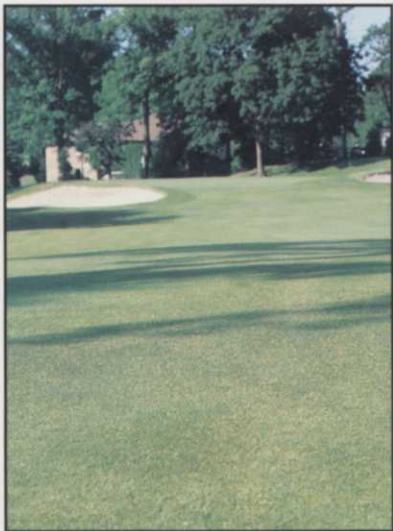


New 20% Lower Application Rate*

**Now Daconil Ultrex® Fungicide
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Week 1



Week 2



Week 3



Week 7



Week 8



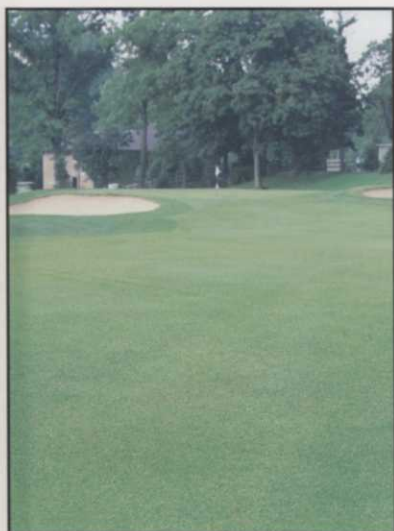
Week 9

Now You Can Use Daconil U For A Great Looking Course Week A

What could make spray-dry Daconil Ultrex® fungicide even better? How about a new, enhanced Super Weather Stik™ formulation? Testing shows you can get exceptional results with this new formulation at application rates 20% lower than before. That means you can now tighten your schedule for even better disease control without a significant increase in overall cost.

You could even use Daconil Ultrex every time you spray, either alone or tank mixed, and actually cut your costs by reducing your use of expensive systemic fungicides.

A special free offer to try an even better approach. Because Super Weather Stik Daconil Ultrex fungicide is so effective at these new low rates, we've been able to



Week 4



Week 5



Week 6



Week 10



Week 11



Week 12

Ultrax Every Time You Spray After Week After Week After Week.

develop a whole new spraying program using it at regular seven day intervals. As the photos above show, this program has been getting great results at courses like Shaker Heights Country Club, near Cleveland, Ohio, and it can do the same for you, giving you better disease resistance management and a healthier, greener course than you've ever had before, while still supporting

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ISK BIOSCIENCES™

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Chlorothalonil Fungicide**

45 sec

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45 sec

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And You Still Get Fast, Thorough Mixing Plus Easier Disposal, Too.

There's a lot more to like about Super Weather Stik Daconil Ultrex than its new reduced rate. Like the way it goes into suspension faster and stays in suspension for consistent spraying from start to finish with less settling out and fewer problems with clogged nozzles. Or how it pours so completely out of the bag

that it eliminates all need for rinsing to make disposal easier, too. Plus the superior sticking and staying power of our Super Weather Stik formulation for exceptional broad-spectrum control of some 70 diseases that attack turf, ornamentals, and trees. And the fact that there's never been a documented case

of disease resistance to a Daconil® brand fungicide in over 25 years. More good reasons Super Weather Stik Daconil Ultrex is a great choice for you. ISK Biosciences Corporation, Turf & Specialty Products, 1523 Johnson Ferry Rd., Suite 250, Marietta, GA 30062.

ISK BIOSCIENCES™

Always follow label directions carefully when using turf and ornamentals plant protection products. ® Registered trademark of ISK Biosciences Corporation. ™ Trademark of ISK Biosciences Corporation. *For best results, we recommend using 20% lower application rates on a 7-10 day schedule. Section 12(a)(2)(G) of FIFRA provides that it is unlawful for any person "to use any registered pesticide in a manner inconsistent with its labeling"; quoted language is defined in section 2(ee) of FIFRA and expressly excludes the act of "applying a pesticide at any dosage, concentration, or frequency less than that specified on the labeling unless the labeling specifically prohibits deviation from the specified dosage, concentration, or frequency." Thus, in the absence of specific label prohibitions, it is not unlawful under section 12(a)(2)(G) to use a registered pesticide at a dosage, concentration, or frequency less than that specified on the labeling of the pesticide.

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Scotland on Lake Erie

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Greens need 'clean' sand

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Shoreline grasses for aquascapes

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New spreader available

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Biological market bubbles

[GOLF]

The unrepaired golf club divot has long been a thorn in the side of the golf course superintendent.

It's a nagging, persistent problem. Like a squashed bug on a shiny clean window, or coffee spilled on a crisp white shirt.

Golfers have never been fully behind divot repair, as much as they would support, let's say, free golf or fewer sand traps.

Solutions have included bottles with seed mix attached to golf cars to boxes filled with the stuff right there on the tee. Signs don't work because the golfers don't want to be bothered. They must figure they don't come to the course to work, or that "it doesn't matter."

A new compost/seed blend has given Dan Dinelli, CGCS, superintendent at North Shore Country Club, Glenview, Ill., a new strategy for divot repair.

The new blend, from GreenCycle, Inc., Northfield, Ill., is very dark-colored. The repaired divot stands out, and makes golfers aware of the need

to do likewise when their golf clubs scar the turf.

"They could see we were out there repairing divots and that they were leaving them behind. It's changed their attitudes, and helped with our maintenance," says Dinelli.

Golfers started being more careful about gouging the turf, and more of them began to replace and patch their divots during play, says Dinelli.

The crew had long used a sand/peat topdressing in the divot mix. The repair process is the same, but the compost helps turf fill divots faster than sand-based material.

Superintendent Dinelli seeks other new ways to use the compost in turf-repair, such as to fill in after hydraulic leaks from equipment.

It's all about finding more common sense, practical ways to use compost, beyond filling in

around trees and shrubs. It's a superior divot-fill product, says the superintendent, because of nutrients and moisture. Unlike sand, says Dinelli, compost contains nutrients plants need. It holds moisture when it is needed by the roots of established plants and the delicate seedlings that burst out of the Providence bentgrass seed used at North Shore.

"With a sand-based mix," explains Dinelli, you have only about 20 percent peat, so there's not much organic material to hold moisture. That old sand probably gave very little seed germination and plant survival. The seeds need moisture, but we are under pressure to keep fairways firm and dry for the sake of playability. How much chance does a seedling have in that little sandy pocket in a dry fairway?" Dinelli asks.

"With compost, you can see that the seeds are really germinating and taking hold. A week after you make repairs, you see the underlying dark color covered by green peach fuzz. You know the seedlings are definitely growing. That means you're getting a quick recovery. You're not wasting seed, and you're getting those divots filled fast."

Does the darker compost absorb heat better than light-colored sand? Probably, says Dinelli. It helps to accelerate germination during cool weather. **LM**

Divot repair long a super's handicap



Terry McIver

TERRY McIVER
Editor-in-chief

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Scotland

ON LAKE ERIE

Superintendent Bruce Dodenhoff enjoys the challenge of putting the finishing touches on the "links-style" Maumee Bay State Park golf course.

BY RON HALL/ Managing Editor

A flat stretch of shoreline on the far western end of Lake Erie contains a 180-acre slice of Scotland. It's the Maumee Bay State Park Resort Golf Course, east along the shoreline of the busy port city of Toledo, Ohio.

The most distinguishing feature of the course designed by Toledo native and respected golf course architect Arthur Hills, is what it doesn't have—trees. It has none.

What it does have—and plenty of them—are grass-covered, man-made mounds and dunes. Many have sand bunkers tucked in behind them. And it has ponds.

When a blustery Nor'easter churns shallow Lake Erie, the storm-driven rain roils the ponds, bends the course's tall grasses flat, and lashes the narrow, rolling fairways as mercilessly as any storm off the North Sea.

Fortunately for the continued improvement of the 18-hole Maumee Bay course, it has an experienced superintendent, Bruce Dodenhoff, who is tickled to be a part of the course's, indeed the park's, growing popularity.

And, while Dodenhoff says he's no fan of the location's "Scottish Links weather", particularly each fall and what's sometimes referred to as spring in Northwest Ohio, he's happy as can be to be tending the Scottish Links-style course. Particularly, the "no trees" part.

After years caring for more traditional northern courses, including nearby Brandywine Country Club, Dodenhoff says it's mighty nice for him and his staff (11 in season; 4, including himself, in winter) to be able to focus so completely on grass.

"There are a lot of advantages to not having trees on a golf course," says Dodenhoff who, as the sec-



Cooperation among Park Manager Jim Browers, left, Dodenhoff, and Golf Pro Brad Calloway, right, is crucial to the successful operation of the Maumee Bay State Park GC.

ond superintendent at the state resort, is entrusted with "finishing off" off the 6-year-old course.

"Without trees, of course, we don't have tree roots growing into the fairways or the tees. We don't have to trim around trees when we mow. We don't have leaf cleanup. And, we have nothing to stop the wind here," says Dodenhoff. The wind, however, is both a blessing and a curse.

On the negative side, says Dodenhoff, the wind creates waves on the course's 10 holding ponds (nine of them come into play). The waves erode the ponds' clay banks in spite of attempts to establish protective wetlands plants there.

To remedy this, the state park installed a 15,000 gallon-per-minute pump to lower pond water levels whenever they get too high. Dodenhoff's crew also has been collecting big pieces of driftwood that wash up on the park's beach. They're staked in the water in front of eroding pond banks. The driftwood buffers the banks against wave action and, hopefully, will give wetlands plants a chance to dig in, says Dodenhoff.

But, the wind, which generally blows from the northwest, brings benefits too. Dodenhoff says that the wind lessens the occurrence and severity of turfgrass diseases. So far the biggest disease problem has been sporadic incidences of dollar spot. "But, I have to see it coming up a little bit before we'll spray," he says.

(The same goes for control of insect pests. He used Oftanol to knock down a problem with black atenius two summers ago. Last summer, the course experienced some damage from cutworms but the superintendent decided not to treat.)

The almost-constant wind, combined with excellent drainage on most of the course, makes it playable even after heavy rains. When officials visited Maumee Bay to determine its suitability as a qualifying course for the 1997 U.S. Open, Dodenhoff told them if it should rain hard enough to cause unplayable conditions "you guys aren't going to want to be playing anyway." They selected the course.

"Out on the course there is no shade. It's usually windy and when the conditions are dry, you can have a two-hour shower at night, and by the next afternoon, the course can be totally dry," the superintendent says.

Plenty of water

A modified, double-row Toro system irrigates the course's Pennway tees (3 acres) and fairways (28 acres), and Penncross greens (4 acres). Three pumps draw water from the retention ponds which are, themselves, supplied by nearby Lake Erie. "Usually the lake level is higher than the ponds and if we need water, we just have to open a gate," says Dodenhoff.

In finishing off the course, Dodenhoff says he and his crew have made progress in ridding the course, particularly the tops of dunes, of Canadian thistle with a program of spot treatment. To encourage root growth and seedhead formation of tall grasses which replace the thistle, he's been applying an all mineral 8-32-16 analysis at 1.5 pounds of phosphorus per 1000 square feet.

"The seedheads of these grasses are what give us the look we want, the Scottish links look," says the superintendent who got his formal turf training at Ohio State's ATI campus in Wooster, Ohio.

Pheasants and other wildlife

Conditions at the course lend themselves to wildlife enhancement. Man-made nesting boxes attracted colorful wood ducks to ponds on the course this past spring. And, the organization known as Pheasants Forever began creating suitable pheasant habitat in an adjacent 30 acres of the park.

This particular corner of Ohio, with much of its wetlands remaining in the form of hunting, and state and national wildlife preserves, has long been known as

one of the nation's top waterfowling locations. It remains a major migratory route for ducks, geese, songbirds and, even, monarch butterflies.

Dodenhoff acknowledges that being a superintendent at a state resort golf course is different from what he's experienced as a superintendent elsewhere.

His fulltime crew members are unionized. This has its advantages, he insists. They're paid well and have good benefits (at least compared to private courses), and there's little turnover. Also he has no



Superintendent Bruce Dodenhoff likes the links-style course but not the links-type weather.

greens committee to answer to. His immediate supervisor is Park Manager Jim Browers, who was at the park long before the golf course or its adjoining resort lodge and cabins were built.

Dodenhoff and his golf course crew know that they answer to all Ohio golfers. The park and the golf course are public facilities. The park was financed by revenue-producing bonds, not taxes.

"I try to remind my crew that we're building our security by improving this course," he says.

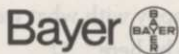
"If the public is happy with what we're doing, we're going to be here." □

Keep these guys off your course.



MERIT® Insecticide is remarkably effective. Both on the course. And off. An application of MERIT on your course in the spring will provide excellent residual grub control through the fall. Under

normal conditions, MERIT can give you residual soil insect control up to four months or longer in turf. In short, it controls grubs and keeps controlling them. If that was all it did, that might be enough to make it your insecticide of choice.



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Keep these guys off your case.



But when you add in its low application rate of only 0.3 pound of active ingredient per acre, you have a pretty remarkable product that presents less exposure than current insecticides to birds and fish. A product so good, even the

Greens Committee will love it. To find out more, contact Bayer Corporation, Specialty Products, Box 4913, Kansas City, MO 64120. (800) 842-8020.





If the organic materials used in green construction have a low 'ash content,' a high amount of fine material will plug it up.

In the past, native top soils were frequently used for putting green construction. In some cases, this is still being done.

Native soil greens can survive, but it's a matter of traffic. Native soils contain varying amounts of clay and silt, which tend to slow drainage. Clay will plug up a green and, of course, greens that drain poorly don't tolerate high traffic, and usually have more disease problems.

Most agree that a washed sand in the 0.25 to 0.5 mm particle size range works best. Some may put the bottom of the range at 0.10 mm. Adding a decomposed organic material to the sand adds some degree of water and nutrient retention.

The percentage of organic material may be based on experience, as much as anything. The range seems to be from 20 percent to as little as 5 percent. And, I emphasize the word 'decomposed.' I've seen new greens fail due to fresh organic material.

Fresh organic matter uses nitrogen in the decomposition process. A severe nitro-

Dirty ponds, dirty sand, dead greens

Use clean sand, and install the irrigation system inlet where it won't pull material out of the bottom of the pond.

By BILL KNOOP, Ph.D. / Technical Editor

gen deficiency can occur if the organic material in the greens mix is not decomposed.

About washed sand

New greens fail because the sand used to build them was not washed. Sand size quality can be evaluated by passing it through a set of sieves. The problem is that the sand can be dirty; that is, coated with clay. And this dirty sand can pass the sieve test easily. But as the new green is irrigated, the very fine clay particles can wash off the sand, and they may slowly accumulate to form a layer. This layer reduces internal drainage, restricts root growth, and may support increased disease activity.

