by seed; other *Sisyrinchium* spp. occur.

Longstalked Phyllanthus (*Phyllanthus tenellus*): erect perennial broadleaf weed, escaped from ornamental industry; leaves arranged in two rows; flowers inconspicuous; fruit green, smooth, round on long stalks from the leaf axils; reproduces by seed.


Lawn Burweed (Spurweed) (*Soliva pterosperma*): low-growing, freely branched winter annual broadleaf weed; leaves opposite, twice divided into narrow segments of lobes; flowers small and inconspicuous; fruits have sharp spines; reproduces by seed.

Annual bluegrass (*Poa annua*): several biotypes now exist including triazine-tolerant (atrazine/simazine) biotype; perennial biotype; pronomide-resistant/tolerant biotype.



Torpedograss runner

—the author is an associate professor at Clemson University, Clemson, SC. To learn more about weeds in the Southeast, he suggests the publication *Weeds of Southern Turfgrass* available from Clemson University, Extension Service, Room 82, Poole Agriculture Center, Clemson, SC 29034-0311. \$8 per copy.



Learn the 3-minute equipment check

Weekly peeks

Save time at the end of the work week to check these systems:

- ▶ Remove the engine shrouding and clean out the cylinder cooling fins. Dirty cylinder fins will hamper a unit's ability to cool itself and can reduce engine life or even cause seizures, because heat won't dissipate as well from the unit.
- ▶ Check the grease in the gear head to make sure it's at the proper level. If necessary, add grease until it reaches the level recommended by the manufacturer.
- ▶ On trimmers, inspect the starter rope for frays.
- ▶ Remove spark plugs; clean and replace if necessary.
- ▶ Check the fuel lines for cuts, deterioration, other damage.
- ▶ Remove the fuel filter and inspect it for any physical breaks or cracks and replace the filter according to the manufacturer's guidelines.
- ▶ Use a tachometer and check the engine's RPM at idle and at wide-open throttle. When checking your unit at wide-open throttle, refer to the manufacturer's guidelines to determine if these should be done with the line extended, or if so, with the recommended line size.
- ▶ If the unit features anti-vibration systems, check the rubber or spring mounts to make sure they're secure and free of cracks.
- ▶ On trimmers, inspect the string head and the bump knob. Check the knob and the eyelets for wear. Also, inspect the spool and housing for breaks or cracks. Never use a string head or blade with a visible crack or break.

M.M.

It's easy to talk about ergonomically sound equipment selection and maintenance and quite another to find the time to manage the process.

by MARK MICHAELS

Attention to basic service will keep your equipment and crew running at peak efficiencies during the busy season. Whether you have a well-

staffed service department or a do-it-yourself approach, there are a few ongoing preventive maintenance tips that will get you through the summer.

Take time to look over and adjust your equipment, to prevent lost work time. Remember that even the simplest piece of equipment needs some fundamental maintenance which can be accomplished in less than three minutes.

Even how you treat your equipment when it's not in use can contribute to wear and tear.

"This type of equipment doesn't require a lot of mainte-

With regular equipment checks, the operator saves time, and the company saves money.

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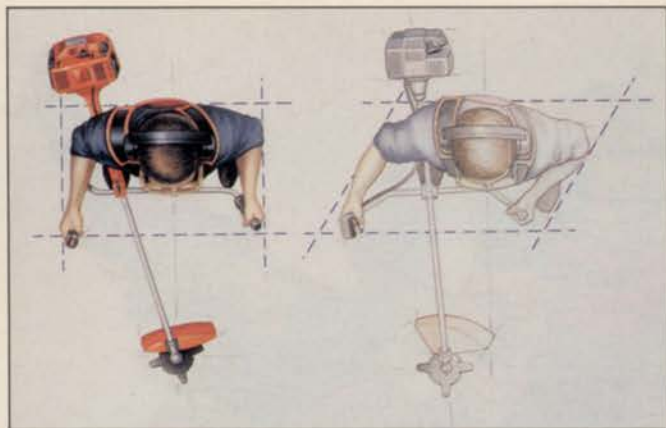


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With the trimmer shaft mounted at seven degrees to the left, the cutting head automatically rests in front of the user, for comfortable working position.

nance," says Bruce Wilson, president of Environmental Care Inc., Calabasas, Calif. "A key issue for us is how equipment is transported on our trucks. If trucks and trailers are well-designed, the equipment isn't piled on other equipment, and debris

bags aren't piled on equipment.

"Significant damage can occur when equipment is in transit," says Wilson. **LM**

—The author is senior forestry product manager for Husqvarna Forest & Garden Co.

The daily check list

- ▶ Clean the air filter.
- ▶ Inspect the engine shrouding for any problems that could interfere with the flow of cooling air.
- ▶ Check the air filter cover and air filter box for any broken or missing pieces that would allow unfiltered air to enter the engine and cause damage.
- ▶ Do a complete check over the unit and tighten any hardware that may have come loose the day before.
- ▶ Blow debris off the housing around the engine. Inspect for grass and debris between the gear housing and string head. Neglect here can create heat that may possibly cause loss of power and damage the gear box or cutter head.
- ▶ On trimmers, check the string guard for any broken or missing parts. Many users risk damaging the trimmer when they take off the string guards. Not only is this a safety concern for the user, but a unit without a shield can allow too much line out and may overload an engine not designed for such a heavy load.
- ▶ Lastly, inspect the throttle and operating controls for proper operation and visually inspect the shaft for damage or cracks.

M.M.



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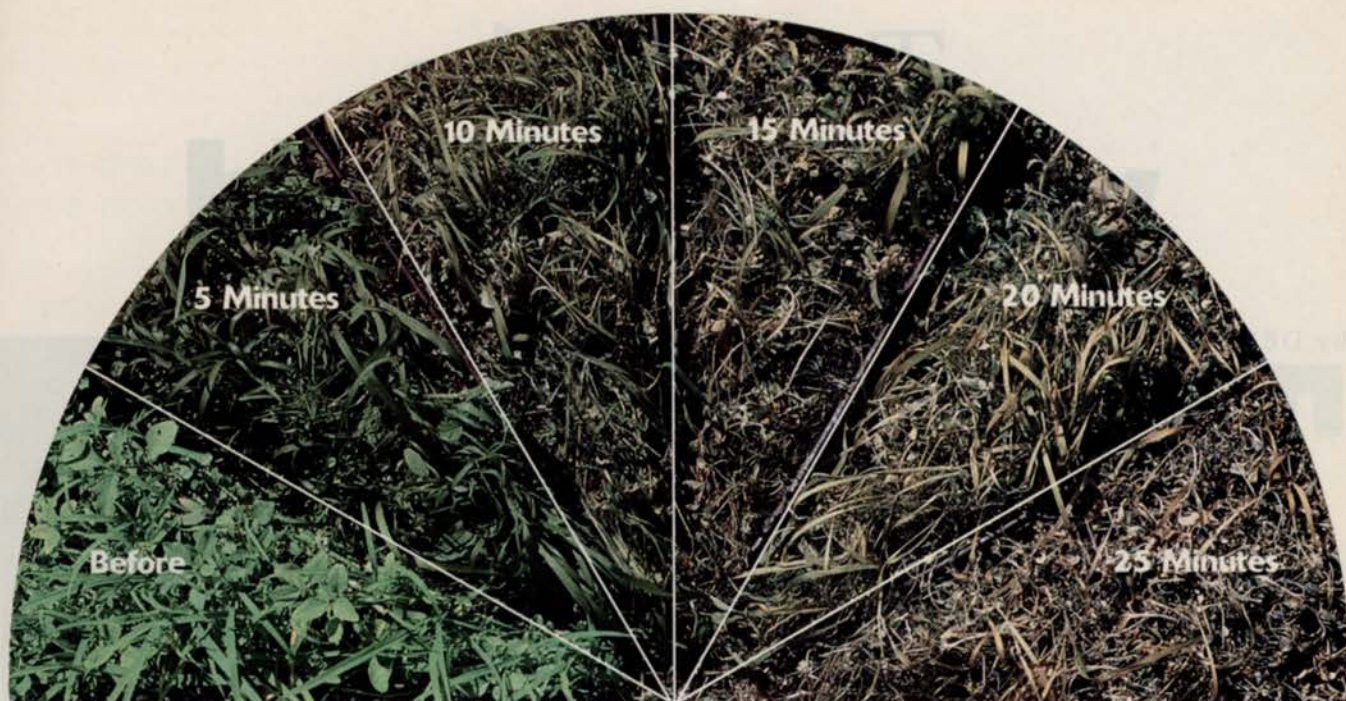
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Taming the woolly adelgid

by DEBORAH SMITH-FIOLA

The Hemlock Woolly Adelgid (HWA) is an aphidlike insect that is a serious pest of Eastern hemlock and Carolina hemlock. It was introduced into the United States (Oregon) from Asia in 1924 and discovered in Virginia 40 years ago. It's since spread throughout Pennsylvania (1960s), Connecticut and Massachusetts (1980s), killing forests and landscapes from New England to North Carolina.

Symptoms

The HWA prefers to feed on new twig growth of hemlocks, feeding on sap, and, theoretically, injecting a toxic saliva. HWA usually attacks lower branches first. Feeding damage first appears as needle discoloration, from deep green to grayish green to yellowing; followed by premature needle drop/defoliation, branch dessication and loss of vigor. Eventual death of the tree occurs after four to eight years, depending on the size, stress level and site of the tree. Even seemingly healthy, mature trees in good growing sites may succumb to this pest. Trees of all sizes and ages are attacked. Mature trees in native settings or landscapes that are large and tightly packed together may be severely attacked.

Monitoring and life cycle

HWAs reach maturity between late winter and early spring at the base of individual needles, covering themselves with white, cottony wax, resembling the tips of cotton swabs, for protection. All HWAs are female. Brownish orange eggs are laid under the cottony wax and hatch during an extended period from February through June. Wind, birds and animals spread the eggs from tree to tree during the spring.



Mature trees tightly packed together in large, native settings may be hit hard by the woolly adelgid. Wind, birds and small animals can disperse their eggs.

Newly hatched woolly adelgids (immature crawlers) are black, oval and flat. They emerge from the cottony egg mass with new hemlock growth in May and June. Use a hand lens to look for crawlers; they are barely visible to the naked eye. Crawlers migrate to new growth, molt, lose their legs, and settle down at the base of needles and begin to feed. These immature nymphs remain where needles attach to twigs until maturity. In the summer, nymphs enter a hibernation stage (aestivate) before resuming feeding in early fall. By October, nymphs begin covering themselves with white, cottony wax, initially secreting it along the outer edge of their bodies like white fringe. This wax often remains firmly attached to hemlock branches long after the insect dies. There is

one spring generation a year plus a partial fall generation.

(Black nymphs are exposed on new growth for a long period, from June to October, before beginning to secrete their white protective wax. They are susceptible to pesticides at this time.)

Cultural controls

There are ways to reduce HWA populations on hemlocks by managing trees properly.

► Do not place birdfeeders in hemlocks as birds pick up eggs/nymphs in their feathers and transport them to other trees and other areas.

► Do not fertilize HWA-infested hemlocks. Nitrogen fertilization enhances the survival and reproduction of HWAs. Research shows that twice as many HWAs

survived on fertilized hemlocks as on unfertilized ones. This was true whether the fertilizer was soil broadcast, micro injected, or implanted. (McClure, 1991)

► No effective natural enemies are known for reliable biological control. Several native predators may help to lower HWA populations.

► A winged population of HWAs is produced each spring which leave hemlock and lay eggs on spruce. It has yet to be determined what type of spruce may act as an alternate host.

► Western hemlock species (*T. heterophylla*, *T. metersiana*) tend to tolerate or be more resistant to HWA. However, these species may not be adapted to Northeast conditions.

Biorational pesticide control

The settled nymph stage is extremely sensitive to control treatment for a long time period, June-October.

► Sprays timed between September-October have less potential impact on beneficial insects, and landscapers/nurserymen tend to be less busy this time of year.

► Research in Connecticut and New Jersey has shown excellent control using either insecticidal soap or horticultural oil. Read the label directions. Do not spray oil if temperatures are over 90 F. and hemlocks are under drought stress. Thorough

Tree injections look promising

Tree injections and implants give good control of adelgids, say researchers in Connecticut. Fertilizer and insecticide treatments were applied using the Mauget system; a combination of both was applied using the CSI Medicap system in late May.

Pesticides injected or implanted in May in a forested site significantly reduced HWA levels within four weeks: Metasystox-R by 98.6 percent; Bidrin by 94.3 percent, and Orthene by 93.4 percent.

Intermediate control occurred on trees treated with combinations of insecticide and fertilizer (acephate/Orthene and 12-4-4). After four weeks the average control was over 88 percent even with the fertilizer. Applications of fertilizer alone (Stemix Hi Volume 0.5-0.7-0.6) significantly improved HWA survival.

DSF

coverage is necessary, using a high-pressure sprayer. Use of insecticidal soap will remove most of the white wax, which is an eyesore. Target sprays to the underside of new growth.

► The developing females in early spring are also vulnerable to dormant oil (2%) applied in March or April.

Chemical controls

► The exposed, settled nymph in June and July is vulnerable to most sprays. Diazinon and malathion have shown excellent control during this period. (McClure, 1991)

► Fluvalinate (Mavrik) is also labeled, using the same timing. However, preference is given to the less toxic soaps and oils for control of this pest. Spray coverage must be thorough.

► A recent study at Longwood Gardens, Pa., looked at the effect of Morestan (Joust) on HWA survival. A September spray targeting nymphs provided excellent control with thorough foliar coverage. This treatment (and timing) could also control hemlock rust mites and spruce spider mites.

► Also, many landscapers and nurserymen are awaiting research results using imidacloprid (Merit) for control of HWA as both a foliar spray as well as a soil injection.

Merit is used at a very low rate, has a long residual and may take weeks to months to translocate and control pests in large trees. Research by the product's manufacturer, Bayer Corp., determined that soil injections gave 96 percent control—after 153 days.

► There is also a new product on the market, called the Wedge, which essentially is a large hypodermic needle injector system. The manufacturer, ArborSystems, Inc., (402/571-9786) claims that Merit can be injected at waist height in a simple process with minimal tree wounding. Additionally, the pesticide will be uptaken within the tree in a matter of hours versus weeks. Research trials on this new product are underway.

Injecting insecticides is most effective in dense stands of trees that are inaccessible by spray equipment, or when thorough drenching by sprays is impossible or undesirable.

(Mention of any product in this article does not constitute an endorsement by Rutgers Cooperative Extension, and does not imply approval to the exclusion of other suitable products.) **LM**

Deborah Smith-Fiola is associate professor and extension agent with Rutgers Cooperative Extension.

Egg masses of overwintering adelgid adults



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Fish tore up the grass on your golf course?" I asked, trying to envision how that could be. For some absurd reason I kept seeing walking catfish pulling themselves out of the nearby river, chomping off mouthfuls of turf and then slithering back into the brown water! No that's, well...a little too crazy.

But the small, grey-haired man insisted.

"You bet they did," he fairly shouted. "The fish were everywhere, everywhere. These weren't little fish. These were big fish." The man, the owner

and superintendent of this golf course, arose from the snack counter stool and spread his hands about 18 inches apart to show the size of the fish.