Even though the sand is of proper size, the "dirt" that covers it significantly lowers the quality of the green and may force reconstruction. The use of dirty sand in topdressing will end up creating the same problem. Put a sand sample in a glass container with water, swirl it around and see how dirty the water becomes. Whatever is floating in the water is going into the green. Dirty sand used for green construction and for topdressing can be a major source of future problems.

Intake pipes a problem

Many golf courses get their irrigation water from ponds. If, during construction, soil is allowed to erode into these ponds, the water becomes "dirty." The fine particles may be carried through the irrigation system to the greens. Dirty irrigation water

may be caused simply because the irrigation system intake pipe is too close to the bottom of the pond.

I've seen large holes or depressions in the bottom of ponds just under the intake pipe. All that very fine soil material had been sucked up through the system and deposited on the greens. In some parts of the country, water is hard to get and very expensive. Golf courses pay thousands of dollars a month for city water, only to store it in "dirty" ponds.

Burn to learn ash content

One other smaller problem area to be concerned about is the source of any organic material used in construction or used for topdressing. There is a test used in the evaluation of organic material which simply involves burning the sample to determine the "ash content." This tells us just how much of the sample is truly organic and how much is "dirt."

A low "ash content," it means that a lot of fine material will remain. This just becomes another source of fine particles that can plug up a green.

Use "washed" sand of the proper size, get the "dirt" out of the irrigation system, and use organic material with the highest "ash content" possible.

These suggestions will help prolong the life of any green. □

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CALCIUM DEFICIENCY CORRECTOR

Addition of calcium to the soil by traditional means is not usually efficient or effective in treating the calcium deficiency of turfgrass. Once applied, the common forms of liming materials can rapidly change to compounds that are insoluble in water and not readily available to the plant. Continuous applications over long time periods are necessary to effect even modest improvements in calcium uptake.

Quelant™-Ca is a newly available amino acid chelated calcium product that corrects calcium deficiencies in turfgrass upon application. Quelant™-Ca provides readily available calcium chelated with amino acids so that it is easily absorbed by the leaves and/or the roots of the plant regardless of most soil and water conditions. The unique formulation of amino acids used for chelation was



developed not only to facilitate absorption by the leaves and roots, but to increase mobility of the calcium within the plant as well.

Quelant™-Ca is normally applied as a foliar spray and may also be applied through fertigation. Either way, it is tank-mix compatible with herbicides, soluble fertilizers, insecticides, fungicides and plant growth regulators. It will even help improve the efficiency of most of these treatments by increasing their absorption and translocation within the plant.

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The natural approach

By STEVE BEEMAN

Historically, water hazards on golf courses have been open bodies of water, with manicured turfgrass shorelines. In recent years, however, golf course designers have begun to work more with the natural features on new construction sites and to incorporate native habitats into their designs.

Shoreline grasses stabilize slopes and control erosion. Emergent aquatic plant communities along the banks pro-

vide habitat, nesting sites, cover and food for a wide variety of animals. Wetlands and vegetated shorelines also have an important function in the improvement of water quality.

Erosion control

Planting shoreline grasses on slopes and emergent aquatic plants below the water line can effectively control erosion. The roots stabilize the substrate and the plant stems in the water column act as wave buffers. Establishing native shorelines also eliminates the requirements for expensive hand maintenance on slopes that are too steep for conventional mowers. While it may not be practical to have wetlands along shorelines that regularly come into play, planted slopes and littoral zones can provide efficient and cost-effective erosion control around tees, greens and in out-of-play areas.

Wildlife habitat

Natural areas created by planting shoreline grasses, rushes and trees serve as habitat and shelter for a variety of upland creatures that live or forage near water. An extensive shoreline community may provide corridors for animals traveling between areas of natural cover. Marsh rabbits, raccoons, foxes, birds, reptiles and amphibians use these low-growing canopy areas.

The shallow water littoral

◀ **Steve Beeman started Ecoshores, Inc., in May 1978. Based in Port Orange, Fla. His firm promotes proper wetland management systems.**



Planted shorelines enhance the beauty of a golf course in the same way upland landscaping does.

zone provides room and board for a diverse array of birds, fish, crustaceans, reptiles, amphibians and mammals. As aquatic plants die off, they produce soluble carbon compounds that feed plankton and microbial populations in the water body. Plant production is the basis of the aquatic food web.

Shallow water plants provide shelter from predation for small animals, including the juvenile forms of some species that will grow up to become predators. Because wetland fringes provide cover for prey species, predators feed along the edges. Wading birds patrol the shoreline, stalking and spearing. Carnivorous fish species cruise the borders in

search of smaller animals which may stray from the protective screen of emergent plants.

Water purification

Perhaps the most important but least understood or appreciated function of vegetated wetlands is their role in water quality improvement. This feature can be beneficially exploited in lakes around golf courses. Ponds and lakes that don't have vegetated shorelines or wetlands associated with them frequently experience problems with floating algae mats or blooms which can inhibit water clarity and are unsightly. Rooted aquatic plants assist in the removal of nutrients from the water column. In fact, constructed and natural wetlands are now commonly used



to water features



by water treatment facilities to treat waste water effluent.

When nutrients such as nitrogen and phosphorus occur in excessive quantities they fuel population explosions among several species of algae. Wetland plants help control these nutrients. One way that nitrogen (and phosphorus to a lesser degree) is taken out of the water is through assimilation into plant tissues by vascular plants and the microbes which adhere to them. Microbes (bacteria, fungi, algae and protozoa) that are attached to the underwater portions of aquatic plants and on submerged soils, account for a substantial reduction in dissolved phosphorus and nitrogen. The more attachment surfaces for microbial populations, the more potential there is for nutrient removal. As the vegeta-

tion slows water flow, sedimentation occurs, trapping phosphorus in layers of fine mineral soils where it is immobilized by metallic ions like calcium, aluminum and iron.

The principle pathway for the removal of nitrogen from aquatic ecosystems is a process called denitrification, which is dependent upon rooted aquatic plants. Most submerged soils are oxygen poor (anaerobic), but the area surrounding the roots of aquatic plants (the rhizosphere) is rich in oxygen (aerobic). Dissolved nitrogen is converted to nitrate in the aerobic rhizosphere and then changed by microbes in the adjacent anaerobic soils to nitrogen gas, which rises to the surface and leaves the water column permanently.

Wetlands along can't completely purify a water body that is receiving excessive nutrient runoff, but they can help maintain a balance, especially if incorporated into an integrated plant management (IPM) program for the surrounding golf course.

Aquascaping for aesthetics

Aside from the benefits to wildlife and the aquatic environment, planted shorelines enhance the beauty of a golf course in the same way upland landscaping does. Waving fields of cordgrass (*Spartina bakeri*), blending into shoreline hedges of rushes (*Juncus* or *Eleocharis*) form native plant savannahs that bridge the aquatic and terrestrial zones. Flowering herbs like duck potato (*Sagittaria*),

pickerelweed (*Pontederia*), canna lily (*Canna*) and blue flag (*Iris*) provide bright colors at different times of the year, framed by variable shades of green foliage. Tall plants like bulrush (*Scirpus*) or fire flag (*Thalia*) can be used as accents

or to warn golfers of hidden hazards. □

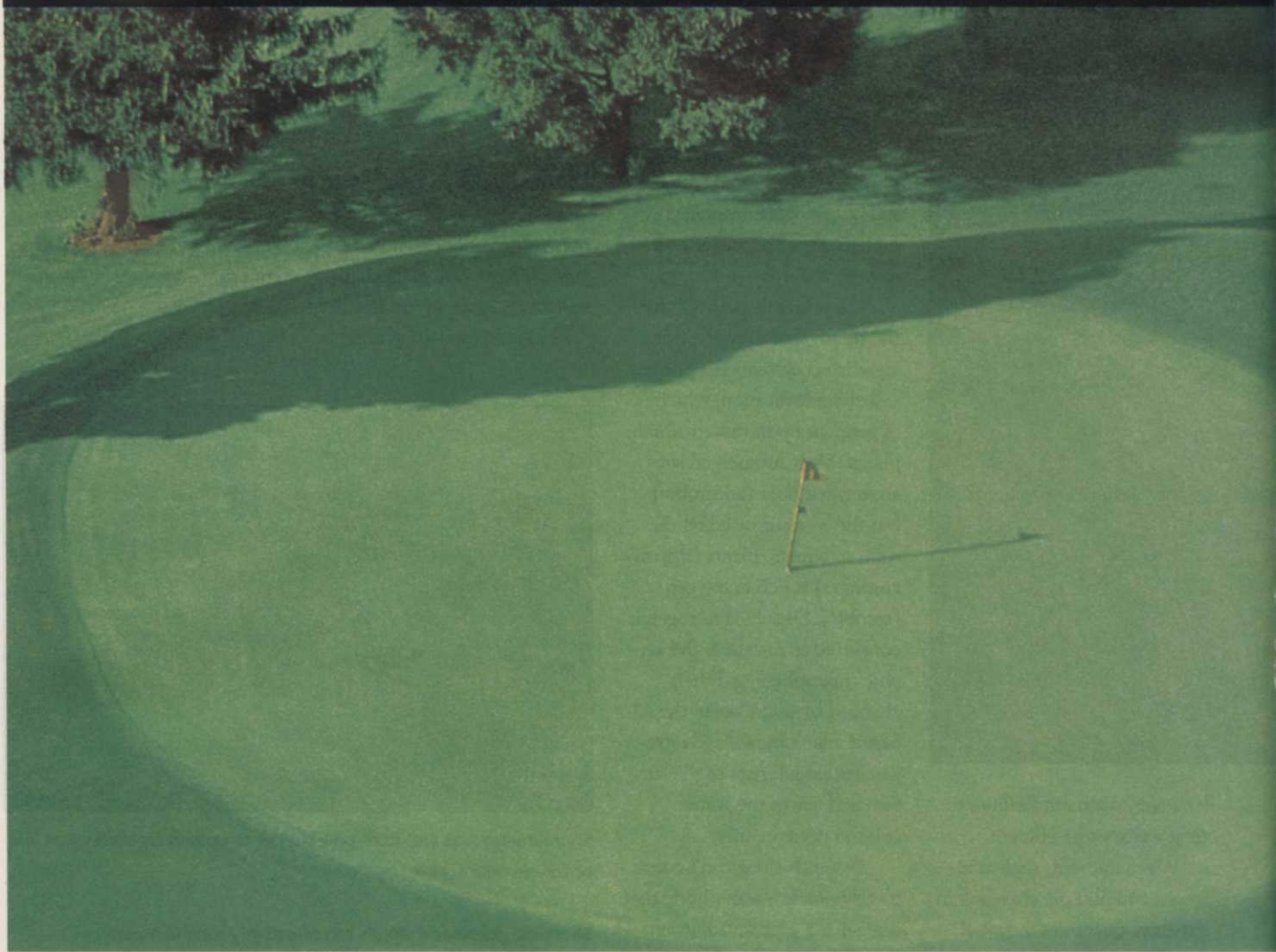
The author is President of Ecoshores, Inc., Port Orange, Fla., and spoke at the Southeastern Turf Conference in Tifton, Ga., in May



Shoreline grasses and trees give shelter to upland creatures that live or forage near water.

Shoreline grasses on slopes can effectively control erosion.





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.

"Then about July, the decline starts and it's a constant battle all through September."

Mike's solution was to intensify his preventative fungicide program with Eagle® while raising fertility levels.

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.

"Considering its length of control, low-use rates and cost,"

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

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Circle No. 125 on Reader Inquiry Card

More precise apps with new spreader?

by BILL KNOOP, Ph.D.

Every turf maintenance program includes periodic fertilizer and pesticide applications.

Now, more than ever, it's vital that these materials be applied at correct rates, and on target.

Most pesticides are applied as liquids. Assuming that the sprayer is properly calibrated, the greatest environmental concern is probably the threat of spray drift. Spraying equipment must be designed to completely control drift.

It is fair to say that a cyclone spreader can't produce an absolutely accurate application of some fertilizer or seed mixes. Also, if a cyclone seeder is used on a windy day, the wind could seriously distort the application pattern. Again, environmental concerns may dictate that materials not go beyond the target areas.

The ideal applicator

If we were designing an ideal liquid and dry material applicator, it might have the following characteristics:

1) Able to apply liquids in any concentration, including low-volume liquids; able to apply dry materials at rates from a few pounds per acre to several hundred pounds per acre.

2) It would produce an even application from one tip of the spray boom to the other of a dry material, with no 'ballistic separation' of particles.

3) It would permit liquid or dry applications in wind or rain.

4) It would have a folding, self-leveling boom, so the spreader can get through gates and still offer a reasonably wide application pattern.

5) It would prevent any spray drift.

Air-controlled spreader

The Course Air, is an original product that uses a technology new to turf, but that has been used in agriculture.

Robert Wicker of Southeastern Turfgrass Supply, Inc., Jacksonville, Fla., is using a Course Air for custom applications of seed and fertilizer on golf courses and athletic fields. According to Wicker, the

ACCURACY OF DROP AND CYCLONE SPREADERS

Drop spreaders

- ▶ Fairly precise application pattern. Width of application limited by width of gates; distance between trees, other objects.
- ▶ Agitation might harm coatings of some nitrogen products.

Cyclone spreaders

- ▶ Wider, perhaps less precise pattern cause 'ballistic segregation' of materials. Nutrient particles or seed are thrown different distances, based on weight; uneven applications may result.

Course Air is more precise and accurate than other spreaders, says Wicker.

John Mills, superintendent of Dancing Rabbit Golf Club, Philadelphia, Miss., says the spreader has reduced labor costs, reduced material waste, and has provided more accurate applications of materials.

Most important, says Mills, environmentally sensitive areas can be avoided.

Robert Mange, assistant golf course superintendent at The Bridges Golf Resort, St. Louis, says the Course Air is easier on turns, stays set at a steady seed output, is easy to calibrate, and can be pulled by any vehicle.


This machine may well present a new level in spreader technology. We need spreaders like this, that help us protect the environment while we make the necessary fertilizer and pesticide applications.

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The author is LANDSCAPE MANAGEMENT technical editor.



The Course Air has reportedly reduced labor costs and material waste.



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Common sense control

Pest mole cricket and fire ant control can be achieved more economically with a program based on proper identification and regular mapping.

By PAT COBB, Ph. D.



Observing fire ant foraging activity before bait applications can directly influence control.

Common sense is the foundation of any effective management program for turf and landscape pests. A few

important steps in imported fire ant and pest mole cricket management listed below illustrate this point.

Know the problem

It is not only important to identify the source of the problem, but also to know as much about the causal agent as possible. Vulnerable stages or time intervals can be identified by knowing life cycles, periods of pest activity and feeding, and other behavioral patterns.