"No, no, many of them were bigger, much bigger," scolded his wife, stepping in front of him and holding her short, plump arms another foot wider anyway. "They were carp. Carp can get much, much bigger. There were so many we couldn't do anything."

The thought of fish, even "big, big fish" destroying turfgrass on a golf course didn't register, and the look on my face must have said so, because both of them kept up a running commentary of just how their 9-hole course had, temporarily at least, become a 7-hole golf course.

Who would have thought it? Not me, not until I stopped late that afternoon for a quick 9 holes while on a husbandly errand in an unfamiliar part of the county. Hey, why not? There were just a handful of golfers on the course, and at least another hour or so of daylight.

When I handed the owner a ten he immediately apologized that I couldn't play the 4 and 5 holes. I could play numbers 8 and 9 twice to make my 9 holes, he explained before handing me back 3 bucks in change. That was good

This fish story meant trouble for golf turfgrass



RON HALL

Managing Editor

GOLF

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This putting green is a laboratory

PAGE 86 ▶

Where every drop of water counts

PAGE 126 ▶

How to make dry spots vanish

PAGE 186 ▶

Is equipment leasing for you?

enough for me. Even so, I wasn't going to tee off until I heard the rest of this fish story.

The man and wife took turns explaining how a storm in mid May caused the nearby river to "back up" and overflow its banks onto the course. The storm also apparently damaged some nearby cribs in the river. The pens held thousands of carp. The suddenly-free carp spread out over the shallow water of the fourth and fifth holes on the course. It was spawning season. Whoopee! They wiggled and thrashed in the shallow water until they'd destroyed almost all the grass on the two golf holes, the two that paralleled the river.

When the water receded after eight or nine days, it left behind thousands of stranded, dying carp. The owner said he couldn't reseed the two holes until he and his wife gathered the dead fish up and hauled them to a landfill. They did a lot of the work themselves. It was a nasty business.

The man said he'd owned the golf course for years and it had flooded before. But this was the first time it had ever suffered such severe fish damage. **LM**

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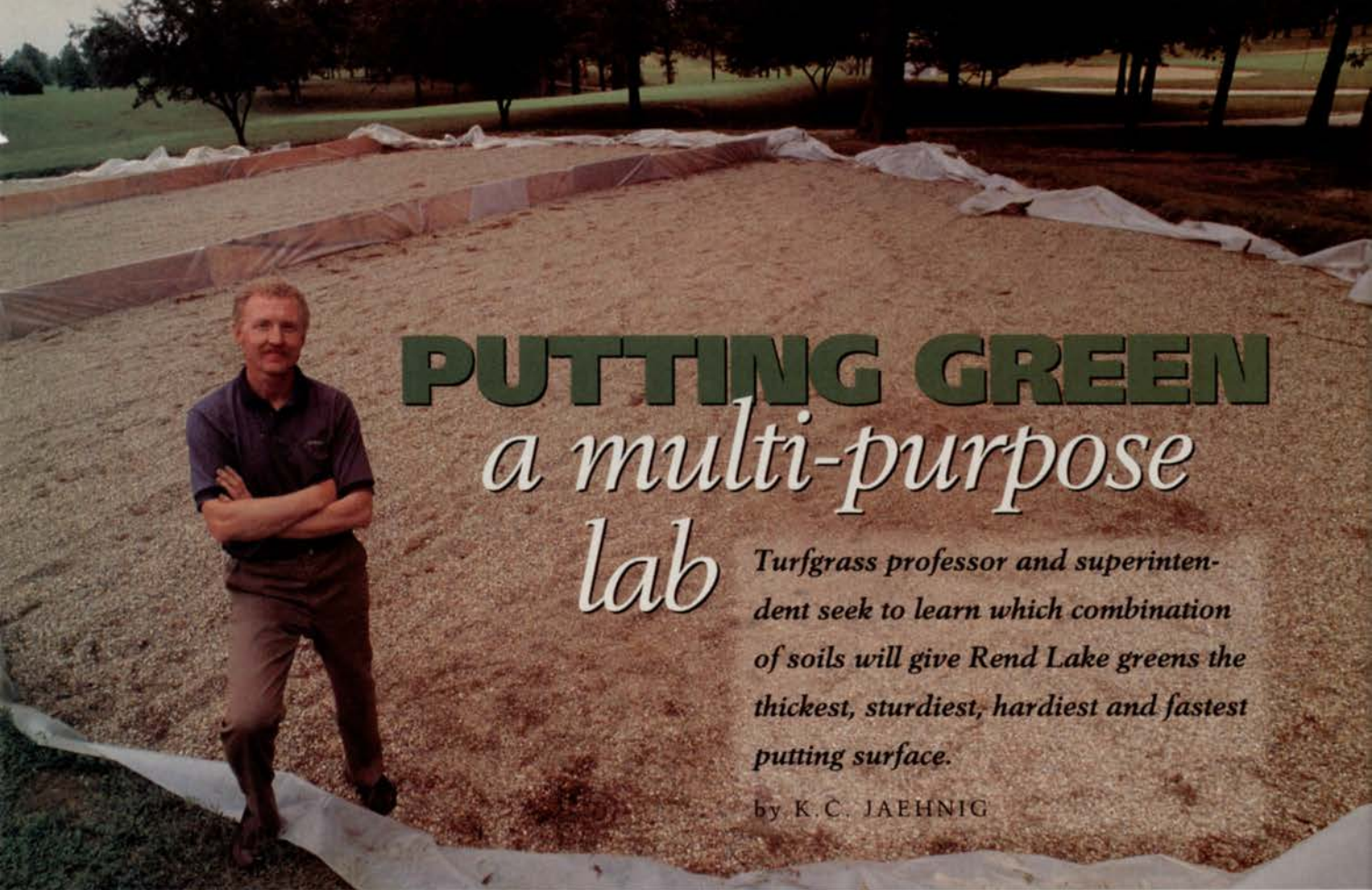
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PUTTING GREEN

a multi-purpose lab

Turfgrass professor and superintendent seek to learn which combination of soils will give Rend Lake greens the thickest, sturdiest, hardiest and fastest putting surface.

by K. C. JAEHNIG

Ken Diesburg's newest research lab is a putting green at Rend Lake Golf Course, Carbondale, Ill. "There are probably a few, but to my knowledge, this will be the only golf course green in the country with the dual purpose of being used for play and for research," says Diesburg, turfgrass professor from Southern Illinois University at Carbondale, who has set up shop at Rend Lake to come up with solutions to putting green problems.

Traffic wear solutions

Diesburg has been at work with regional superintendents since he came to teach at SIU seven years ago. They encouraged Diesburg to follow through on their idea to conduct research on a working green.

Rend Lake superintendent James Ashby, says how practical the notion was.

"We'd go to turf field days and see research plots that look fantastic, but there's no wear and tear on them," says Ashby.

"You can't simulate what ball marks will do, or spikes or someone taking a divot out

of a green when they miss a putt. Traffic is a huge problem for greens, and so is daily maintenance. Field plots may be mowed every two, three, even four days, but on a course you have to do it every day, which makes wear patterns from mowers.

"We want to see what happens to a green that is in play daily."

Tracking leachates

Work on the putting green began last fall, when Belleville resident/business owner Joe Munie of Munie Outdoor Services, Inc., provided the equipment and crewman to dig out the green space.

Kenneth Diesburg with the first stage of his research putting green. Wooden boards between plastic liners separate the soil/grass mixes. They will be removed after the turf takes hold.

The rough grading created a 7,000 square-foot, 16-inch deep 'tub,' elevated and sloped for better drainage. Diesburg lined the tub with heavy-duty plastic, and formed three compartments in the hole. Then, with four-inch plastic pipe and gravel, installed a separate drainage field for each compartment.

Research benefits

The putting green project combines education, industry, management and research, and is also a service to the public, says Ken Diesburg, who will use the green as a teaching tool for his turf management students. When two more identical greens are built at other courses, the results of comparing cultivars and rootzones will hopefully be published in scientific journals. The Southern Illinois Golf Course Superintendents Association will gain valuable information through field days at the green, and through the experimentation. Eventually, the golfing public will have more vigorous greens during the heat of the summer.

"Each rootzone is completely separate from the others, with its own drainage field, to monitor the leachate contents," says Diesburg. "This will enable us to determine the movement of nitrates or pesticides from the rootzones. We will also be able to calculate infiltration rates and water retention. Any water that drains through the root zone has to go out one spot, through the drainage field, where we can collect it," explains Diesburg. "The point is to collect what gets through the root zone."

What's wrong with sand

Diesburg, a 14-year green industry researcher, theorizes that most of the sands being used in his part of the country are comprised of particles that are too small, and, he says, barely meet USGA standards.

"The bulk of the particles are at the smaller end—0.020 to 0.030 millimeters—of the recommended predominant distribution range, which is 0.250 to 1.00 millimeters. Additionally, there is 8 to 16 percent of fine particles, less than 0.020 millimeters."

Diesburg says something must be done to the rootzones to increase water retention in the top inch while increasing the infiltration of excess water.

To test his theory, Diesburg will compare mixtures of sand and peat as rooting media in two of the green compartments. A third will contain a mix of sand and "Profile" porous ceramic.

"We're looking at two rootzones and a sand commonly used in the area. In those two root zones we're looking at two different types of peat. One is from Canada. It's got larger particles, and is more of a sphagnum peat. The other is from the Dakotas. It's more mature, with darker, finer granules.

Diesburg says the "Profile" product

Lots of help

Ken Diesburg was hopeful we'd be able to mention the various contributors to the green construction project, and we're happy to oblige.

► First was the Rend Lake Conservancy District, owners of Rend Lake Golf Course.

"Jim Ashby was going to build a practice putting green anyway," says Diesburg.

"Contributions from other entities simply reduce his cost. He contributed the bulk of manhours from his crew, as well as most of the standard materials."



From left, Rend Lake Superintendent James Ashby with Ken Diesburg and Todd Thomas, assistant superintendent, in early stages of the research green project.

► The Southern Illinois Golf Course Superintendents Association contributed \$2000 and backing. SIGCS member Ashby says that if this project is a success, two more identical greens will be built.

► AIMCOR, Buffalo Grove, Ill., donated the "Profile" Rootzone amendment.

► Munie Outdoor Services, Inc., of Belleville, Ill., lent a grader operator to shape the rough grade for the green.

► Modern Distributing of Maryland Heights, Mo., contributed irrigation sprinklers for the green.

► John Wear of Texas contributed a biological derivative from steer manure.

T.M.

won't crumble, and is durable like sand.

Diesburg says he often finds greens drying out too fast in the top inch of the rootzone during summer. They're saturated with water just below that top inch.

"Even if the bentgrass would be vigorous enough to grow deeper roots, the roots cannot grow into a water-saturated zone,

and there is no oxygen for respiration."

"It looks like [Profile] has potential as a replacement for peat," says Diesburg. "It adds to the construction cost of a green, but if it works, the savings in green management during the next 20 years would far exceed the initial cost."

Diesburg seeks a turfgrass cultivar with nice green color, quick fill-in capacity, high leaf growth and shoot density and good all-around hardiness. He also wants to observe the differential response of these cultivars to the three rootzones.

The green is seeded with Penn A-4, Crenshaw and Penncross bentgrasses. □

—Additional reporting and contributions by Ken Diesburg and Terry McIver

ROOTZONE SOIL PROPERTIES FOR RESEARCH GREEN

	Sand	Sand/15% Canadian peat	Sand/10% Dakota peat	Sand/15% 'Profile'
Saturated hydraulic conductivity	30.2	18.2	13.0	36.2
Water retention at field capacity	5%	9%	9.7%	7.3%



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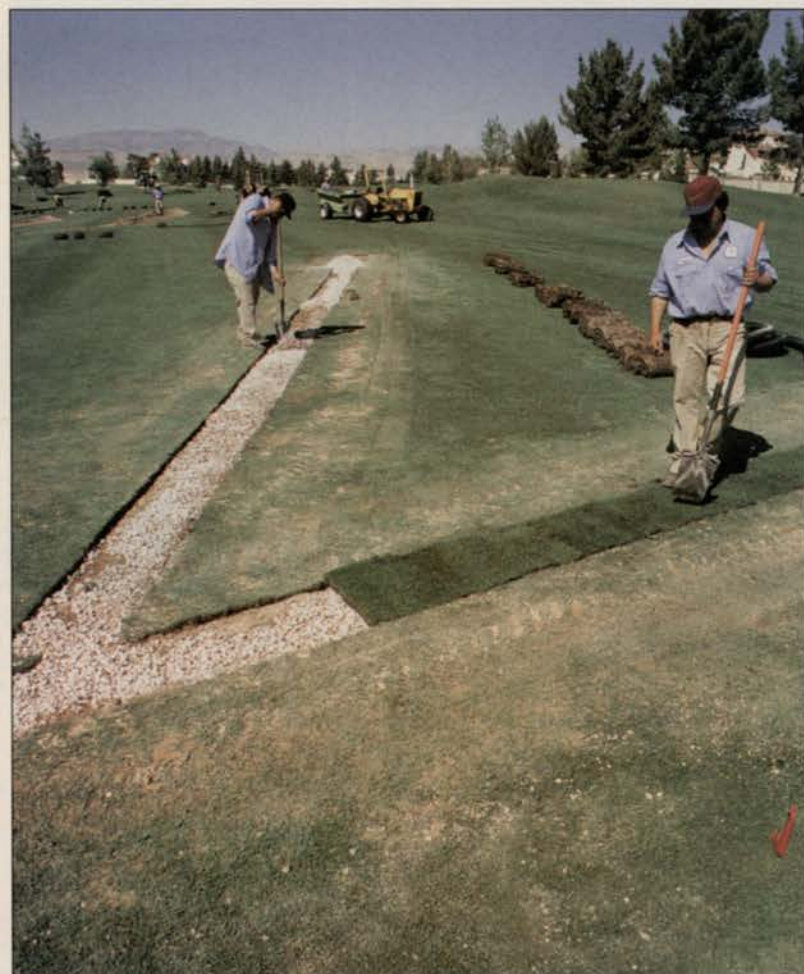


Every drop counts

Superintendent Bill Fielder, CGCS, seeks long-term water conservation solutions in maintaining Spanish Trail Country Club Golf Course in Las Vegas.

By DON DALE

Spanish Trail in Las Vegas is an impeccable golf course but receives, on average, just three inches of rain a year. Bill Fielder is, understandably, big on water conservation. And how: the annual water bill for the club is almost \$1 million. But his primary re-



The Spanish Trail crew works on installing drainage tile on the #9 hole on the Canyon Course. A new pump station, redesigned irrigation system are in place too.

sponsibility, as a certified golf course superintendent, is to maintain quality turf and trees at Spanish Trail Golf and Country Club where members expect superb playing conditions.

"We pay the highest water rates for golf courses anywhere in the western United States, and maybe the entire country," says Fielder who waters 210 acres of turf (common Bermuda fairways, hybrid 328 Bermuda tees, Penncross bentgrass greens) on the 240-acre development. His water conservation program seeks savings in places where many courses might not even think they can conserve water.