For example, the fact that adult imported fire ant workers cannot eat solids plays a big part in control strategies that include the use of bait formulations. Peak mole cricket activity just after dark and just before daylight impacts directly on application timing of many controls. Knowledge of imported fire ants and pest mole crickets is also useful in identification of control options.

Monitoring for pest presence is important. However, continued monitoring is important in timing controls and in control evaluation. Observing fire ant foraging activity before bait applications can directly influence control. If worker ants are not actively foraging on the turf surface, bait applications should be delayed. Monitoring mole cricket development is important to application timing of controls.

Mapping spring tawny mole cricket activity for treatment of nymphs later in the season saves money. Mapping imported fire ant infestations can also save money and provide valuable information about reinfestation potential. Mapping and monitoring are important practices that can often determine the success of ongoing control strategies.

Develop strategies

Imported fire ant management in larger landscapes such as on golf courses can be very expensive in labor costs. Broadcast insecticide treatments can eliminate imported fire ants in an area. However, detrimental effects of this practice include the elimination of all fire ants as predators on new, incoming fire ant queens and the subsequent resurgence of fire ant colonies in the area, and/or the movement into these areas of other pest ant species.

Combined mapping of existing heavily infested areas, priority-setting and perimeter or spot treatment with baits and contact insecticides has reduced control costs and resulted in better ongoing control of imported fire ants.

Tawny mole cricket activity can be mapped in early spring, and mapped areas treated later when young nymphs are present. This practice, along with monitoring life stages, saves money by reducing the area treated and the amount of pesticide used.

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If treatments are timed properly, more effective control usually results. Although new insecticides provide long-term mole cricket control, continued mapping and monitoring are essential to provide early-season information about mole cricket populations before serious turf damage occurs.

Control strategies for imported fire ants and mole crickets are site-specific. Although general guidelines are available and helpful, specific measures must be devised to fit specific situations. Where budgets are

Map and monitor to determine the success of fire ant and mole cricket control strategies.

limited, this probably means identifying priority areas and working with these most extensively.

Development of money-saving practices such as mapping are often the result of limited resources. In addition, identification of available control op-

tions before treatment is necessary and can save time and money. Knowledge of various "weak link" stages or periods in the life history or behavior of pests as related to identified control options can add purpose and meaning to monitoring.

Finally, there is no "silver bullet" for controlling imported fire ants and pest mole crickets. Both these pests were imported from South America and have few naturally-occurring biological controls in the Southeastern U.S. These highly mobile insects that live mostly in the soil are difficult to control. Regardless of available resources, common sense is still the most valuable asset in devising control strategies for these serious pests.

—The author, an entomologist at Auburn University, spoke about pest insect control at the Southeastern Turf Conference in May.

Slit application of fipronil demonstrated

Turfgrass managers at the Southeastern Turfgrass Conference in Tifton, Ga., last month learned about one of the latest weapons against pest mole crickets. John C. Wicker of Turf Solutions, Jacksonville, Fla., demonstrated a custom application of Chipco Choice (a.i. fipronil).

The product can only be applied by certified applicators trained and approved by Rhone Poulenc. They use specially designed machinery to make slit applications of the dry granular material into soil/thatch interface, about ½ inch below the soil surface. The product is deposited on 1 ½-2 inch centers which, considering the mobility of pest mole crickets, should bring them in contact with the fipronil. These machines are inspected and certified by the product manufacturer.

The machine that Wicker demonstrated in Tifton, Ga., was considerably smaller than those typically used on golf course fairways. Those machines can be 8-feet wide.



This machine makes slit applications at about a half inch below the soil surface.

Regardless of the size of the application apparatus, the product can be applied as low as 0.0125 lb. active ingredient per acre. Wicker, responding to questions from the turf managers, said the cost of an application is \$315 per acre (in four acre lots).

Clyde Gorsuch from Clemson University spoke briefly about fipronil at the conference and reminded turf managers that the product is, so far, labeled for golf courses and around commercial buildings, but not for home lawns.

Because of the technology needed to apply the product, it's unlikely an entire golf course could be treated. Therefore, said Gorsuch, it

would be wise to monitor for mole crickets in the areas that don't receive treatment.

Fipronil does not control white grubs, said Gorsuch. "Don't forget to get off the cart and get down on your hands and knees and look what's going on in the turf," he advised.

Dr. Pat Cobb of Auburn University also advised the golf course superintendents to keep mapping and monitoring for insect pests and not rely on any single "silver bullet."

—Ron Hall

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Bio market bubbles

The development and promise of new biological products to solve pesky turfgrass problems is providing the green industry with more choices.

by RON HALL/
Managing Editor

Gone is much—but not all—of the hype. It left with too many unfulfilled and, perhaps, unfulfillable expectations. But the use of biological controls in professional turfgrass is accelerating.

Specifically, researchers are starting to sort and discover which biological products work, and against which pests. Equally important, they're finding out why. Promising new biological agents are being targeted against insects, diseases and, surprisingly, weeds too.

Even so, the amount of biological product used by turfgrass managers remains miniscule, particularly compared to chemical controls. But it's growing, 300 golf course superintendents learned from four researchers at the North Central Turfgrass Expo near Chicago this past December.

Bios and chemicals as partners

What they learned was that most turfgrass managers will use biological agents along with, or perhaps in conjunction with, chemicals. The use of biologicals will allow managers to use chemical products less frequently or at lower use rates.

Speaking at St. Charles, Ill., were Dr. Hank Wilkinson, plant pathologist at the University of Illinois; Dr. Nick Christians, professor of horticulture at Iowa State University (see article in Feb. '97 LM); Dr. Gary Harman, plant pathologist at New York State Agriculture Experiment Station

(Cornell); and Dr. Fred Baxendale, professor and extension entomology specialist at University of Nebraska.

Wilkinson offered a working definition of a biological control as "one organism suppressing another." (His colleagues later expanded that to include by-products of organisms also.)

A severe outbreak of a turfgrass disease is "an imbalance of a turfgrass ecosystem," explained Wilkinson. The disease proliferates in the absence of other micro-organisms that, given sufficient time and the right conditions, keep disease in check. The soil contains thousands of micro-organisms. Some control harmful fungi.

However, turfgrass managers rarely have time to wait for the micro-organisms to re-establish themselves or this balance. Managers must use fungicides to reduce disease.

Meanwhile they must keep turfgrass growing and healthy to replace the damage



The grubs, top, are healthy; those on the left have been killed by nematodes and those on the right by milky spore disease.

caused by the disease.

The other researchers built on this concept which they indicated is key to understanding how biological agents work in the complex turfgrass bio system.

Develop a strategy

"There is no single activity to manage or control disease," said Wilkinson. "Biological controls need to be integrated with other practices." Biologicals are most effective when used in a multi-step process involving:

- Forecasting. "If you wait till you see it (a disease), generally it's too late," said Wilkinson.

- Using disease-resistant turfgrass varieties. The composition of a stand of turf can be changed over time by slit-seeding or overseeding with disease-resistant cultivars or varieties of turfgrass.

- Cultural practices that promote grass growth and also the health, diversity and activity of micro-organisms around the turf.

Harman discussed three biological sys-

tems that turfgrass managers can already use to reduce turfgrass disease: composts, the Bioject System and Bio-Trek 22.

Composts can be made of almost any organic matter. They vary significantly in quality, said Harman who commented on research by Dr. Eric Nelson at Cornell that demonstrated that applications of some composts suppress turfgrass diseases. These composts contain high levels of the types of micro-organisms that prey on harmful fungi.

Soon, turf managers will be able to purchase composts fortified with beneficial fungi and bacteria. Harman credited Dr. Harry Hoitink at Ohio State University with developing the fortified compost which, because of its fungicidal claims will have to be registered as a pesticide. It will likely be introduced into the greenhouse market first, said Harman.

"You begin to tilt the population of the soil in favor of a healthier situation," he added, describing the use of fortified compost as an example of "a complex biological control."

Bio-Trek 22G

Harman briefly described one biological systems to control disease that is already available to turfgrass managers: Bio-Trek 22G.

Bio-Trek 22G is a granular formulation that has been available for two years. It uses a single fungus known as trichoderma that colonizes turfgrass roots. Trichoderma occurs naturally in the soil but not, usually, in sufficient numbers to suppress disease. Bio-Trek 22G increases the microbe's population manyfold and is superior to wild strains in its ability to colonize roots and suppress diseases.

"Here, more is indeed better. The more we apply, the more disease suppression we will have," said Harman.

The summer of 1996, Harman tested the compatibility of the product with popular fungicides. Products like Rubigan, Aliette, Chipco 26019, and Bayleton among others did not harm it. Also, tests of the product's use as a foliar spray indicated promise. Bio-Trek 22G could be applied either by itself or in combination with re-

duced rates of fungicides. Harman said he's hopeful that the product will become available as a spray by early 1998.

"These results certainly suggest that, at least with an integrated and maybe with a pure biological we can get good disease control, at least with some diseases," said Harman.

Insect pathogens

Nebraska's Dr. Fred Baxendale described three types of biological control agents of pest insects: predators like lady beetles and ground beetles, parasitoids including species of tiny wasps and flies, and insect pathogens.

"There is more activity going on in this area (insect pathogens) than any other aspect of biological control of turf insects," said Baxendale. Pathogens include bacteria, viruses, fungi and nematodes. "In many cases these naturally occurring organisms come in and reduce insect populations, but we often don't have time to wait," he said. "They're not going to help us before the turf has been damaged."

Turfgrass managers are already familiar with bacteria like *Bacillus thuringiensis* (Bt) that attacks caterpillars. There are many Bt products. *Bacillus popilliae* which causes milky disease in Japanese beetle grubs is also relatively well known and marketed under several trade names.

Work to improve the effectiveness on these pathogens continues at an encouraging pace.

Baxendale said he is encouraged by what he's seeing. The entomologist said researchers at Cornell and Kentucky are looking at fungi for insect control. One commercial product, Naturalist, using *Beauveria bassiana* shows promise against



Beneficial predators like this big-eyed bug often provide unseen control of turfgrass insect pests.

chinch bugs and billbugs.

Nematodes? "I'm still a proponent of nematodes," said Baxendale. "I think there is potential, but there is still a lot of work that needs to be done."

Conserve from DowElanco represents a class of control products derived from naturally occurring metabolites of micro-organisms. In turfgrass, it provides excellent control of armyworms, sod webworms and cutworms. It should be available soon.

Two new chemical products, while they aren't biologicals, are noteworthy also, said Baxendale. Merit from Bayer and RohMid's MACH 2 are effective against target pests, particularly grubs, but are less toxic to beneficials in the soil.

Baxendale seemed to be speaking for his colleagues too when he described how a good turfgrass manager attempts to maintain and conserve the balance of organisms in the soil and turfgrass.

"We want to preserve the existing natural enemies," he said. "We want to minimize our insecticide applications. We can use our insecticides selectively." □



Dr. Fred Baxendale says certain strains of Bt and fungi show promise against turfgrass insect pests.

Industry inventor Tom Mascaro dies at 81



Tom Mascaro:
invented the turf
aerator, other
tools.

Thomas Mascaro, whose lifetime of contributions to green industry technology helped modernize turf management, died May 6 at the age of 81.

Mascaro held many patents for golf course maintenance equipment. His inventions include the West Point aerifier, the first such tool to be used for cultivating turfgrass; the verticut mower for removing thatch; and the green industry's first battery-powered mower.

Mascaro was past president of West Point Products, West Point, Pa., and former president of Turf-Tec International, Oakland Park, Fla.

"We've lost a pioneer," said Dr. Eliot Roberts, of Rosehall Associates, Sparta, Tenn., and past executive director of The Lawn Institute. "Tom had a keen sense of observation. Over the years, he took thousands of color slides of turfgrass conditions to use in educational programs all over the world.

"He was a wonderful person, with a great sense of humor," said Roberts. "Whenever Tom was around, he stood tall. It was a pleasure to be included with him on conference programs."

Mascaro is survived by his wife Dorothy; sons John and Bobby; daughters Tammy Shackelford, Linda Owens and Stella Churchill; nine grandchildren and six great-grandchildren.

Donations may be made in Mascaro's name to the Golf Course Superintendents Association Foundation's Historical Preservation Fund, 1421 Research Park Dr., Lawrence, KS, 66049.

GCSAA reports on EPA activity

The Golf Course Superintendents Association of America reports a strategic action plan on wetlands conservation has been drafted by the Environmental Protection Agency water office. The agency intends to reduce the complexity of wetlands regulations, increase integration of wetlands into watershed management planning, and pursue technical outreach efforts.

The agency may also rely less on voluntary initiatives and more on enforcement.

According to Environmental Policy Alert, industry representatives expect increased oversight of development projects and tougher penalties for violations.

The plan has been circulated to EPA regional offices for review.

Endocrine disruptor debate

The GCSAA also says that an interim report from the EPA's Office of Research and Development has found limited evidence exists that traces human illness to chemicals called "endocrine disruptors."

The report, according to GCSAA, says the effects of certain industrial chemicals on human endocrine or hormonal systems are unclear and that further investigation on the human and wildlife connection is essential.

For a copy of the report via the World Wide Web, dial up: <http://www.epa.gov/ORD/whatsnew.htm>.

Musser Foundation names award winner

The Musser International Turfgrass Foundation has given Robert C. Golembiewski its 1997 Award of Excellence.

Golembiewski earned a Bachelor of Science degree in Crop and Soil Science at Michigan State University. He also earned his Master of Science degree in Botany and Plant Pathology from MSU.

Golembiewski is currently working on his doctorate in Horticulture and Crop Science at The Ohio State University. His thesis is titled *Characterization of Creeping Bentgrass Using Randomly Amplified Polymorphic DNA (RAPD) Markers*.

Over the past nine years, the Musser Foundation has awarded \$79,000 to graduate students at 11 different universities around the United States of America.

USGA awards Rieke for service

The United States Golf Association Green Section has given its 1997 Green Section award to Dr. Paul Rieke of Michigan State University.

Rieke, a researcher, teacher and state turfgrass extension specialist at MSU for the past 35 years, was chosen for his service to the game of golf through his work in turfgrass science.

Nominators noted Rieke's achievements as a teacher. More than 1,000 turfgrass and soil science undergraduates have studied under Dr. Rieke, many of whom later worked their ways into prominent posts in a variety of green industry professions, from academia to golf course management.

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.

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

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



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For more information, contact RISE, 1156 15th St., NW, Suite 400, Washington, DC 20005, or call 202/872-3860. Our Internet address: <http://www.acpa.org/rise>.

GCSAA warns of unionizing

The Golf Course Superintendents Association of America has expressed concern recently over an apparent threat of unionizing in light of increased AFL/CIO activity, "its most ambitious organizing effort in decades."

The AFL/CIO, reports the Association, is "funneling significant dollars into union organizing activities, and endorsing research to increase its knowledge about workers and employers and ways to garner community support."

Golf courses may be ripe for union organizing, says the Association because workers usually aren't well-paid; they don't

receive significant benefits; and often are not treated with respect by customers and employers.

To maintain union-free status the Association suggests the following:

- ▶ Review personnel policies and practices for potential discrimination and violations of federal and state wage/hour laws.

- ▶ Foster an environment of trust and respect. Involve employees in planning, set goals together, communicate in person often and recognize employee achievements.

- ▶ Educate golfers that employees deserve respect. Be a role model for the way employees should be treated by customers and by their peers.

- ▶ Know your own rights as an employer. If your employees are discussing unionizing, you have the right to speak to your employees and give your views, under the national Labor Relations Act.

Super Jones wins for writing

The Greater Detroit Golf Course Superintendents Association has presented the John Walter Award to Mike Jones, superintendent at the Lochmoor Club.

The award is given to a superintendent who writes what is judged to be the best article written by a superintendent and which is published in the Association's Patch of Green magazine.

Jones' article is entitled, "Producing Quality Putting Surfaces Through Overseeding."

USGA, Wildlife Foundation discuss golf & environment

The United States Golf Association and the National Fish and Wildlife Foundation met at the headquarters of the National Geographic Society in Washington, D.C. May 16 for a day-long summit on "Golf Environments of the 21st Century: Integrating Wildlife Conservation into Golf Courses of the Future."

The summit was held to find common bonds between green industry recreational groups and environmental organizations.

"The idea of partnerships is what brought us together today," said Kimberly Erusha, Ph.D., USGA director of education.

"There have been many excellent partnerships that have been established between organizations in the golf and the environmental community that are working towards the common goal of protecting our environment," said Erusha.

Reg Murphy, president of the National Geographic Society, urged involvement in environmental issues to end the extinction of various plants and animals.

"Unless people like you take a great interest in the environmental subjects that we are going to talk about today, this [extinction] will continue," said Murphy, who said control product applicators must be aware of "what is damaging to the environment and what is healthy for the environment."

Catherine Waterhouse, an expert on environmental enhancement, spoke of golf course involvement in the Audubon Cooperative Sanctuary Program as a positive force in golf.

"Environmentally dedicated superintendents abound both here in the United States and in Canada," said Waterhouse.

—Look for a full report on the symposium in the July issue of *LANDSCAPE MANAGEMENT*. Thanks to Saul Keeton, USGA media relations, for preliminary information-ed.

COURSE CORRECTIONS

Thank you very much for featuring the Golf Club at Eagle Mountain in your April issue. If I may, please allow me to clarify a few issues that perhaps were not entirely clear.

Our unusually warm location caused our bermudagrass fairways to resist dormancy—not excessive overseeding. As a result, our fairway stand

appears very strong leading into the summer.

The AERA-vator enhances permeability. Obviously, the accompanying amendments improve moisture retention. With our various treatments we are attempting to improve the carbon to nitrogen ratio, not change carbon to nitrogen.

The product being used on heavily-trafficked areas,

such as cart path edges, is called Athletic Mix, and is produced by Redi-Play, Inc. We have no plans to utilize the material on our fairway surfaces.

Sincerely,

Kevin P. Smith, CGCS

We apologize for the errors, Kevin, and wish you and the Golf Club at Eagle Mountain a successful summer, at what is indeed a fine golf course!—ed.

Are we driving ourselves too fast?



Ron Hall

RON HALL
Senior Editor

The most dangerous product that you or your employees will ever use in the lawn/landscape industry isn't a pesticide. It's not a mower or chain saw. It's your service vehicle.

Think about it. You the driver, or occupant, are strapped inside of a shell of steel, plastic and glass. You and this mass of molded sheet metal hurdle along a narrow ribbon of pavement, almost always at potentially lethal speeds.

That's scary enough even without the hundreds, perhaps thousands, of other cars and trucks that you'll be sharing that pavement with.

Don't even think about the condition of your vehicle. Or, the condition of the other cars and trucks. What about your condition? How about the mental or emotional condition of the operators of the other vehicles? Sleepy? Angry? Hung over?

There's real risk in just getting our lawn care and landscape to our customers.

Every day we should remind ourselves and our employees about road safety because, it seems to me anyway, that this risk is growing. Traffic on our roads is multiplying, especially in the suburbs and surrounding areas where demand for our services still is greatest. Can you think of a road in your service area that used to be a snap to drive, but you now avoid when you can? Getting to job sites is even tougher now that road construction season is here.

But, it's not unsafe roads or unsafe vehicles that cause most road accidents. It's unsafe drivers. Aggressive driving is epidemic. Many drivers see nothing at all wrong with speeding and tailgating.

Never mind that the speed limit on most highways has been bumped up from 55 mph to 65 mph; it's still not fast enough for some drivers, perhaps even for some of your employees.

Considering the added difficulty and liability in operating vehicles that deliver chemical products

[LAWN/LANDSCAPE]

PAGE 4 L ▶
Build a Plant Health Care program

PAGE 8 L ▶
A simple way to rate landscapes

PAGE 10 L ▶
NFL Cardinals tackle poa

PAGE 14 L ▶
Preview of Expo 97 in Louisville

PAGE 16 L ▶
Straight talk gets funding results

PAGE 20 L ▶
Hardscaping is a profitable add-on

or pull trailers containing construction and maintenance equipment, the responsibility to make sure your vehicles are both properly maintained and safely operated is great.

Many of us, of course, check the driving records of potential employees. Many of us have drug testing programs in our companies. But neither addresses the problem of aggressive, unsafe driving.

Constant reminders about defensive driving--perhaps driver training for those who don't understand the concept--belong in our training programs. **LM**

Comments? Phone Ron at (216) 891-2683; fax him at (216) 891-2683, or E-Mail him at rhall@advanstar.com.

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Sell clients on concept of Plant Health Care

PHC is a system to allow the original design intent of any landscape to develop by improving overall plant health and vigor.

The focus is not solely on pests.

By TOM SMITH

Many landscape professionals practice the concept known as Integrated Pest Management (IPM), but I believe that a system of Plant Health Care (PHC) is a better approach to proper landscape management. That's because PHC encompasses all management practices, and doesn't focus solely on "pests".

PHC is a complete system to allow the original design intent of any landscape to develop by improving overall plant health and vigor. The building blocks of PHC are:

- ▶ proper design and site placement
- ▶ proper site preparation and establishment
- ▶ species and cultivar adaptability and resistance to pest problems
- ▶ proper cultural practices (irrigation, pruning, fertilization, mowing, mulching)
- ▶ pest management

All are combined to establish and maintain healthy, vigorous landscape plants. No one strategy is necessarily more important than any other. All are needed in a PHC operating system. But, recognize that as you go down the above list of strategies, flexibility decreases.

Poor decisions during design and site placement, or during site preparation and establishment, or in plant selection severely restrict later management options.

It's a pyramid

Visualize the landscaping process as a pyramid. The base of the pyramid is design, site placement, site preparation and establishment. The stronger the base, the stronger the overall landscape. At the peak of the pyramid is the use of pesticides.

As landscape managers we often inherit the mistakes of others. These include poorly prepared and compacted subsoils. Inappropriate species or cultivar selection. Poor establishment practices and/or timing. Any of these mistakes complicate long-term management success.

The effects of these mistakes can't be corrected solely by the use of pesticides. Pesticides are not a quick fix at the expense of sound management practices. Relying too much on pesticides is careless. Pesticides are too valuable to lose through carelessness.

A system

Rather than relying on a product-based management system,

develop a PHC knowledge-based system. Use these steps:

1) Initial inspection. Make the initial inspection as detailed as possible. Include information like species and cultivars; cultural practices; soil profile and texture; drainage; soil test information; weed, insect or disease activity; date of establishment.

Don't forget to note the expectations of the owner or property manager.

Use the the information you develop during the inspection to build a management plan containing appropriate specifications and recommendations. This is also the stage to predict pest problems and devise control strategies.



Tom Smith, president of Grass Roots, Inc., East Lansing, Mich.



A median strip offers special challenges in picking site-adapted landscape plants.

2) **Develop a management plan.** While the process may seem involved, a lot of the information gathered during an inspection will be common to many sites. Generally it's a matter of deciding what specific information applies to a specific landscape. On smaller sites, write the plan at the time of inspection, or supply a management sheet with the appropriate items marked. Larger sites may require more input and a lengthier report done separate from the inspection visit.

Obviously, the customer or property manager must agree with you on the need for the plan, and accept it. That's where your skills as a communicator are tested.

3) **Monitoring and care based on the management plan.** Care of the landscape is accomplished through a series of visits to the site. In essence, each visit becomes an inspection. At times, no treatment may be needed but the site would still be monitored and inspected. Target pesticides to high risk areas or areas where pest activity is present. Spray systems that inject materials at the gun or allow small quantity mixing on the vehicle are well suited to a PHC operation.

4) **Evaluation and modification of the management plan.** This step is easily neglected. But it's critical. Proper management requires evaluation and adjustment.

Certain sites will require little modification while others will require considerable change. This is almost always good change as problem sites respond to proper management and inputs decrease.



A properly designed landscape consisting of a combination of trees, shrubs, perennials and turf not only looks attractive but can also be maintained with a minimum input of chemical control products.

You must communicate

Even so, the need to communicate with the property owner or property manager continues. This often is what makes or breaks a sound plan. Keep clients informed of the management plan, the monitoring and care visits and the subsequent evaluation of the program. Help the customer develop realistic expectations.

The technician that conducts site visits and provides services should be a good communicator too, in addition to being knowledgeable about turf and landscapes. If possible, the technician should be involved at all stages of the process.

A mistake often made in marketing PHC is to offer a traditional product-based plant care option and a PHC option. It's better to implement proper management principles in a gradual transition away from a product-based management approach.

Practices such as targeting pesticides, offering additional fertilizer recommendations and developing fact sheets detailing cultural practices and pest problems are simple ways to ease into a PHC system. If you look closely at your current operation you will likely recognize many PHC principles at work.

Based on knowledge

Our industry has always talked about service but a large segment of it does not make any money unless it sells and applies a product. This is wrong. A doctor, dentist, or lawyer all charge for their expertise. So does a plumber or even an auto mechanic. Try talking the repairman for your washer out of his service charge.

With a PHC approach, doing nothing is a viable option in certain cases. What makes it viable in these certain cases is that it is also a good option horticulturally or environmentally. Unless we charge for our

ability to make this type of management decision, we can not operate with a PHC approach profitably.

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PHC does not eliminate pesticides. Instead, it personalizes service and meets the needs of consumers, making pesticides one of many valuable management tools available for a particular landscape. □

Tom Smith spoke about PHC at the 1997 Metropolitan Detroit Landscape Association Conference in Novi, Mich.





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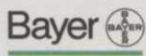


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Rating the 'scapes

Ever wonder how your projects might hold up under someone else's rating system? Give this one a try to see how you're doing.

The accompanying tally sheet allows you to "grade" your landscape projects.

It may give you a good idea of what is missing or what needs to be enhanced in a particular plan.

Landscape professional Frederick Campbell of Gnome Landscapes, Design & Masonry, Gloucester, Maine, has co-written *Landscaping Makes Cents* with Richard L. Dubé of Environmental Information & Design, Inc., Lexington, SC. Dubé devised the rating system.

"There is a great deal of value to a landscape," says Campbell. "We put together a model and scale that makes sense, based on our experience."

Evaluate elements (based on your own feelings and the definition of each term) on a scale of 1 to 10. Take that number multiplied by the ranking (provided) and you have your score for that criterion. Then, add the scores together:

0-260 = poor

261-440 = fair

441-540 = good

541-620 = very good

621-660 = excellent □

Excerpted from Landscaping Makes Cents, copyright 1996 by Frederick C. Campbell and Richard L. Dubé. Used with permission from Storey Communications, Inc., Pownal, Vt. 05261; (800) 441-5700, Dept. YP.

HOW DO YOUR LANDSCAPES RATE?

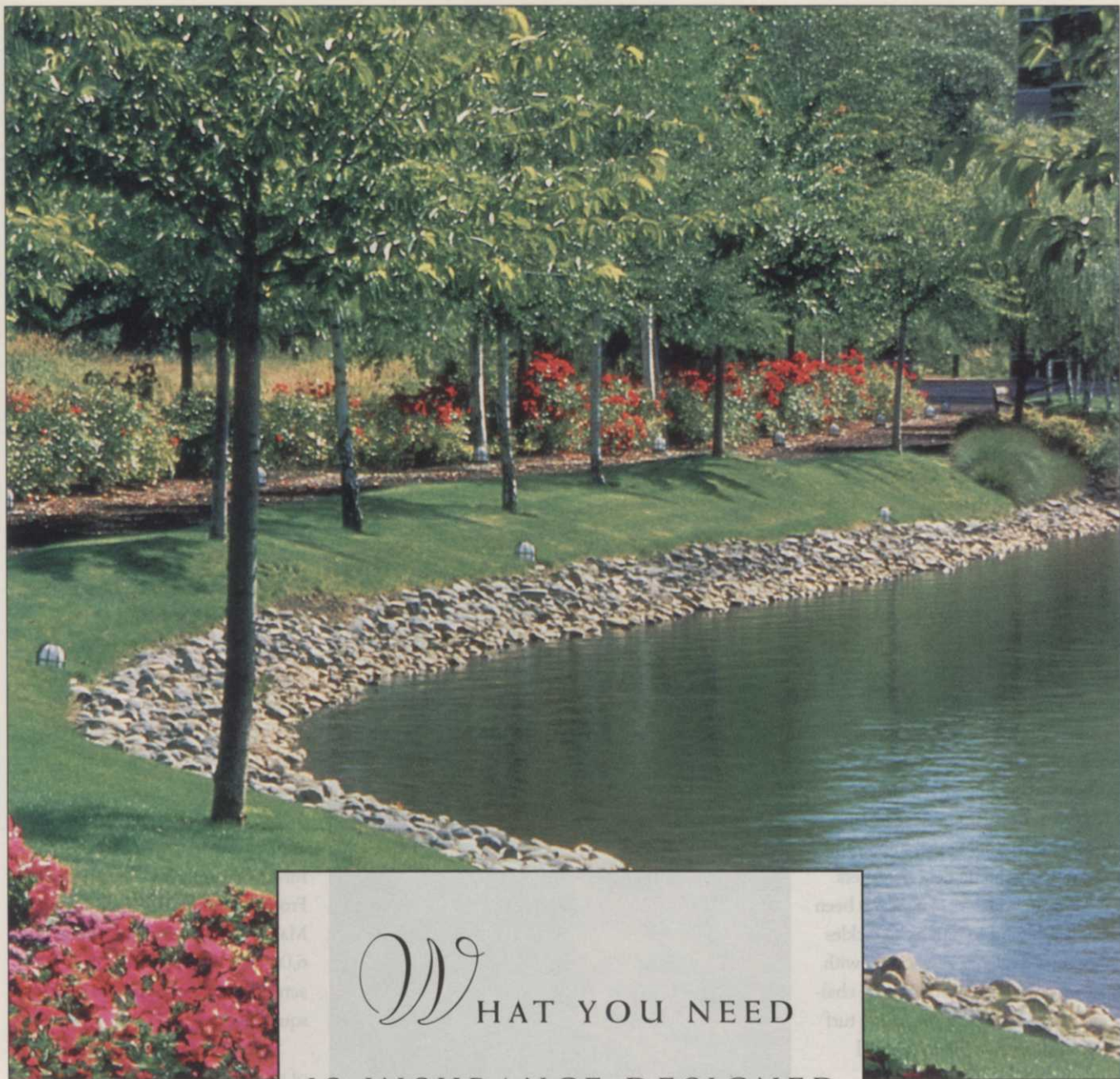
Formula: Rating x Weighting Factor = Score

Element	Your rating (0-10)		Weighting factor	=	Score
First impression	_____	x	11	=	_____
Sustainability	_____	x	10	=	_____
Function	_____	x	9	=	_____
Visual flow	_____	x	8	=	_____
Context to architecture	_____	x	7	=	_____
Context to site	_____	x	6	=	_____
Balance	_____	x	5	=	_____
Depth	_____	x	4	=	_____
Color	_____	x	3	=	_____
Framing	_____	x	2	=	_____
Contrast	_____	x	1	=	_____
TOTAL					_____

LANDSCAPE ASSESSMENT SAMPLE RATING

Formula: Rating x Weighting Factor = Score

Element	Sample rating (0-10)		Weighting factor	=	Score
First impression	9	x	11	=	99
Sustainability	9	x	10	=	90
Function	7	x	9	=	63
Visual flow	9	x	8	=	72
Context to architecture	7	x	7	=	49
Context to site	8	x	6	=	48
Balance	9	x	5	=	45
Depth	8	x	4	=	32
Color	9	x	3	=	27
Framing	8	x	2	=	16
Contrast	8	x	1	=	8
TOTAL =					549



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Circle No. 110 on Reader Inquiry Card

Tackling *poa annua* in the Cardinal's turf

Soil tests, sulfur and a control product help manager get Arizona bermudagrass practice fields healthy again.