"The first thing was to get a new pump station," Fielder says of his new dual-pump Flowtronex PSI station with six 75-hp motors. The pump station, costing about \$110,000, increases water distribution efficiency, and allows Fielder to pump water where he needs it, when he needs it and under the pressure he needs it.

The new pump station, with its even pressures, has eliminated a lot of breakage and weeping of lines. Irrigators also constantly correct head spacings and nozzle imbalance.

The pump station is just part of a complete redesign of the irrigation system at Spanish Trail. That meant changing from a block system to a valve and head system on the 9-hole Canyon Course, with the other two courses scheduled for changeover in the near future. The redesign will cost \$1.5 million, but saves lots of water.

More precise control

By running each sprinkler head with its own valve, Fielder has more precise control of his irrigation. Before, he often had to overwater one spot to get adequate water on another spot. "Now we can address the hot spots, and only the hot spots," he says.

Management practices have a lot to do with total water usage, he notes, and he has gone to an efficient system. He has three irrigators, one for each nine holes.

"Constant maintenance of the system is the most important thing. Second is constant adjustment of the irrigation schedule," says Fielder. The Maxi V System is a great aid here, says the superintendent. Using the computer's calculations based on weather,

and their own knowledge of each course, Fielder and assistants make nightly adjustments to the schedule.

The superintendent even prints out each daily station log and go over it to see if there are problems, with irrigators changing each station's precipitation rates as needed to match up with evapotranspiration rates.

In the previous irrigation setup, Fielder recalls, "we'd actually have to come out in the day and add more water." In addition to poor coverage and massive water losses to evapotranspiration, the soil suffered from sodium buildup.

"Basically what happens is that sodium makes the plants unable to use the water that is there." Consequently, more water has to be used to get the desired effect.

Other options

"We use a lot of soil amendments and wetting agents to reduce the amount of water required to properly irrigate," Fielder says—calcium, sulphur, gypsum and, on an experimental basis, some porous ceramics. The amendments improve water penetration to the root zone, as well as improve drainage.

"In the case of wetting agents we're trying to reduce the surface tension so water will penetrate," he points out. He uses the wetting agents through the pump station, or applied with a boom pressure sprayer directly to greens, tees and localized hot spots.

The club is also laying drainage tile under one fairway, and plans to French-drain other holes if this experiment in leaching is successful.

Another method of reducing water usage is by reducing turf, and Fielder has taken out about 10 acres in low-use areas such as along drainways. This isn't popular in a development that has houses worth up to \$15 million, but it does save money.

Spanish Trail is also drilling its own water well to participate in an irrigation district groundwater recharge program. This will give the club reduced rates on their Colorado River water, but it will also cost \$0.5 million for all the upgrades.

Leaky lakes are scheduled for a bottom-lift in the future, and that will save water in bunches. "We're



Bill Fielder at Spanish Trail Golf Club in Las Vegas says the three most important things on a desert golf course are—"irrigation, irrigation, and irrigation."

going to drain them and line them with 20 mm PVC liner," Fielder says. "Each one we do is going to cost us \$100,000."

But look at the cost to replace water lost to leaks and evaporation in one month, April, and you'll see why leak stoppage is a good policy. That month's water loss on one lake cost \$1,100.

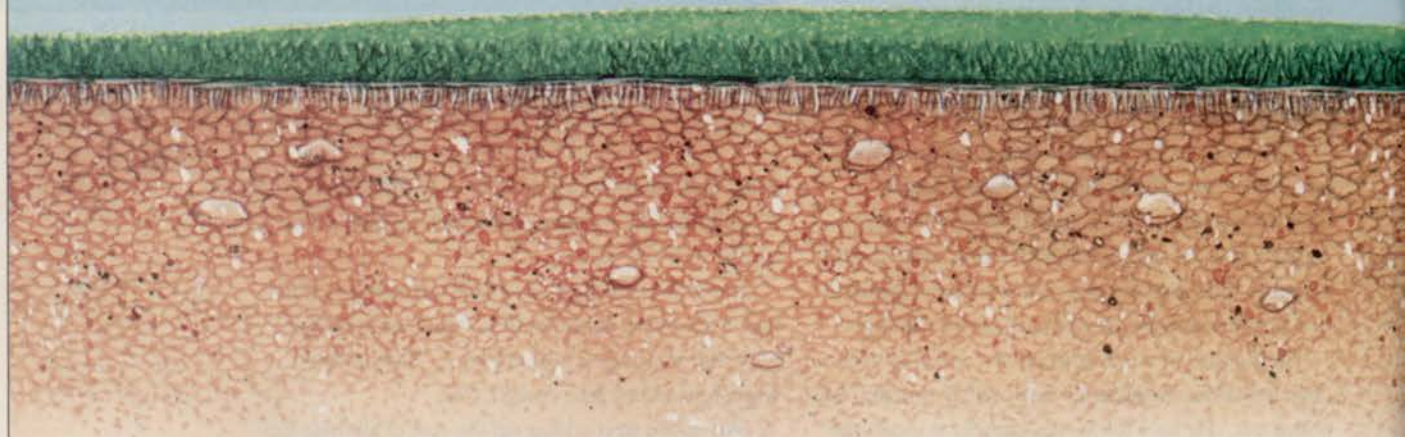
When you start adding up the cost of all these improvements you're looking at millions of dollars. But Fielder says that in a city of a million people that is adding a thousand families a week to its population, water will become more expensive in the future. Restrictions on usage will also be more prevalent.

"In the desert the three most important things on a golf course are irrigation, irrigation, irrigation," Fielder says, adding, there are two ways to pay for a golf course: "Now, or forever." A good irrigation system pays off now.

It's paying off now at Spanish Trail thanks to an aggressive program to conserve water. □

—Writer Don Dale is based in Willcox, Arizona

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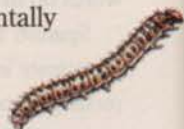
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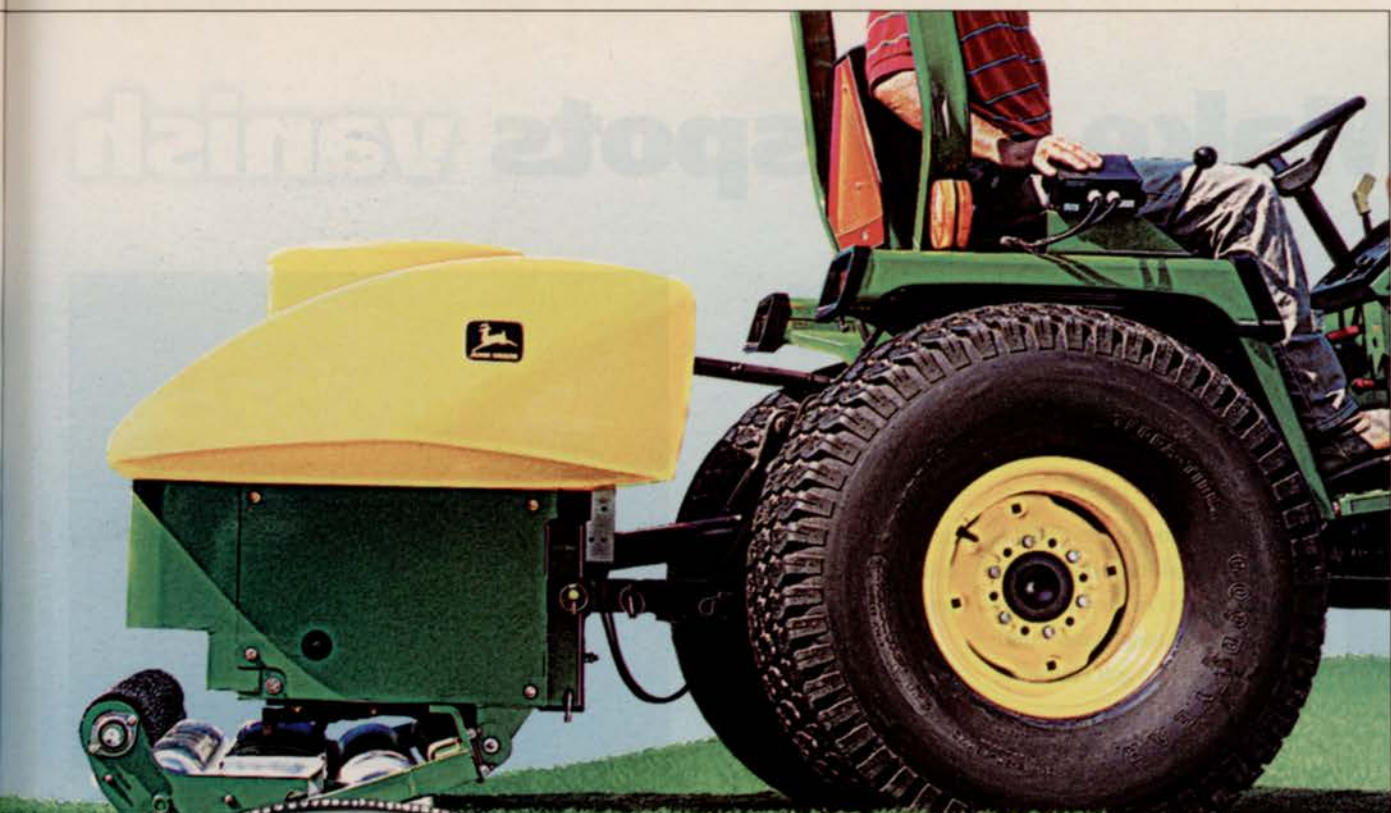
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NOTHING RUNS LIKE A DEERE®