Tim Peterson likes to ask questions. "I've always had a tendency to dissect things," says the sports field manager for the NFL's Arizona Cardinals. "I'm not satisfied just knowing that something works. I want to know how it works."

Peterson has asked lots of questions during his careers in air conditioning and cooling, to owning his own lawn care and landscape management firm, to membership in the fraternity of athletic field managers.

Peterson's analytical bent has been especially useful to him as he tackles numerous challenges associated with his Cardinals post. Two of those challenges have been restoring ailing turf to controlling *poa annua* (annual bluegrass) on the field.

When he joined the Cardinals in August of 1994, the sand-based turf Peterson inherited had seen better days. "Our 419 Tiff Bermudagrass fields were yellow and stunted," he says. "The grass was practically dead at a time when it should have been thriving."

"To put it in perspective," Peterson explains, "you have to cut healthy turf just about every day. When I first came here, I mowed the fields about once every four weeks."

So he started asking questions. He found some interesting answers:

▶ soil probes showed a pH as high as 8.5



The sideline area along Field 1 is representative of how thick the *poa annua* was on Fields 2 and 3 prior to treatment.

▶ sodium content was 337 parts per million

▶ exchangeable sodium was at 12.5 percent, well above the normal 5 percent level.

Sulfur-based product helps

"My job is basically about creating and maintaining a viable soil environment that allows the necessary interactions and exchanges to take place between soil, water and nutrients that allow grass to grow,"

says Peterson, who explains that the high pH levels increased the sodium levels, which caused salts to bind on the soil colloids. These salts prevented the water from penetrating and dissolving nutrients so they could be absorbed into plant roots.

"I knew that before I could accomplish anything else with this turf, the first thing I had to do was bring pH levels and the total soil chemistry back in line."

He did this through numerous applications of a water-soluble, sulfur-based product called Disper-Sul. From November 1994 through March 1995, he applied a total of 6,000 lbs. of the product over 6.4 acres, at a rate of 5 lbs. per 1000 square feet.

"We were fortunate to have a lot of rain my first year. Every time it was in the forecast, I would put down more sulfur," Peterson recalls. This diligence paid off:

▶ By August 1995, soil from the different fields tested anywhere from 6.9 to 7.3 on the pH scale;

▶ Sodium levels dropped dramatically, too, from 337 parts per million to a low of 98 parts per million.

▶ Exchangeable sodium checked in at 3.5 percent, well under the acceptable limit of 5 percent.

Saving money

When Peterson lowered the soil pH and sodium content, he had better looking fields and a better looking budget.

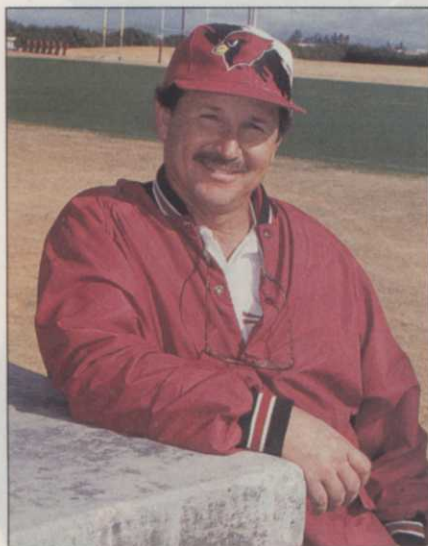
"When pH and sodium are out of line, you have to increase the amount of fertilizer and herbicide you use just to get the same response," says Peterson. "You're wasting money."

"Our turf wasn't healthy. It was anemic, and as a result, it didn't provide as much competition against weeds and problem grasses as a healthy turf would. That may have helped the *poa annua* get started."

The annual bluegrass burst through the turf once the bermudagrass fields went dormant in the winter of 1994-95.

"Our turf wasn't healthy. It was anemic, and as a result, it didn't provide as much competition against weeds and problem grasses as a healthy turf would. That may have helped the poa annua get started."

—Tim Peterson



The number 2 and 3 fields at the Cardinal's training facility are now completely bermudagrass, with not a blade of Poa in sight, says Tim Peterson.

Field 3 showed the most Poa, says Peterson, with eight or nine large patches of about 15 square feet showing.

Don Follett, facility manager for Arizona State's Sun Devil Stadium suggested Peterson try Kerb herbicide. The product is used as a preemergent and postemergent herbicide to control annual bluegrass, quackgrass and orchardgrass, among others. Peterson applied the product—in water

soluble packets—at the recommended rate of 1.5-2 pounds per acre.

"The second week, the *poa annua* started yellowing a bit. In the third week, I forgot I had ever sprayed it; it actually looked like Kerb had caused the *poa annua* to disintegrate."

Peterson says the control lasted all season. □



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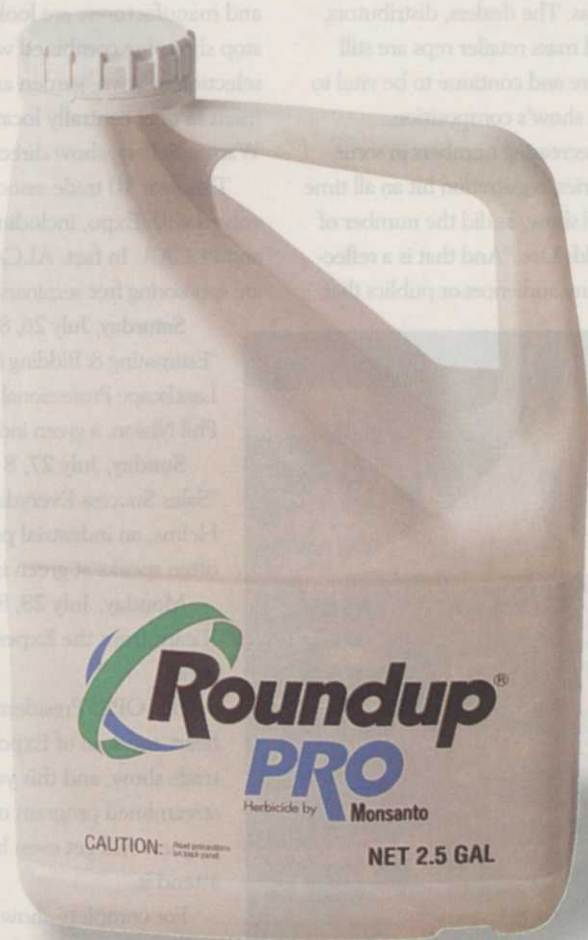
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To get more information on these and other profit opportunities, call the Monsanto Customer Relations Center at 1-800-332-3111 and ask for these sell sheets by name:

- Roundup Pro. The Brightest Idea Since Roundup.
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- Turf Renovation.
- Questions & Answers About Roundup Pro.
- Roundup Pro In The 21st Century.
- Product Label and MSDS.

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Expo set for Louisville

The outdoor demonstration area continues to be a top draw at International Lawn, Garden and Power Equipment Expo 97 set for July 26-28.

The Outdoor Demonstration Area makes the 14th Annual International Lawn, Garden and Power Equipment Expo 97 unique. Expo 97 is being held July 26-28 at the Kentucky Exposition Center in Louisville, Ky.

Expo opens one day earlier this year as the show's traditional Sunday start has been moved up to Saturday in order to:

- ▶ provide more weekend time for servicing dealers to attend,
- ▶ better accommodate domestic and international airline schedules, and
- ▶ take better advantage of the City of Louisville's weekend social activities.

Even so, most of the action on the last weekend in July in Louisville is going to be at the Kentucky Exposition Center grounds with its combination of showroom product exhibits inside and nearby outdoor demonstrations.

Dennis Dix, president and CEO of the Outdoor Power Equipment Institute (OPEI), recalls that prior to the first show in July 1984 some people didn't see a need for the outdoor demonstration area.

"As soon as we had our first show, everybody headed out to the demo area, and the demonstration area has been a valuable part of the Expo ever since," Dix says.

Expo has grown significantly since 1984. It's also evolved as the industry's evolved. "While we are a mature industry, we are experiencing a growth



Dix: growth in Expo's commercial segment.

segment which is commercial," says Dix. "The landscape aspect is also taking on an added dimension. So, we've shifted from primarily a dealer/distributor and mass merchandiser show to one which is really even more broad-based encompassing the commercial, landscape and rental areas. The dealers, distributors, and mass retailer reps are still there and continue to be vital to the show's composition.

"Despite decreasing numbers in some buying categories, registration hit an all time high in the '96 show, as did the number of exhibitors," adds Dix. "And that is a reflection of the many audiences or publics that

we are trying to attract. It is sort of a 'Heinz 57' varieties, so when they do come to Louisville, synergism will take place and they benefit from interacting with each other."

In 1996, more than 30,000 people from 51 countries roamed the 500,000 square feet of indoor exhibit space as well as the 20-plus-acre outside demonstration area.

"What domestic and overseas buyers and manufacturers are looking for is one-stop shopping combined with the broadest selection of lawn, garden and power equipment in one, centrally located show," says Warren Sellers, show director.

This year 10 trade associations are involved with Expo, including AAN, ALCA and PLCAA. In fact, ALCA and PLCAA are sponsoring free seminars. They are:

Saturday, July 26, 8 a.m.-10 a.m.,
"Estimating & Bidding for the Lawn & Landscape Professional," presented by Phil Nisson, a green industry consultant.

Sunday, July 27, 8 a.m.-10 a.m.,
"Sales Success Everyday," by Dr. Larry Helms, an industrial psychologist who often speaks at green industry events.

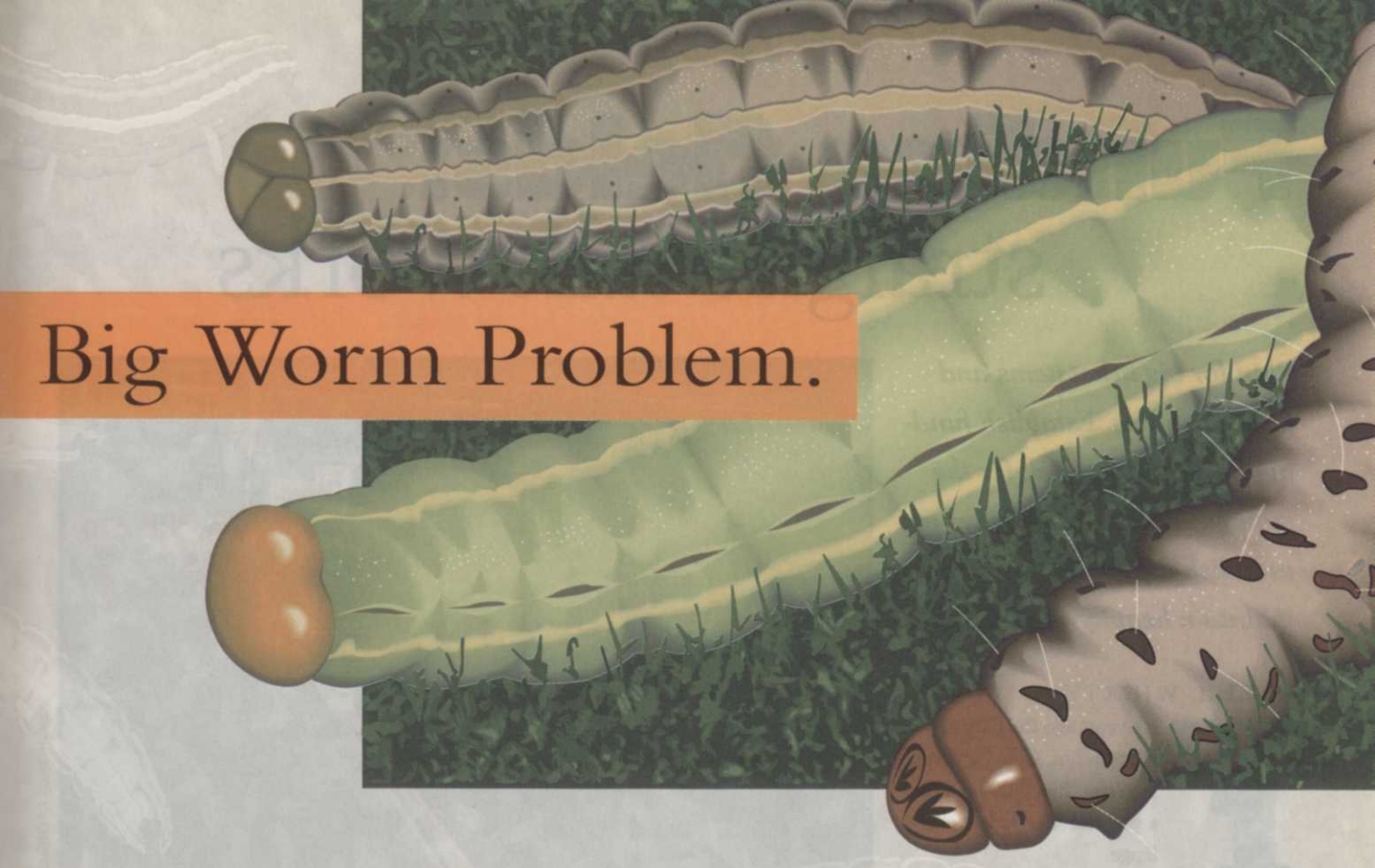
Monday, July 28, 8 a.m.-9 a.m.,
"Learn from the Experts," discussion panel.

But OPEI President Dix says the heart and soul of Expo remains the trade show, and this year, with a streamlined program of seminars, Expo-goers will get even more time to attend it.

For complete show information and a registration order form, call 1-800-5588-8767, or visit Expo on the internet at <http://EXPO.mow.org>. □



The Expo show combines showroom product exhibits and outdoor equipment demonstrations.



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parks and the construction of a new horticultural center. The third referendum was for the land acquisition and construction of a 60 to 70 acre community park which will include an athletic field complex, shelters, a lake and a district parks maintenance building.

Green space in developments

Green space in new housing areas also is pre-planned and pre-funded. When a developer purchases a block of farm land or other property to convert to residential units, he or she is required to set aside a specified segment of land (approximately 10 acres in the average development) for a small neighborhood park. In addition, the developer must contribute a set fee per each house built to a fund for development of that park.

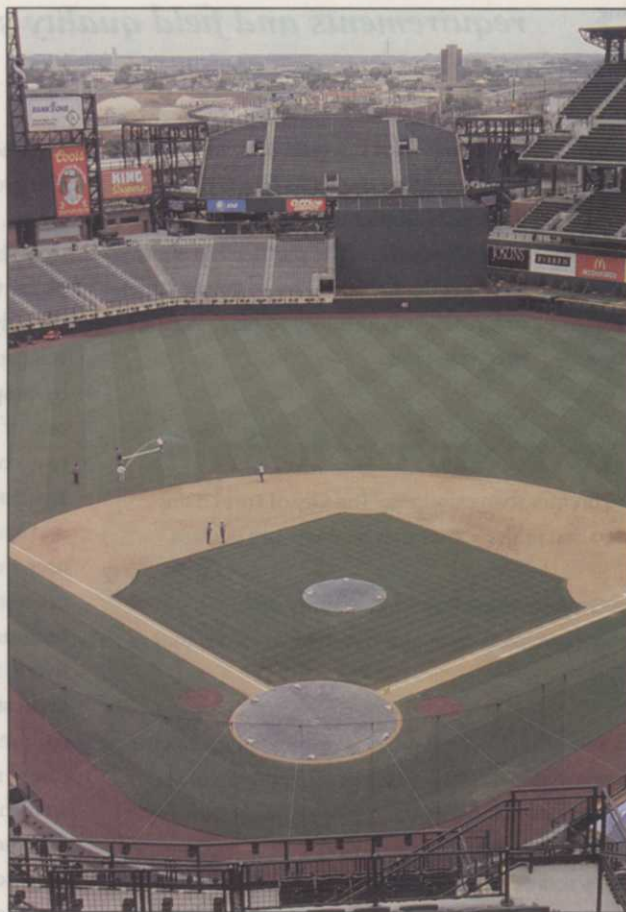
Where's the pain?

Problems still remained. With the population growth and more interest in sports participation, requests for use of the park's athletic fields outnumbered existing resources. Increased use of existing fields would have resulted in excessive wear and deterioration of field integrity and usability.

We believe it's vital to the parks program to know who is using your facilities and for what. We had already established good communications with our various user groups. The next step was to find the pain.

We attended board meetings of our key groups — the Youth Soccer Club, the Youth Baseball Club, and the Poudre School District — and met with them at their sites and ours to determine their feelings about existing conditions and to learn what they needed and wanted to improve the situation.

We then compared the expectations of the various user groups with the reality of current conditions. Armed with the fact-



Coors Field in Denver is managed by Mark Razum. It is the home field of the Colorado Rockies professional baseball team.

finding results, we began working together to develop realistic solutions to our problems.

Strategic partnerships

Strategic partnerships became the basis to accomplish goals that no individual department or group could manage alone. Some of these partnerships are relatively simple and involve our Parks Maintenance Department and one of our user groups. For example, the Youth Soccer Club wanted more fields painted but we had no funds for that in our budget. The Soccer Club offered to purchase the paint machine and cover one-half the costs of the paint if our department would do the painting.

Under this arrangement, our department paints all the fields used by the Soccer Club, including all those park fields we

were painting before plus some fields at off-city sites on school district and church properties. We're doing a little more painting, but because of the more efficient tool, the paint machine, and the additional funds, it's within our budget.

Everyone wins

Some partnerships are complex, involving our department, other city departments and multiple user groups. For example, more athletic fields were needed to attempt to accommodate the increasing number of players. The city had allocated some funds for field development, but not enough for multiple fields. The school district had some usable undeveloped land, but no funds for development. We proposed a joint project to build three soccer fields and two baseball/softball diamonds on the site. Then, together, we approached the Youth Soccer Club and Youth Baseball Club, who would be the primary field users

after the School District, to ask for their assistance.

Parks Maintenance already had been working within Quality Improvement (QI) groups with the Park Planning and Development Departments. The development of this successful cooperative project required: the School District to supply the ten acres of land and the irrigation system that was already in place on one-half of the site; the Parks Planning Department to develop the field and irrigation system designs; the Parks Maintenance Department to provide the earth work, irrigation installation, seeding and fertilization; the Youth Soccer Club to fund the remaining half of the irrigation system; and the Youth Baseball Club to supply the backdrops for the

baseball/softball fields and to supply additional financial support through fund raising and donations.

The partnership continues following the construction of the multi-field site. Parks Maintenance maintains the infields of the ball fields and handles fertilization, overseeding and sodding of all the fields. The School District handles mowing and irrigation.

This does necessitate some coordination. For example, if we need to lay sod in the soccer goal mouths we must work with the school district to communicate irriga-

Athletes and other field user-groups have developed a better understanding of basic field maintenance requirements and field quality standards.

tion needs. But it would have taken five years for either the Parks Department or the school district to swing a project of this size individually. The partnership allowed us to get the fields and more young athletes to have the opportunity to play. Again, everyone wins.

The city is working on further cooperative projects with the school district for the future. As new schools are developed, we're building parks next to the school property. This minimizes costs by requiring only one set of such infrastructure development as roadways and walkways and by cooperating in such areas as the installation of a single water system large enough to accommodate both facilities.

The benefits

Open communication with the various user groups serves as an educational process for all of us. Parks Maintenance has become more sensitive and more responsive to their needs. Field users have a better understanding of basic field maintenance requirements and quality standards. If we cancel soccer games on all fields following an inch of heavy rain they'll understand that the safety of the athletes was the prime consideration. They'll also recognize that play in those conditions could cause enough damage within the goal mouths and other heavy use areas that they would lose accessibility to some of those field for a much longer period.

While it's not easy to reschedule the 3,000 young athletes who were ready to play soccer that Saturday morning, the reasons why it had to be done is understood, and is an accepted part of providing safe, playable conditions for as our athletes.

Once again, everyone wins! □

The author is parks supervisor for the City of Fort Collins, Colo., and a member and former board member of the national Sports Turf Managers Association (STMA). Photos by Steve Trusty, Trusty & Associates.

Communicate to match schedules

Even with new fields, demands are greater than resources. The City of Fort Collins had to set priorities on field use and focused primary attention on the youth in three areas.

- ▶ Sports coordinated through the City Recreation Department programs.
- ▶ Youth sports groups and the school groups, such as girls competitive soccer, that require park facilities.
- ▶ Adult competitive groups.

The city and school district partner here as well. We share joint project fields, with the school district needs coming first. On other sites, the school district uses park fields as they "fit" into the scheduling. During the winter months, the city recreational basketball leagues use the school district courts as we "fit" into their scheduling.

The Parks Department must also leave some non-scheduled playing time on the various fields for those people who are not part of organized sports groups, but still want to use the fields occasionally. Communication makes this all possible. Representative of all the organizations involved meet quarterly to coordinate scheduling for that quarter's athletic events.

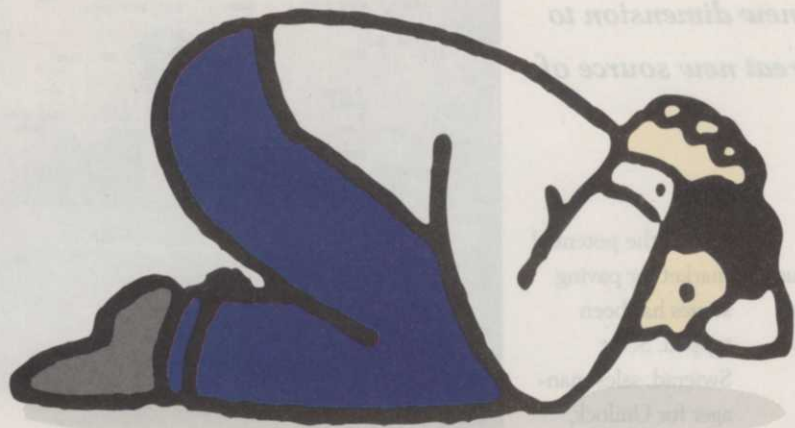
A typical meeting would include:

- ▶ the school district;
- ▶ the city recreation department,
- ▶ the youth soccer club,
- ▶ the youth baseball club,
- ▶ five church-run high schools,
- ▶ coordinators for sport tournaments other than those connected with the organizations already represented,
- ▶ parks maintenance.

While we try to schedule the more intensive maintenance and renovation procedures during the "off play" periods for the various sports, that isn't always possible. We'll inform all the groups of changes in field availability during these meetings. For example, two fields were out of use this past spring; one for major fence replacement, the other for outfield sod installation and establishment. We'll also identify and schedule maintenance requirements to accommodate the various use demands.

Parks maintenance personnel talk directly with the athletic directors of the various schools and with the various groups to coordinate scheduling changes.

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B. Ask for a demo.



The answer is B. After all, every mower claims to deliver higher productivity and a high quality cut. But claims don't do much for your bottom line. So give our new zero turning radius Twister a try. Spin it on a dime. Run it through an obstacle course. You'll see it really is fast, productive,

easy to maintain and delivers a high quality cut. In short, the best equipment value your money can buy. Call, toll-free, 888-423-7897 for more information or the name of a Bunton dealer near you.

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See us at EXPO97 Booth #4435 inside and booth #7060 outside

HARDSCAPING

an easy add-on service

Concrete pavers can add a new dimension to your scope of work and a great new source of income for your company.

by DOUG WILBRANDT

Being in a competitive industry like landscaping, we're constantly looking for new ways to expand our customer base and new services. And I think we've found a good way with hardscaping.

Using concrete paving brick for patios, driveways and sidewalks has proven to be an excellent and profitable sideline for our landscape business. It doesn't need to be in a new housing project either. More than half of the sidewalks we install are replacements for existing, broken concrete walks.

The International Concrete Paver Institute (ICPI) states that less than two per-

cent of the potential market for paving stones has been tapped. Scott Swierad, sales manager for Unilock, the largest paving stone manufacturer in the U.S. agrees.

"Although our growth has been 15-20 percent a year, I feel we are just seeing the tip of the iceberg," says Swierad.

Jot down on a piece of paper all your customers with broken concrete sidewalks or patios and remember, they are already your customers!



Many supply houses also have seminars and hands-on demonstrations. This helps with doing the design layout, choosing which shape paver to use and getting the proper base down.

Quality pavers, local sources

Concrete pavers are available from a variety of sources, but your best bet is to buy from your local landscape supply dealer, brickyards, or even directly from manufacturers. Avoid thin, flimsy concrete blocks that crack easily and are hard to level.

Quality pavers are made with high-strength concrete and are uniform in shape. The color is blended throughout the paver and isn't sprayed on. Look for the manufacturer's guarantee. Quality producers usually offer a lifetime guarantee on the paver's integrity.

Equipment and installation

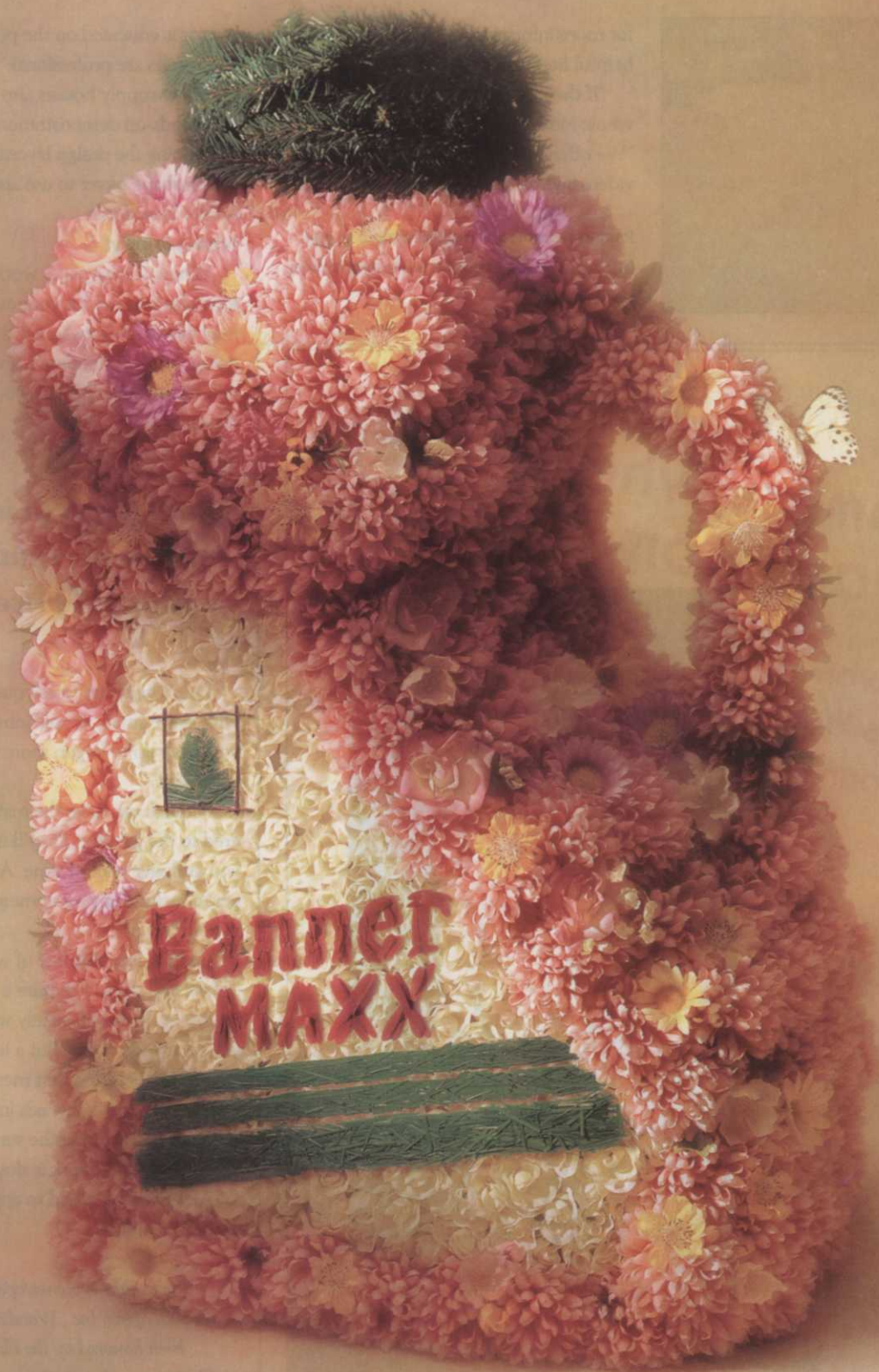
Most of the equipment you will need to install concrete pavers is already in your garage. Two things you will need to use are a power plate compactor (a lawn roller isn't heavy enough) and a brick saw or cutter.