Make dry spots vanish

Researchers tell superintendents what to use and what they can do to make the dry spots on their greens go away.

By JOHN C. FECH

It's just a few short weeks away from the annual statewide tournament and you're the host. Lots of details run through your mind as you prepare the golf course for play.

The last thing you need to worry about are localized dry spots on the greens. But, sure enough, the symptoms are showing up—foot printing, dark blue-green color development, and even some wilting and tissue loss. You try stepping up the irrigation cycles, but it doesn't help much. The spots are there.

Many causes

Localized dry spots (LDS) are symptoms with various causes. On native soil greens, many factors including thatch, compaction, poor irrigation coverage, and fungal mats can cause dry spots. On USGA specification or other high-sand-

content greens, hydrophobic (water repelling) soils are mainly responsible.

On both types, once a spot becomes noticeable, it's difficult to get it to perform normally again. As with pest control and other problems, proper diagnosis of the cause of the LDS is critical.

Research sheds some light on this problem on high-sand-content greens. The water-repelling capacity of a given soil is believed to be related to the buildup of an organic coating on the soil particles.

"The coating results from the natural microbial process of breakdown of roots, shoots and organic elements of the soil mixture such as peat moss," says Dr. Keith Karnok, professor of turfgrass science at the University of Georgia. When the coat-

ing becomes dry, its chemical nature repels water. Because high-sand-content greens hold water poorly to begin with, coatings further reduce moisture holding capacity and increase the rate of drying.

The symptoms of localized dry spots can be temporarily suppressed by using wetting agents, compounds which lower the surface tension of applied irrigation water. There are many products available in today's market. However, Karnok's research indicates that there are not significant performance differences among them. "Differences show up in cost, amount of product required and number of applications necessary to relieve symptoms," says Karnok.

Superintendents, on the other hand, may have favorite products. "Superintendents have to feel comfortable with whatever product they use. It has to be compatible with whatever else they may be applying to the green at the time such as fungicides or fertilizers," says Charlie Hadwick, superintendent at the Country Club of Lincoln, Neb. "The bigger concern is potential phytotoxicity to the green." To reduce risk to valuable turf, Charlie tests new products on the practice green.



Localized dry spot symptoms: blue-green turf color, wilting.

PHOTO COURTESY DR. PAUL REKE



Expression of mushrooms in localized dry spots, something you might not expect.

PAUL VERMUELEN, USGA

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Hadwick believes the coating issue is at the core of debate over controlling dry spots. "It affects so many things—USGA sand greens versus native soil mixes, high rates of wetting agents being effective, and possible relationship to fairy ring—sort of a problem cousin to localized dry spots." As evidenced by the expression of mushrooms in spots, the coating causes odd symptoms. "Whoever would expect mushrooms to show up in a dry spot?" asks Hadwick.

Soil modification through aeration and topdressing is another approach. Also, Kamok has seen positive results with the use of PSA diatomaceous earth soil amendment products.

Dr. David Minner, associate professor of turfgrass science at Iowa State University, has conducted several field studies to assess the optimum procedures and materials to incorporate.

"There is a negative stigma surrounding these products, kind of skepticism based

Be persistent or you'll have a hard time getting rid of localized dry spots.

on the notion of using kitty litter on your green," says Minner. Even so, he's encouraged by the results of his studies. One product in particular, Profile, has demonstrated dramatic differences. He encourages superintendents to try it for themselves.

"Break open a bag and see for yourself," says Minner. "After coring a green, backfill the holes with Profile in a 10 by 10 ft. area where dry spot is a problem. The treated area should show up if its helping your dry spot problem."

Minner reports that some calcined clays are dusty and can break down into finer materials that may severely reduce water infiltration on sand greens. Profile is differ-

ent than calcined clays of the past in that the dust particles are removed and the material is heated to a higher temperature creating a porous ceramic material.

"It appears that coring and topdressing dry spots with Profile will allow water to quickly enter, and remain in the dry spot sand," adds Minner.

The best approach to dealing with localized dry spots is to be persistent. "You've got to stay on top of them," adds Hadwick. "Hand water during the heat of the day, and put the water where it's dry, not where it's wet. Use light repeated applications. Let it soak in. Rewater. Otherwise the water just runs downhill, and you haven't got enough on the dry spots, and you've got too much everywhere else." □

—The author is an extension educator with the University of Nebraska



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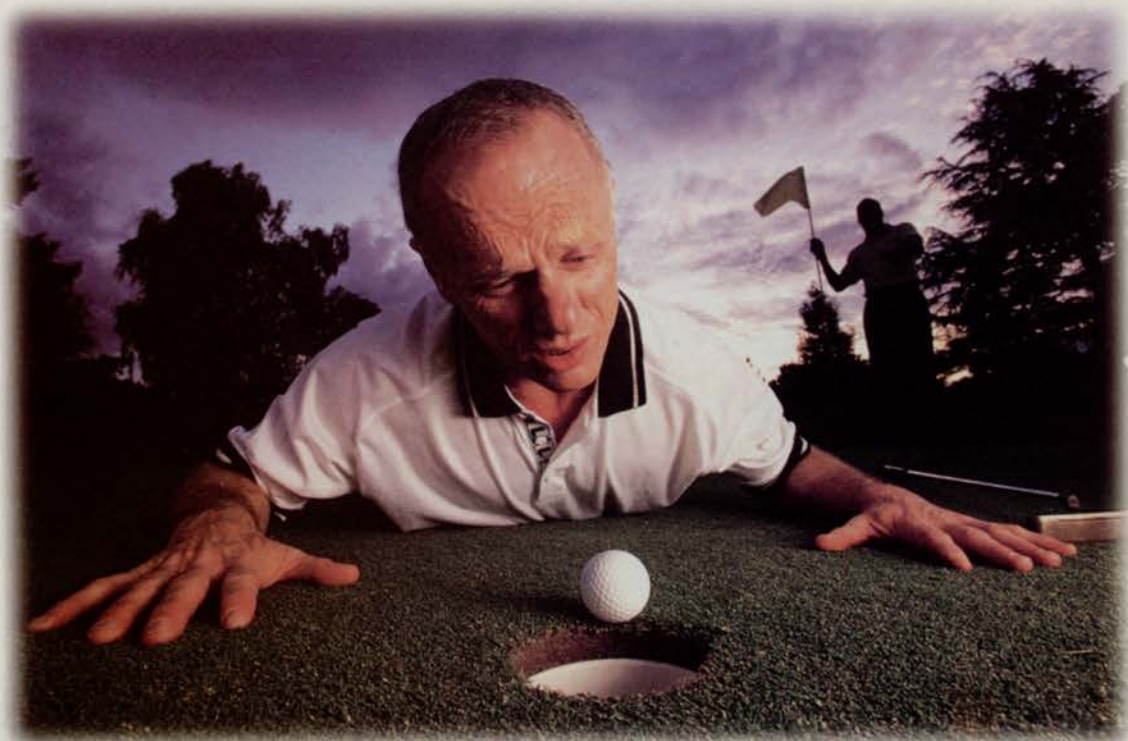
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Is leasing for you?