I recommend renting these from the rental yard until you have enough work to warrant purchasing them.

As far as installing the pavers, talk to your local supplier or call the manufacturer




Don't be afraid to ask questions of suppliers. Start with some small, simple jobs and work your way up to larger, more intricate installations.



ONCE A MONTH IS ALL IT TAKES.

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IN CALIFORNIA**

TURF. SHRUBS. ORNAMENTALS. PROTECT THEM ALL WITH JUST ONE TREATMENT EVERY 28 DAYS. COMPLIMENTS OF BANNER® MAXX® FUNGICIDE. IT CONTROLS 56 DISEASES AND CAN BE TANK MIXED AND APPLIED WITH OTHER PRODUCTS IN ONE STEP. PLUS, IT'S ODOR-FREE. SO IT NOT ONLY FITS INTO YOUR SCHEDULE, BUT INTO ANY LANDSCAPE AS WELL. OBVIOUSLY, IT'S NOT YOUR TYPICAL GARDEN VARIETY FUNGICIDE. BANNER MAXX. MAXXIMUM VALUE.  NOVARTIS

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for more information. Most offer help and helpful literature.

"If the installation is bad, it gives the whole industry a black eye," says Swierad. "We offer detailed installation manuals, videos and design aids to ensure the con-

Paving stone work is quite simple to get into, and doesn't require a big investment.

tractor is educated on the process and the end results are professional."

Many supply houses also have seminars and hands-on demonstrations. This helps with doing the design layout, choosing which shape paver to use and getting the proper base down.

Pricing is easy!

When pricing paver work, use the same formulas you use for your other jobs. It may take a few jobs to get the man hours down, but by attending a few seminars and talking to your suppliers, you'll get a handle on it.

Don't forget to include equipment rental costs in your bid price.

Don't be afraid to ask questions. Start with some small, simple jobs and work your way up to larger, more intricate installations.

A quick tip: have the materials delivered to the job site. They'll unload it for you and save a lot of time. And don't forget to include any equipment rental costs in your bid price.

Getting into this line of work is quite simple and doesn't require a lot of new investment. It also fits nicely with what you're already doing. Put a line in your Yellow Pages listing that mentions paver installation. Run a few ads in the newspaper, especially during the summer months, when your other work is slowing down.

And don't be afraid to approach your existing customers. □

The author is owner/operator of C.B.D. Landscaping, Inc., Woodstock, Ill. He has been honored by the Illinois Landscape Contractors Association, and in 1986 was named U.S. Small Business Administration "Entrepreneur of the Year."

"Mommy, where does grass come from?"

"Advanta Seeds West. of course!"



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1-800-288-7333 or 1-541-967-8923 in Oregon

Flat land, color green present challenges



Drainage issues and a client's desire to use lots of green in the landscape were the major challenges which faced Scott Byron & Company during a project on Chicago's North Shore.

"This is a very flat property, located within a hundred-year flood plain," says Byron, owner of the Lake Bluff, Ill. design/build firm.

"The residence was constructed six feet above the flood plain, which put the entire location out of proportion. We needed to create a grade that would make the house look as though it had always been there."

Byron engineered a series of gently rolling hills to serve as a temporary water retention system in times of heavy rain and quick-thawing snow. The hills serve as small ponds in about one-third of the property. "The hills hold so much water," says Byron. "With this technique, water collected during a heavy rain is gone within a couple of hours; half a day at most. Across the street, they've had two feet of standing water for weeks at a time."

Lots of hardscaping

The client wanted minimal color, so

Byron's L/A team designed, coordinated and supervised installation of a gently-sloped circle drive court and parking. Privacy was also important, as well as the ability to enjoy long views from the house without using evergreens.

Design elements included:

- ▶ bluestone front walk and rear terrace;
- ▶ swimming pool with a terrace overlook;
- ▶ pool deck and access to an existing tennis court.

"This property is unusual because about 50 percent of the work is hardscape," says Byron. "The drive was paved in black asphalt, to contrast the bright white house. White concrete with minimum wood accents was used on the pool deck and walkways."

'Shotcrete' for pool

The swimming pool design required an excavation to a depth of only three feet. Two 18-inch drainage culverts leading to storm sewer inlets were installed underneath, by using a shotcrete process, a dense mixture of 8 1/2 to 9 bags of cement per cubic yard of concrete. **LM**

Open views from the house were achieved by using low planting areas for a greater sense of yard depth. Perimeter planting was designed to reflect the neighborhood's wooded, secluded character.

Plant selections

Byron's design team chose a wide variety of trees and shrubs to meet the client's demands including: Kentucky coffee tree; American beech; ginkgo biloba; burning bush and red bud.

White accents were provided by hosta; white bud; white crabapple; and viburnum. For a hint of the exotic, quince was used for its delicate pink flowers.

"The natural paradigm is to relate a garden to colors," says Scott Byron. "But by using only shades of green and different leaf textures, we create a more honest perspective. It really has to look good from all angles. You can't cheat by 'throwing in' color."



Swimming pool with a terrace overlook, pool deck and access to an existing tennis court were hardscaping elements used in the project.

AMTOP reports victory in Montana

The Association of Montana Turf and Ornamental Professionals, Inc. reports that Gov. Marc Racicot has signed HB489, which requires local governments to conform to state rules if they decide to adopt a local posting ordinance.

The legislation had been proposed by AMTOP and the Montana Agra Business Association. Both groups had been working for three months to stymie excessive regulations on the local level.

"AMTOP lobbyist Pam Langley worked long and hard to secure passage of this important piece of legislation," says Mike Voeller editor of the Association newsletter. "We owe here our deepest gratitude for a job well done."

AMTOP reports that environmentalist had tried to exempt the cities of Missoula and Helena from the legislation.

"Missoulians for a Clean Environment have not given up on trying to make it difficult to use pesticides in the "Garden City," reports Langley.

New address for ALCA

The Associated Landscapers Contractors of America has moved to new offices, at: 150 Elden St. Suite 270, Herndon, Va. 20170. Phone numbers remain: (703) 736-9666; fax: (730) 736-9668.

Vander Kooi kicks off PLCAA session

Business consultant and author Charles Vander Kooi will deliver the keynote address at the Professional Lawn Care Association of America's Annual Conference Opening Session, Nov. 15, from 1 to 3 p.m. at the Charlotte Convention Center, Charlotte, N.C.

PLCAA's Annual Conference is held in conjunction with the Green Industry Expo, Nov. 14-18, 1997. Vander Kooi will also lead a seminar on staff building.

Vander Kooi, long one of the most respected of industry professionals, is known for his no-nonsense, down-to-earth, tell-it-like-it is approach to the realities of running a business successfully.

His address is titled, "No Limits, No Boundaries to Building Your Business."

PLCAA— GROWING LEADERS FOR SUCCESS

The Professional Lawn Care Association of America is in the business of "Growing Leaders." Growing your career, your company and your industry. That's our mission. From all parts of the United States, Canada and around the world, PLCAA members are dedicated lawn and landscape professionals, grounds managers, industry suppliers, and students committed to professionalism and success.

Invest in your success, join PLCAA today! As a member, you can take advantage of:

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- > Legislative Support and Updates on the Issues
- > Discounts on PLCAA's Operating Efficiency Study
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or (770) 977-5222
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LANDSCAPE
management

June 1997

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 FIRM _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP _____
 PHONE (_____) _____ FAX (_____) _____
 INTERNET/E-MAIL ADDRESS _____

I would like to receive (continue receiving) **LANDSCAPE MANAGEMENT** free each month: Yes No

Signature: _____ Date: _____

1. My primary business at this location is: (check ONE only)

01 250 GOLF COURSES

CONTRACTORS/SERVICE COMPANIES

- 02 255 Landscape Contractors (installation and maintenance)
 03 260 Lawn Care Service Companies
 04 265 Custom Chemical Applicators (ground and air)
 05 270 Tree Service Companies/Arborists
- 06 275 Landscape Architects
 07 280 Land Reclamation and Erosion Control
 08 285 Irrigation Contractors
 Other (please specify) _____

INSTITUTIONAL FACILITIES

- 09 290 Sports Complexes
 10 295 Parks
 11 300 Right-of-Way Maintenance for Highways, Railroads or Utilities
 12 305 Schools, Colleges, Universities
 13 310 Industrial or Office Parks/Plants
 14 315 Shopping Centers, Plazas or Malls
 15 320 Private/Public Estates or Museums
- 16 325 Condos/Apartments/Housing Developments/Hotels/Resorts
 17 330 Cemeteries/Memorial Gardens
 18 335 Hospitals/Health Care Institutions
 19 340 Military Installations or Prisons
 20 345 Airports
 21 350 Multiple Government Municipal Facilities
 Other (please specify) _____

SUPPLIERS & CONSULTANTS

- 22 355 Extension Agents/Consultants for Horticulture
 23 360 Sod Growers/Turf Seed Growers/Nurseries
 24 365 Dealers/Distributors/Formulators/Brokers
- 25 370 Manufacturers
 26 Other (please specify) _____

2. Which of the following best describes your title? (check ONE only)

- 27 10 **Executive/Administrator**- President, Owner, Partner, Director, General Manager, Chairman of the Board, Purchasing Agent, Director of Physical Plant
 28 20 **Manager/Superintendent**- Arborist, Architect, Landscape/Grounds Manager, Superintendent, Foreman, Supervisor
 29 30 **Government Official**- Government Commissioner, Agent, Other Government Official
 30 40 **Specialist**- Forester, Consultant, Agronomist, Pilot, Instructor, Researcher, Horticulturist, Certified Specialist
 31 Other Titled and Non-Titled personnel (please specify) _____

3. SERVICES PERFORMED (Check ALL that apply)

- 31 A Mowing
 32 B Turf Insect Control
 33 C Tree Care
 34 D Turf Aeration
 35 E Irrigation Services
- 36 F Turf Fertilization
 37 G Turf Disease Control
 38 H Ornamental Care
 39 I Landscape/Golf Design
 40 J Turf Weed Control
- 41 K Paving, Deck & Patio Installation
 42 L Pond/Lake Care
 43 M Landscape Installation
 44 N Snow Removal
 45 O Other (please specify) _____

4a. Do you specify, purchase or influence the selection of landscape products? Yes No

4b. If yes, check which products you buy or specify: (check ALL that apply)

- 46 1 Aerators
 47 2 Blowers
 48 3 Chain Saws
 49 4 Chipper-Shredders
 50 5 De-icers
 51 6 Fertilizers
 52 7 Fungicides
 53 8 Herbicides
 54 9 Insecticides
 55 10 Line Trimmers
- 56 11 Mowers (reel/rotary)
 57 12 Snow Removal Equipment
 58 13 Sprayers
 59 14 Spreaders
 60 15 Sweepers
 61 16 Tractors
 62 17 Truck Trailers/Attachments
 63 18 Trucks
 64 19 Turfseed
 65 20 Utility Vehicles

5. Do you have a modem? Yes No

6. Do you subscribe to an on-line service? Yes No

7. Is CD-ROM available in your workplace? Yes No

101	119	137	155	173	191	209	227	245	263	281	299
102	120	138	156	174	192	210	228	246	264	282	300
103	121	139	157	175	193	211	229	247	265	283	301
104	122	140	158	176	194	212	230	248	266	284	302
105	123	141	159	177	195	213	231	249	267	285	303
106	124	142	160	178	196	214	232	250	268	286	304
107	125	143	161	179	197	215	233	251	269	287	305
108	126	144	162	180	198	216	234	252	270	288	306
109	127	145	163	181	199	217	235	253	271	289	307
110	128	146	164	182	200	218	236	254	272	290	308
111	129	147	165	183	201	219	237	255	273	291	309
112	130	148	166	184	202	220	238	256	274	292	310
113	131	149	167	185	203	221	239	257	275	293	311
114	132	150	168	186	204	222	240	258	276	294	312
115	133	151	169	187	205	223	241	259	277	295	313
116	134	152	170	188	206	224	242	260	278	296	314
117	135	153	171	189	207	225	243	261	279	297	315
118	136	154	172	190	208	226	244	262	280	298	316



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IN THE
UNITED STATES

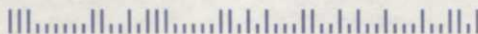
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ADVANSTAR COMMUNICATIONS INC
PO BOX 5054
PITTSFIELD MA 01203-9697



June 1997

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NAME (please print) _____
 TITLE _____
 FIRM _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP _____
 PHONE (____) _____ FAX (____) _____
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I would like to receive (continue receiving) LANDSCAPE MANAGEMENT free each month: Yes No

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- 09 290 Sports Complexes
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- 12 305 Schools, Colleges, Universities
- 13 310 Industrial or Office Parks/Plants
- 14 315 Shopping Centers, Plazas or Malls
- 15 320 Private/Public Estates or Museums

CONTRACTORS/SERVICE COMPANIES

INSTITUTIONAL FACILITIES

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- 35 D Turf Aeration
- 36 E Irrigation Services
- 37 F Turf Fertilization
- 38 G Turf Disease Control
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- 40 I Landscape/Golf Design
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- 102 120 138 156 174 192 210 228 246 264 282 300
- 103 121 139 157 175 193 211 229 247 265 283 301
- 104 122 140 158 176 194 212 230 248 266 284 302
- 105 123 141 159 177 195 213 231 249 267 285 303
- 106 124 142 160 178 196 214 232 250 268 286 304
- 107 125 143 161 179 197 215 233 251 269 287 305
- 108 126 144 162 180 198 216 234 252 270 288 306
- 109 127 145 163 181 199 217 235 253 271 289 307
- 110 128 146 164 182 200 218 236 254 272 290 308
- 111 129 147 165 183 201 219 237 255 273 291 309
- 112 130 148 166 184 202 220 238 256 274 292 310
- 113 131 149 167 185 203 221 239 257 275 293 311
- 114 132 150 168 186 204 222 240 258 276 294 312
- 115 133 151 169 187 205 223 241 259 277 295 313
- 116 134 152 170 188 206 224 242 260 278 296 314
- 117 135 153 171 189 207 225 243 261 279 297 315
- 118 136 154 172 190 208 226 244 262 280 298 316

5. Do you have a modem? Yes No

6. Do you subscribe to an on-line service? Yes No

7. Is CD-ROM available in your workplace? Yes No

WIN \$500!

Announcing: the second annual LANDSCAPE MANAGEMENT "Emerald Awards". LANDSCAPE MANAGEMENT magazine is offering a \$500 first prize to the winner of a random drawing to be held on July 1, 1997. Second prize is \$300 and third prize is \$200 in cash. To be eligible for the drawing, simply fill out the questionnaire at right and return it to LM's editorial offices.



Answers to the questions will determine our "1997 Emerald Awards" winners, to be revealed—along with the contest winner—in our August issue.



CONTEST REQUIREMENTS: Contestants must be owners or employees of landscape maintenance companies or lawn care companies; or maintenance employees of a golf course or country club, including superintendents and assistant superintendents; or an athletic field manager or member of an athletic field maintenance crew; or manager or member of a facility landscape management crew. Employees of Advanstar Communications and their families are not eligible.

All questions on this entry form must be completed, and all blanks filled. One entry per person. No more

than five entries from any one employer will be allowed. Entry forms will appear in the February-June, 1997 issues of LANDSCAPE MANAGEMENT.

Completed questionnaires should be mailed to: Emerald Awards, LANDSCAPE MANAGEMENT, 7500 Old Oak Blvd., Cleveland, OH 44130. They must be received by noon, July 1, 1997.

A random drawing of all eligible entry forms will be held the afternoon of July 1, 1997. Winners will be notified within 24 hours.

OFFICIAL ENTRY FORM

QUESTION:

What is your favorite brand name of...

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- riding mower?
- walk-behind mower?
- turf fertilizer?
- pre-emergence herbicide?
- post-emergence herbicide?
- turf insecticide?
- turf fungicide?
- plant growth regulator?
- compact tractor?
- turf aerator?
- pick-up truck?
- leaf blower?
- line trimmer?
- chain saw?
- Kentucky bluegrass?
- perennial ryegrass?
- turf-type tall fescue?
- turfgrass mix or blend?
- biological control product?

NAME: _____

EMPLOYER: _____

CITY/STATE: _____

PHONE NUMBER: _____

(AC) _____

At least she insists

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fake brows

fake teeth

fake beauty mark

fake fur

fake diamonds

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fake Dalmatian

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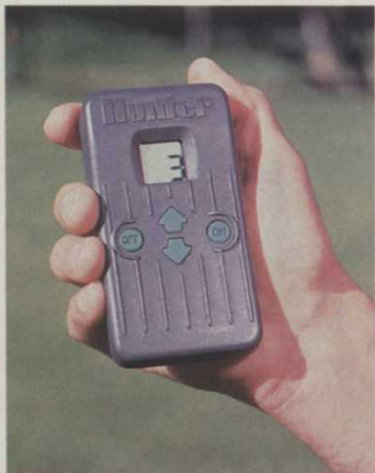
Dursban

If it doesn't say Dursban, it's not.

Hunter's hand-held unit saves time, \$\$\$

The SRR, a new remote control unit that manually activates irrigation systems, is now available from Hunter Industries. The SRR is a companion component to the Hunter SRC controller and is designed for use on residential and light commercial sites.

The hand-held device can access up to 48 stations and has an operational range of 450 feet. It features a large LCD display and simple push buttons to select the desired station or program. Contractors



can use a single SRR remote control to activate various customers' irrigation systems by simply re-configuring the transmitter to the appropriate "address code."

The Hunter SRR offers a range of conveniences for both contractors and homeowners that save time and costs during installation or maintenance. For example, the SRR can trim installation time because the installer can run the system and flush out new pipe without walking back and forth to the controller. It also saves labor costs when winterizing because one person with a hand-held remote can drain the irrigation lines and complete the job.

See your local Hunter distributor or contact Hunter at 619/744-5240.

Circle No. 260

Autoscape just right for residential systems

The Autoscape Controller from Buckner Turf Irrigation is perfect for large residential and small- to medium-sized commercial irrigation systems. It is available in 6, 9, 12, 16, 18 and 24-station configurations. Features advanced programming options, allowing you to tailor-fit your system to handle virtually any irrigation need. Protected by a tough outer cabinet made of high-impact plastic resins, ideal for outdoor mounting. Buckner's number is 800/328-4469, or

Circle No. 261

FloBoy pumps simple to maintain

Flowtronex PSI's FloBoy pumps range in size from 2-10 hp, pumping between 43-210 gpm. Each low-profile-design model is simple to start and maintain, featuring industrial-grade, cast-iron pumps to reduce energy consumption and increase service life.

The company's newest division, Commercial Pump of Swanton,



Ohio, also offers a line of self-contained single pump systems in a range of sizes. This line of pump stations, called RCTT (for Residential/Commercial Turf Tender) is powered with motors up to 30 hp with capacities reaching 300 gpm.

Flowtronex PSI is also bringing variable frequency drive (VFD) technology to irrigation ap-

plications. VFD has long been in use on golf courses and other heavy water usage sites.

Learn more about Flowtronex PSI's offerings by calling 614/442-5850, telling them LM let you know, or,

Circle No. 262

Push of finger starts PiggyBack timer

The PiggyBack from Transitional Systems Mfg. Co. is a state-of-the-art timer for sprinkler systems. It can be started by push button or trigger wire and has 4 outputs with timing from 1 minute to 4 hours. PiggyBack's push button water is a great convenience to users who find themselves reprogramming their controllers every few days because of changes in the weather. Also, power outages, dead batteries and watering in the rain are never a problem with push button watering ability.

The trigger wire can be used to start PiggyBack automatically when connected to the last station of a controller. PiggyBack senses when the station is on, but doesn't start until the station turns off. This adds 4 more stations to the controller. PiggyBack is also used to provide long drip system timing for mechanical controllers.

Call TSM at 916/751-2610 and mention LANDSCAPE MANAGEMENT, or

Circle No. 263



Air-conditioned cab from Toro

The Toro Company offers the first air-conditioned cab for golf course sprayers. Designed for Toro's Multi Pro 5500, the cab also contains an activated charcoal filtering system that removes most pesticides and allows cleaner air to circulate throughout.

The cab may be purchased separately and attached to existing Multi Pro 5500s. Toro's Multi Pro 5500, introduced early in 1996, is a dedicated sprayer offering application precision and consistency. The new cab unit will be greatly appreciated by sprayer operators in golf's warmer, all-

year southern states as well as at all courses using sprayers.

Receive additional information on the cab and the Multi Pro 5500 by calling a local Toro distributor at 800/803-8676, or,

Circle No. 264

The Pump Starter a versatile unit

The Pump Starter from Remote Control Technology is a single station receiver used to control pumps, solenoids or any other equipment operated with 24 volts AC. Unit comes with a 500ma (1/2 amp) transformer for use in activating external relays common to pumps. Unit has only two connections for required power and common, both have spade lug connections for permanently attaching to pump start relay.

Operates with standard Sidekick transmitter up to a total of 9 Pump Starter Receivers. Pump number must be specified at time of purchase, and numbers 1-9 are available. Turn on the Pump Starter, and it runs in "Continuous Mode" until you switch it off.

Contact Remote Control Technology at 800/275-8558, and tell them you read about their products in LM, or

Circle No. 265



TouchNet as simple to use as an ATM

The Toro Company's Irrigation Division's touch-screen centralized water management system has features found in its higher-end controllers. The TouchNet's solid-state design incorporates an ultra-user-friendly interface similar to that of many bank ATMs. Other TouchNet features include: manages up to 35 OSMAC RDR satellites (up to 48 stations per satellite, 1680 total); handles up to 12 irrigation programs; system adjust for all stations; up to 20 flow zones; protects the hydraulic system; optimizes the irrigation cycle.

The Toro Company-Irrigation Division can be reached at 909/688-9221, or,

Circle No. 266

No wiring needed for Dayni system

The battery-operated Automatic Sprinkler Control System from Dayni Controls comes in 1 and 5 station controllers. Simple, 2-dial programming is built-in. Solid state quartz reliability eliminates the need for electrical wiring. Users can program long watering cycles for gardens, landscaping and trees, or short watering cycles for flower pots, hanging baskets and greenhouses.

Dayni has a complete line of irrigation products for industrial buildings, highways, parks and agriculture. Contact Dayni Controls at 818/349-8367 and tell them LM informed you, or

Circle No. 267

Crumb rubber puts bounce in turf

Rebound is a patented blend of crumb rubber and organic compost that provides a foundation for safer, high-performance turf. It is designed for use under turf that is routinely subjected to heavy traffic—athletic fields, golf courses and public parks.

Using Rebound in turfgrass reduces soil compaction, reduces turf injury due to traffic, improves drainage and, in general, provides turfgrass with better growing conditions.

A related product is Rebound Turf Dressing, a topdressing made of crumb rubber. Available in a grass-green color, the product is non-abrasive and protects the turfgrass by cushioning and supporting the sensitive turf crown.

For more information about Rebound, contact American Tire Recyclers, Inc. at (800) 741-5201 and tell them you read it in *LANDSCAPE MANAGEMENT*, or,

Circle No. 268

NaturaLawn of America offers fertilizers to golf course market

NaturaLawn of America, a professional lawn care provider, now offers organic-based fertilizers to the golf course industry.

"We have developed natural, organic-based fertilizers that are uniquely different from what is available to the marketplace," says Philip Catron, company president.

Each of the proprietary fertilizer blends contains Ryzin, a homogeneous blend of amendments containing over a dozen natural soil enhancers and organisms which not only help build the soil and feed the turf, but also allow for reduced pesticide use, says Catron.

To learn more about the fertilizers, contact Randy Loeb at (800) 989-5444 and mention LM. Or,

Circle No. 269

Daconil Zn kills algae too

ISK Biosciences Corporation's new Daconil Zn fungicide gives greens superintendents a new preventive option in algae-susceptible situations. Algae (primarily blue-green or cyanobacteria) shows itself often in low-cut areas and can explode in those areas during periods of wet or cloudy weather. Daconil has long been a popular preventive product for many turf diseases, but under an expanded label accepted by the U.S. EPA, Daconil Zn also has been labeled for control of algae. The product is packaged in a convenient flowable formulation. It is effective on a wide spectrum of turf diseases, and because it is a preventive contact product it makes an outstanding resistance management tool, says ISK Biosciences. To learn more about Daconil Zn, contact ISK Biosciences at 216/357-4610 and tell them LM let you know, or



Circle No. 271

This irrigation filter inhibits roots

The Netafim Techfilter is an irrigation filter that protects against roots invading the system. Here's how it works: Trifluflex is incorporated into the replaceable disk ring assembly inside the filter housing. When water passes through the filter, a very low concentration of

trifluralin (ppb) is transmitted throughout the system and effectively inhibits root growth into the dripper outlets. Techfilter is for use only with a Techline system which itself is designed with a physical root barrier. The Trifluflex provides "extra" protection. Contact Netafim Irrigation at 800/777-6541 to learn more about the Techfilter, or

Circle No. 272

Rain Bird controllers with lots of features

Rain Bird Sales, Inc.'s, ESP-LX Plus Series controllers offer four independent programs with four-day cycle modes (day-of-week custom, 1-31 cyclical, odd or even) that accommodate various irrigation requirements, including low volume drip applications.

The ESP-LX Plus offers a program memory that maintains the user's program during power outages in the absence of any battery backup. It ships with a rechargeable NiMH battery that allows the removable panel to be programmed prior to installation. Other features include: event-day-off; water budgeting to 300 percent; rain delay; diagnostic circuitry for skipping shorted stations; station timing from 0-12 hours; master valve/pump start control by station 24 start times (6 per program); and robust surge protection.

It is offered in indoor/outdoor (6, 8, 12, 16, or 24 stations) and indoor-only (8, 12, 16 stations) models.

Contact Rain Bird at 818/963-9311 and tell them that you read about the ESP-LX Plus in *LANDSCAPE MANAGEMENT*, or

Circle No. 270

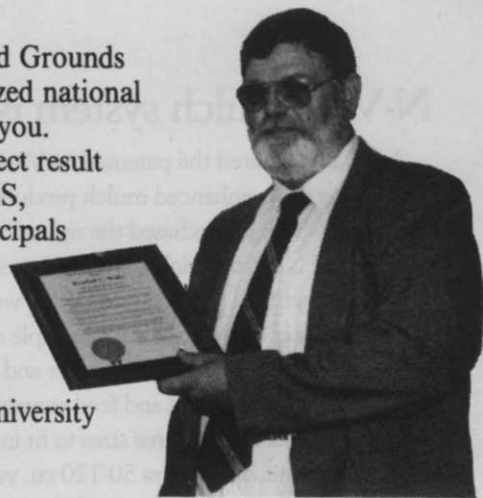


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N-Viro Mulch system is colorful

Morbark acquired the patented N-Viro Mulch system for creating color-enhanced mulch products from shredded wood waste. It purchased the rights from The Craig Group. The N-Viro Mulch Coloring System uses rich, organic pigments to transform shredded wood waste into a premium decorative mulch. The simple system includes a coloring metering system with auger and conveyor, an electric or gas pump stand and feed conveyor with infeed hopper. It is available in three sizes to fit individual applications. The unit can process 50-120 cu. yds. per hour, depending on material. Organic colorants available in red, gold, brown, rose and black. Learn more about the system from Morbark at 517/866-2381, and let them know that LM informed you, or,

Circle No. 273



Drop spreader good for topdressing

The Earth & Turf ET54D drop spreader is an economically priced alternative for topdressing dry flowable materials on greens and lawn. Its ground-driven agitator and drop cylinder applies topdressing in an even spread pattern. Adjustable flow rate gate allows materials to be applied with a uniform depth of $\frac{1}{16}$ - $\frac{3}{4}$ inch. On-the-go engagement/disengagement the spreading mechanism can be done while seated on the pulling unit. Tow-behind unit attaches to small tractors and utility trucks. Spreading system is tolerant of various particle sizes. Jaw clutch design automatically disengages the spreading/agitator mechanisms when unit is pushed in reverse.

Contact Earth & Turf toll free at 888/693-2638, and let them know that LM gave you the word, or,

Circle No. 274

Aeration plus additive equals clear water

The Water Weasel Aquatic Clarifier combines aeration with an environmentally safe additive that is fed to a pond via a metering pump. The additive, combined with aeration and unique mixing, effectively transforms a murky, dirty pond into a crystal clear pool of water. In northern climates, in winter months, the surface turbulence of the Water Weasel keeps much of the pond surface from freezing. To learn more, call Water Weasel Company at 417/866-0235 and mention LANDSCAPE MANAGEMENT, or,

Circle No. 275