You don't always have to buy those big-ticket equipment items you need to maintain your golf course. Here's why.

By STEVE AND SUZ TRUSTY

Your crews need to manure the turf and groom bunkers quickly and efficiently and get off the course to clear the way for play. The better the course looks and plays, the more satisfied the golfers, greens committee and course owners.

Obviously, how you work with and manage people and equipment affects maintenance quality. Less obvious is the impact your allocation of resources has on maintenance quality. But in reality, that's what comes first. You only have so many dollars to spend and how you spend them determines what equipment and which people make up your maintenance team.

How leasing works

Technically, leasing is a contract granting use of property during a specified period in exchange for a specified fee. Some call leasing a long-term rental agreement. And, like rentals, leasing offers you the opportunity to select the equipment you want for the time period you want without tying up financial resources for the total price of the unit.

With leasing you pay for equipment as you use it which helps with cash flow. Down payments usually are lower. Often you can finance 100 percent of the equipment costs. Also, leasing generally allows you to keep your established lines of credit open and available for other needs.

There can be tax benefits as well. De-

pending on the terms and conditions of your leasing agreement, the leasing payments could be up to fully tax deductible.

Terms of the lease must be negotiated, of course, but most offer options in length from 24 to 60 months. For golf and turf equipment, a 36 month lease is common. The lease agreement gives you the option of simply turning in the unit and walking away, or of trading up to a new machine in three years without taking a financial hit for doing so.

That means you could replace that mower, bunker rake or utility cart with the new model that best fits your needs and has all the technological advantages three years of innovation and refinement have to offer.

A quick review of your service and repair records will reveal an added advantage to regular cycles of equipment replacement. The need for major repairs occurs most frequently on older machines.

Though no equipment is immune to unexpected breakdowns, major problems with newer units—whether purchased or leased—should be covered by the manufacturer's warranty.

Comparable terms

Could you get a better deal from a bank? No, according to most lease holders, especially since bottom line cost isn't your only consideration. Banks often will require a down payment, sometimes a substantial one. Most lease agreements have minimal, and some have no, down payment requirements.

With a bank loan, you own the machine. Generally, the tax advantages are not as good. Friendly as your local banker may be, odds are he or she doesn't thoroughly understand your business. Payments are set to fit the bank's needs and schedules, not yours. It's the job of the leasing companies associated with equipment manufacturers to understand your business and meet your needs.

With some of these companies' lease

agreements, you can include a "skip payment" option that allows you to set up a payment schedule in which no payments are required during the off-season when your cash flow is the tightest. They also may offer a "bundling" option in which you may include used equipment from the associated manufacturer, competitive equipment from other manufacturers, and allied products, all in the same package with your new equipment lease.

Who leases?

John Deere's Golf & Turf Division Business Manager Ken Edwards, says, "Anything that's going to appreciate in value, you buy; anything that's going to depreciate, you lease."


While that may be too basic for some things (You can't lease new carpeting for the clubhouse for example, and that definitely depreciates.) it does apply to equipment.

Flexibility

Lease flexibility gives you other alternatives as well. You might decide at the end of a 36 month lease that you really like a certain unit and the job it's doing for you. You can exercise the purchase option that could be included in the lease agreement.

This purchase amount is determined at the time the lease is signed, so you'll already know the cost. You can make your decision based on the condition of the machine—which you and your service technicians will know—and the current market price of a comparable unit.

Or, at the end of a lease period, you could decide that the machine you're using is still performing well and isn't much different from what is currently on the market. You also may have heard that a new model is due for introduction quite soon. You then could extend the lease on the current machine for a specific period, say another 12 to 24 months. **LM**



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Put the power of EAGLE

Superintendents tell why they rely on Eagle to prevent stubborn turf diseases.



Mike Jones
Valley High Country Club
Elk Grove, CA

"We go into the season with really nice greens," says Mike Jones, superintendent at Valley High Country Club in Elk Grove, CA.

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Mike's experience was no surprise to us. We've been saying all along that Eagle provides dependable, long-lasting protection against 14 major turf diseases — protection unmatched by any other systemic fungicide. Better yet, Eagle is now registered to control summer patch and spring dead patch.



Rich Hardebeck
Eagle Lake Golf Club
Farmington, MO

Tackling dollar spot and brown patch

Rich Hardebeck is superintendent at Eagle Lake Golf Club in

Farmington, MO. When he first came to Eagle Lake, he experienced extremely heavy dollar spot on his ryegrass and bluegrass fairways.

"Last year," says Rich, "I applied Eagle preventatively in April and again in September and didn't see dollar spot all summer."



Dave Anderson
Evergreen Country Club
Haymarket, VA

Dollar spot was also Dave Anderson's problem, as well as brown patch on his ryegrass fairways.



to work for you.

Dave is superintendent at Evergreen Country Club in Haymarket, VA.

"I used Eagle exclusively on the fairways," he says, "and they were the best fairways I've ever had, especially considering the extreme heat."

"Late in the year," Dave continues, "I alternated Eagle with a contact fungicide to control gray leaf spot and got excellent results overall."

Effectiveness is just the beginning.

In addition to the long-lasting protection of Eagle, superintendents

appreciated its outstanding turf safety, low-use rates and water-soluble packaging.

"I don't have the safety concerns with Eagle that I do with other sterol inhibitors," says Mike Jones. "And rates are so low, I have the flexibility of using it in the fall if I need to."

The flexibility of Eagle is further enhanced by the new extended spray schedule — now up to 28 days.

Those are powerful reasons for using Eagle. Dave Anderson gives the final word.

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he says, "Eagle offers the best of both worlds."

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T-O-160

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Grass carp nears Calif. okay

The bill to expand superintendent use of the grass carp passed the California Senate by a vote of 31-1 reports the GCSAA. California GCSA and lobbyists were tireless in efforts to secure the vote. Fish and Wildlife officials have expressed concern about expanding grass carp use to the whole state at once but superintendents are optimistic about getting their bill through the Assembly and signed by the governor. □

Alice Dye new ASGCA president

Alice Dye has helped make history for the American Society of Golf Course Architects by becoming the first woman president of the 51 year-old organization.

The selection of Dye is also the first time a husband and wife have served the Society as presidents. Designer Pete Dye served in the post in 1989.

Alice Dye has co-designed more than 40 golf courses in the U.S. and abroad, and is perhaps best known for her work as a promoter of women's golf, according to the Society. She has drawn attention to the need for courses that challenge the skills of women golfers through the placement of tees and hazards.

Dye holds more than 50 amateur titles.

The election of Dye was held at the ASGCA annual meeting in Toronto in May. Also elected officers were:

Vice president: Bob Lohmann, Marengo, Ill.;

Treasurer: John LaFoy, Greenville, S.C.;

Secretary: Brian Ault, Kensington, Md.

Immediate past president Denis Griffiths of Braselton, Ga., will serve as ex-officio member of the ASGCA Board of Governors. □

Detroiters raise \$20,000 for Special Olympics

The Greater Detroit Golf Course Superintendents Association recently raised \$20,000 for the Special Olympics through a golf outing at Bald Mountain Golf Course, Lake Orion, Mich.

The tournament scramble was won by the team of Gerald and Jerry Pireskorn; Scott Barrows and Ron Adams. Second place team was Ted Kasel; Randy Miller; John Haney; and Craig Jach. □

Do the best supers wear Etonics? They do now!

As a component of the three-year partnership, Etonic will market its *Dri-Lite* Series golf shoes as "GCSAA's Official Superintendent's Shoe."

"By working in conjunction with the people responsible for maintaining golf courses nationwide, Etonic will gain input that will allow the company to produce golf shoes that are best suited for today's golf courses, while also strengthening our stature as the industry leader in the alternative spike market," says Bill Kirkendall, president of Etonic Worldwide Corporation.

Etonic and GCSAA will share information in areas related to alternative spikes, focus group discussions, professional development and industry-client round table forums.

Bollig suggests that the information exchanged between the two groups would likely consist of turf research information.

"It's one of those things that if Etonic called and said 'we're trying to develop a product, what have you guys found,'" says Bollig.

"And from [Etonic's] standpoint, if they do any testing...they'd share with our membership."

Does GCSAA or does it not favor alternative spikes?

"From a strictly agronomic focus, I would say 'yes' says Jeff Bollig, spokesman for GCSAA. "But knowing that the game of golf involves more than just [the superintendent's] area, we have to look at this on a wide-range basis.

For example, says Bollig, "There's bermuda-grass courses with very little traffic, and there's probably no reason to mandate some of these courses to go to alternative spikes. There's also some of our members who feel that because the alternative spike craze has hit, people are going to change automatically, and it's just a matter of time [before all courses mandate their use].

Etonic will help to fund the GCSAA's Development Series, and will also contribute to the GCSAA Foundation. □

These questions came straight from the customers of lawn care operators, pest control operators and other professional pesticide applicators across the country—and probably reflect the concerns of your customers. The more your customers know about the products you use, how you use them and how much is used, the more confident they will be in you and your service.

Communicate With Your Customers

Your customers expect you and your employees to be credible and knowledgeable sources of information about your products. Take time to talk with them about your safe and responsible use of pesticides.

Studies show that most people don't know that pesticide products are among the most highly tested products sold. The U.S. Environmental Protection Agency (EPA) registers only those uses of pesticide products that pose minimal risks.

- Emphasize that pesticide products must undergo stringent government-monitored testing before they can be sold. It is a long and costly process. For example:
 - It takes a chemical manufacturer eight to 10 years to test and register a product, at an average cost of \$30 million to \$50 million.
 - As many as 120 tests or more are performed, many specific to health, safety and the environment.
 - Only one potential pesticide in 20,000 makes it from the research lab to the market.
- Explain Integrated Pest Management (IPM) to your customers. Most do not fully understand the concept. Point out that a successful IPM program stresses prevention, pest identification and selection of the best method of pest control, which may require the use of pesticides. Tell how you incorporate IPM into your pest management practices.
- Identify the specific pesticides you use and the pests they control.
- Indicate that professionals use an array of products, many the same as those used by homeowners.
- Assure customers of the benefits pesticides provide for turf, trees and ornamentals, and in the home. For example:
 - Termites cause over \$1 billion in structural damage each year.

"Are the pesticides you use safe?"

"Are the pesticides that professionals use stronger and more toxic?"

"When is it safe for my children and pets to return to an area after a pesticide application?"



- One large, pest- and disease-free tree has the same cooling effect as 15 room-size air conditioners.

- A well-maintained lawn and landscape adds as much as 15 percent to a home's value.

- Discuss your safe and responsible use of pesticides as a professional applicator. Note the many steps you take to ensure that the pesticides you use are used properly.
- Advise your customers that you closely follow label instructions. The label contains instructions for only those uses approved by EPA.
- Outline the extensive training that is mandatory for professional applicators in order to apply specialty pesticides. Applicators are required by law to undergo training, certification and licensing, as well as to keep records of each job performed.

- Explain what happens to pesticide containers once a job has been completed. Note that containers are disposed of properly.

What Else Can You Do?

Provide your customers with materials such as newsletters, brochures, fact sheets and bill stuffers that communicate these messages. Be sure that someone at your company, who has a basic knowledge of the products and application methods your company uses, is available to answer questions.

RISE Is A Resource

RISE is the voice for the specialty pesticide industry. Its members include manufacturers, formulators, distributors and other industry leaders.

RISE works in cooperation with your national, state and local user/applicator associations and is an additional source of information regarding issues facing pesticide users. We can help you in your role as a knowledgeable and credible information source to customers and to the public. A brochure on communicating about pesticides with your customers is available. Contact RISE to receive your copy.

We urge you to take an active part in your state and national association(s). We work together to support your business.



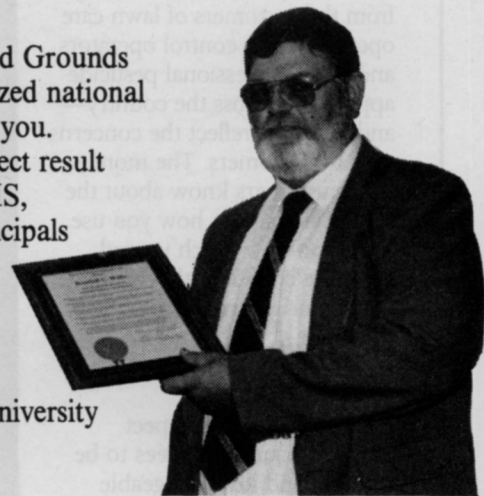
Responsible Industry for a Sound Environment®

The Case of the 'If's':

If
professional
grounds management
means something
to you,
you belong with us.

"If I can become a *Certified Grounds Manager and win a recognized national maintenance award, so can you. Those attainments are a direct result of being a member of PGMS, dedicating myself to its principals and taking advantage of its programs."

Randy Willis, CGM
Grounds Supervisor
NW Missouri State University



Let PGMS Join **YOU** in your future.

Yes, we're a membership organization, but we don't just expect you to join us for joining's sake. We're vitally interested in our members' futures. We literally intend to and will add our expertise and strength to you for your greater attainment.



Join together with fellow grounds professionals who serve in all areas of the profession. Comprised almost equally of independent contractors and on-staff grounds managers, PGMS is THE broad-based professional organization for you.

PGMS Membership Benefits (partial list):

- local branch meetings
- annual conference and Green Industry Expo
- monthly newsletter
 - personal identification (membership card, certificate, hats, jackets, decals)
 - certified grounds manager program
 - training manuals
 - discounts - rental cars, books
 - membership directory
 - awards
 - information clearinghouse
 - in addition, insurance programs now being developed.

*Conferred by PGMS, grounds manager certification is a program of developing and administering a program of voluntary peer review to establish acceptable competence levels, and to help the grounds professional attain his personal goals.

Clip and mail:

TO: PGMS
120 Cockeysville Road, Suite 104
Hunt Valley, Maryland 21031 Tel. (410) 667-1833

I want to grow with PGMS. Please send more information explaining how.

Name _____ Org. _____

Street _____

City/State/Zip _____

Telephone _____